Kemerton silica sand mining proposal

Gwalia Consolidated Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 741
July 1994

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 11 August 1994.

Environmental Impact Assessment (EIA)

Process Timelines in weeks

Date	Timeline commences from receipt of full details of proposal by proponent	Time (weeks)
23 July 1993	Proponent Document Released for Public Comment	
20 September 1993	Public Comment Period Closed	8
7 October 1993	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	2
22 November 1993	Proponent response to the issues raised received	6
2 May 1994	Submission of proponent's vesting proposal	24
28 July 1994	EPA reported to the Minister for the Environment	11

ISBN. 0 7309 5678 1
ISSN. 1030 - 0120
Assessment No. 795

Contents

Figures

Appendices

Summary

The Environmental Protection Authority (EPA) has received a proposal from Gwalia Consolidated Ltd for the development of a silica sand mining operation at Kemerton, approximately 25 kilometres north of the City of Bunbury (figure 1).

The project site is located on private land immediately north of the Kemerton Industrial Park, covering an area of 1,620 hectares. The proponent would exercise an option to purchase the land if the project proceeds, and following the granting of all necessary approvals.

The proposal involves the mining and processing of silica sand at the Kemerton site and transport, by trucking, of the product to the Bunbury Inner Harbour for export. Within the boundary of the private landholding there are nine lakes subject to the provisions of the *Environmental Protection (Swan Coastal Plain Lakes) Policy* (EPP) established in 1992. This policy is aimed at protecting the environmental values of the remaining wetlands on the Swan Coastal Plain from activities which may damage them. The proposed mining activity includes the direct disturbance of two of the EPP wetlands (figure 2).

Aside from the direct disturbance to the two EPP lakes there is a potential for indirect impact on some of the other lakes, particularly EPP lakes 3, 4 and 5, from groundwater fluctuations, particularly drawdown, associated with the mining operation.

The EPA determined that the proposed disturbance of two EPP lakes and the scale of the operation meant that the proposal would be subject to formal assessment by the Authority. The proposal was the subject of a Public Environmental Review including an eight week public review period.

The EPA has recognised the limitations of the EPP for lakes in only protecting the water body, while having no control over land uses in the catchment of the lakes that may cause them to degrade over time. An opportunity existed in the assessment of this proposal to protect, in the long term, both the lakes and a surrounding buffer area.

Negotiations carried out with the proponent resulted in a commitment to an agreement for the vesting of six of the EPP lakes, and the rehabilitated dredge pond, in two stages. Approximately 320 hectares of private land would therefore be vested in the State for conservation.

The proponent has committed to the preparation of an environmental management programme which includes minimising clearing, and the management of construction impacts.

The proponent intends to rehabilitate the disturbed area to a stable landform that would prevent erosion and other forms of land degradation. Dry mined areas would be revegetated and the dredge pond remodelled to form a lake.

The final area of the dredge pond would be approximately 40 hectares. Rehabilitation of wetlands as a specific type of rehabilitation is in its infancy and continuing research into improved methods should be undertaken by the proponent during the 10-year operational life of the project.

The public review period identified the noise and safety impacts from periods of intensive heavy transport as a major issue.

The proponent agreed to change the transport route to alleviate these difficulties and has selected a new transport route (figure 3) which passes through the Kemerton Industrial Park and utilises the access road from the park which is already designed for heavy vehicle entry and exit.

Following the assessment of this proposal, and the modifications and management commitments made by the proponent, the Environmental Protection Authority finds the project to be environmentally acceptable.

Recommendation No.	Summary of recommendations
1	Proposal acceptable subject to vesting of lakes for conservation, the proponent's commitments, and the Authority's conditions.
2	Proponent to prepare and implement an environmental management programme for construction.
3	Proponent to prepare and implement a groundwater monitoring and management programme.
4	Proponent to prepare and implement a rehabilitation plan.

1. Introduction and background

Gwalia Consolidated Limited proposes to develop a silica sand mining operation on private property approximately 25 kilometres north of Bunbury and immediately north of the Kemerton Industrial Park (figure 1).

The proposal was referred to the Environmental Protection Authority by the proponent in March 1993 (Gwalia 1993a). Owing to its impact on two wetlands covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy* (EPP), the EPA determined that the proposal would be subject to formal assessment under Part IV of the *Environmental Protection Act* at the level of Public Environmental Review. The lakes EPP prohibits the unauthorised mining, filling, draining or pollution of lakes nominated in the policy.

There are a number of potential environmental impacts associated with the proposed Kemerton Silica Sand Project. The primary direct impact involves the mining of two wetlands covered by the EPP. Indirect impacts on a number of other lakes are possible if significant groundwater fluctuations were induced by the proposal.

The primary objectives of this assessment were to determine the magnitude of impacts on the long term conservation values of all the EPP lakes within the project area, and the impacts of the mining and associated cartage operations on neighbouring residences.

The project area is spread over 1,620 hectares. The proponent would exercise an option to purchase the land if the project proceeds, and following grant of all necessary approvals (Gwalia 1993b).

2. Summary description of proposal

The proposal involves the excavation of silica sand from the site using a combination of dry and dredge mining methods. Dry mining would be used on elevated dunes utilising a front-end loader. Dry mining would be the initial operation and would continue throughout the life of the project in conjunction with dredge mining. Dredge mining would commence in the first year of the operation and would re-mine areas that were previously dry mined (Gwalia 1993b).

Dredge mining would proceed at an average rate of three to four hectares per year to a maximum depth of 15 metres. The maximum depth of ore extraction below the water table is defined by the design of the dredge, therefore dewatering should not be necessary. The operation is expected to last at least 10 years, however on-going exploration has the potential to increase the mine life.

Ore would be delivered as a slurry to the processing plant located to the west of the dredge pond, as shown in figure 2. Processing, involving wet separation, milling and screening would be used to produce a silica sand product. No chemicals would be used in the treatment process except for the possible addition of a non-hazardous and degradable flocculent to enhance settling of the clay tailings.

The clay slurry produced during processing would be pumped to a dedicated tailings settling pond situated in a natural depression on the property to the west of the processing plant. A weir would be used to recover supernatant water for return to the processing plant or the dredge pond. Supplementary water for processing would be obtained from the local groundwater aquifer using production bores.

The processing plant would require a Works Approval and Licence under Part V of the Environmental Protection Act.

The silica sand product would be transported by road to the Bunbury Inner Harbour for export. The transport route is shown in figure 3. Owing to the lack of storage facilities at the port and the high cost of establishing new facilities, it is proposed to use campaign trucking to transport

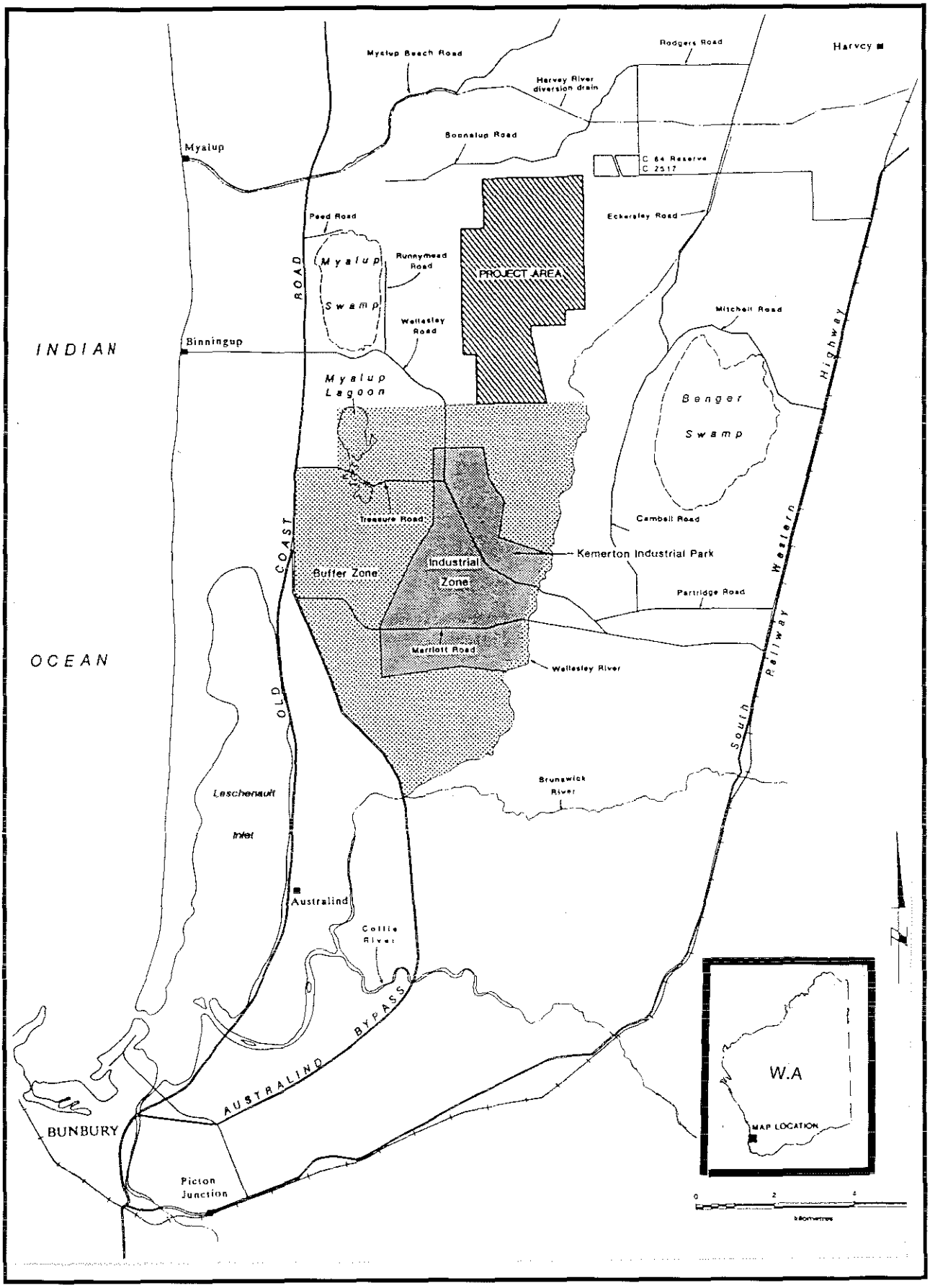


Figure 1. Location of Kemerton Silica Sand Project (Adapted from PER Gwalia 1993b)).

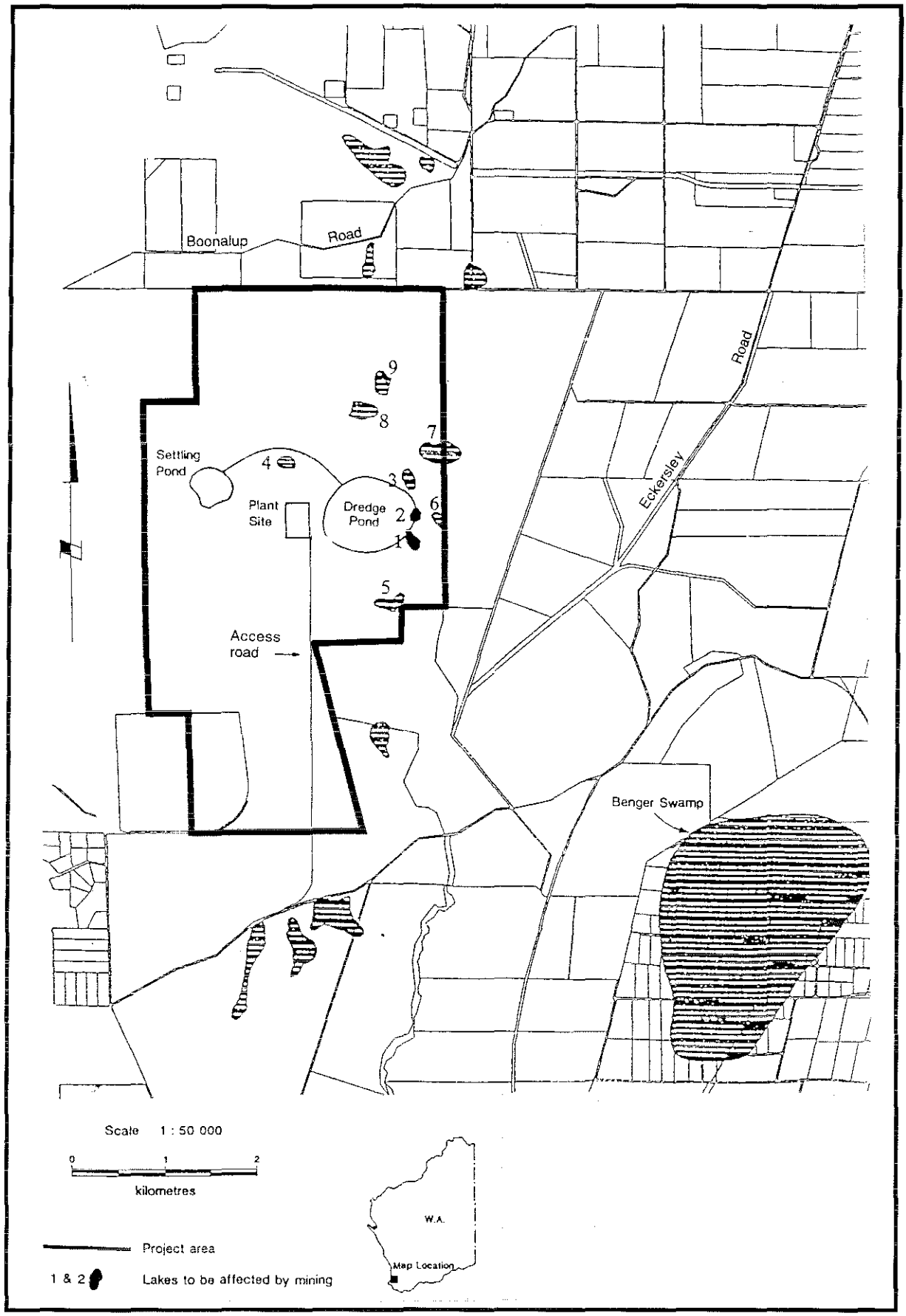


Figure 2. Location of EPP lakes (Adapted from PER (Gwalia 1993b)).

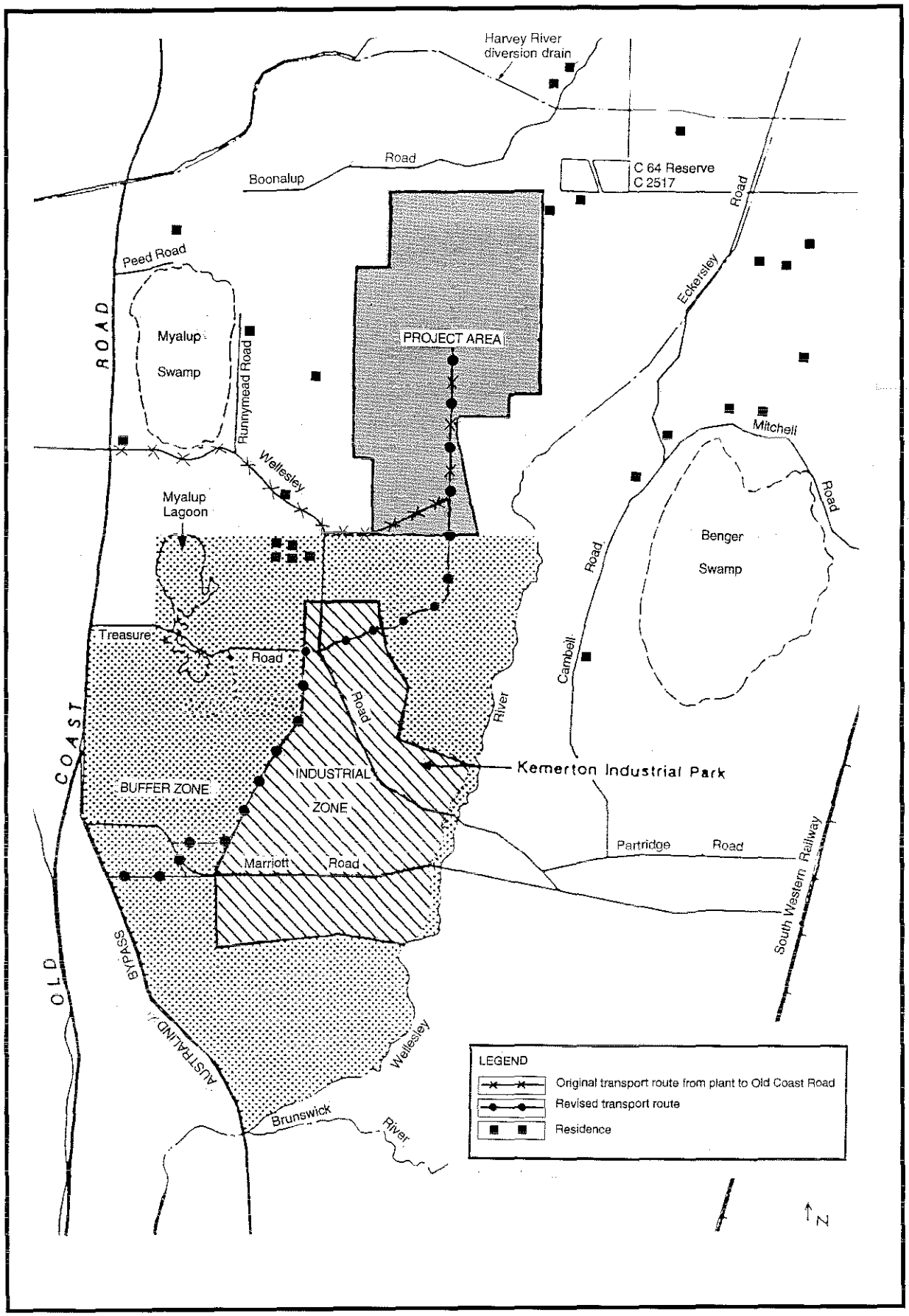


Figure 3. Location of revised transport route (Adapted from PER Gwalia 1993b)).

the sand. Campaign trucking would initially be at a rate of 200,000 tonnes per annum. This would involve ten campaigns a year, each of two days duration on a 24 hour a day basis. When the operation expands to the proposed production capacity of 840,000 tonnes per annum, 21 campaigns of four days duration would be used 24 hours a day.

In response to submissions made during the public review period, the proponent agreed to relocate the proposed transport route. Public concerns were expressed over the close proximity of residences to the original route and the resulting noise impacts. The intensive nature of the trucking operation was recognised as a potential safety hazard given the volume of tourist traffic in the area during summer, and the poor condition of the proposed roads, including the intersection where trucks would have entered Old Coast Road.

The new transport route from the project area to the Australind Bypass is within the project area, the Kemerton Industrial Park, and the buffer zone for the park, thereby avoiding local residences. The entrance point from Marriott Road to the Australind Bypass has already been designed for large vehicles to safely merge with other traffic.

3. Environmental impact assessment method

The environmental impact assessment for this proposal followed the Authority's administrative procedures (EPA 1993) as shown in the flow chart in appendix 1.

The PER was released for an eight week public review period from 23 July 1993 to 20 September 1993. A total of 33 written submissions were received on the proposal from members of the public and State and local government organisations. The summary of submissions and the proponent's response to those submissions appears in appendix 2, and a list of submissions appears as appendix 3. The proponent's revised commitments following the response to submissions appears in appendix 4.

The main issues identified from the public review and the EPA's assessment are as follows:

- impact of the proposal on wetlands at the site, particularly those wetlands covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy* (1992);
- noise impacts and safety considerations from product transport to Bunbury;
- impact of construction activities;
- spread of dieback disease; and
- rehabilitation.

In addition to following the administrative procedures, Department of Environmental Protection officers undertook the following activities:

Date	Activity	Outcome/issues discussed
30 August 1993	Site visit.	Familiarisation with site.
10 November 1993	Assessment of management category of two wetlands by DEP officers.	Wetlands evaluated as category C (Conservation).
16 November 1993	Meeting with proponent and consultant.	Mining of two EPP lakes unlikely to be acceptable without overall environmental gain. Suggestion to cede six of the lakes prior to the project proceeding.

November 1993	Meeting with consultant and proponent.	Explained concerns outlined in public submissions and those from key government agencies. Proponent presented alternatives for transport route.
November 1993	Wetlands evaluated by V & C Semeniuk Research Group.	Lakes and associated wetland areas are of high conservation value, on both a local and regional basis.
10 February 1994	Gwalia presentation to the EPA.	Proposal made to vest land containing eight wetlands in two stages with an appropriate State authority.
11 March 1994	Meeting of DEP staff with National Parks and Nature Conservation Authority (NPNCA).	Vesting proposal presented to NPNCA members.
2 May 1994	Correspondence with EPA.	Gwalia presentation of written vesting proposal to the Chairman.

The proponent also undertook considerable consultation with local landowners to address their concerns raised during the public review, including a number of meetings with the Binningup Community Group.

Limitation

This evaluation has been performed using information currently available. The information has been provided by the proponent through preparation of the Public Environmental Review (in response to guidelines issued by the Department of Environmental Protection), by Department of Environmental Protection officers utilising their own expertise and reference material, by utilising expertise and information from other State Government agencies, and by contributions from independent consultants and Environmental Protection Authority members.

The Environmental Protection Authority recognises that further studies and research may affect the conclusions. Accordingly, the Environmental Protection Authority considers that 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 Environmental Protection Authority.

4. Evaluation

4.1 Conservation significance of EPP Lakes and Wetlands

4.1.1 Objective

To determine the likely impact of silica sand mining and processing on the conservation values of EPP wetlands within the project area, and to evaluate whether the proposed vesting, mining, and rehabilitation of the lakes will achieve the intent of the EPP; that is the maintenance of genetic diversity and conservation significance of lakes on the Swan Coastal Plain.

4.1.2 Evaluation framework

Technical information

The project area is situated on the Swan Coastal Plain within the eastern part of the Bassendean dune system. The area is characterised by a high water table, generally within one metre and often above the land surface, forming wetlands. Regionally, the wetlands belong to the Jandakot Suite and are the only occurrence of this suite south of the type area at Jandakot (Semeniuk unpub.). Most wetlands of this type are in agricultural or pastoral settings, surrounded by cleared land and receiving nutrient enriched runoff from adjacent land uses. The impacts of nearby land uses on water quality has contributed to wetland degradation. These wetlands have also been degraded by off-road vehicular use, fires, feral animals, weeds, rubbish disposal and contamination (EPA 1992).

The Kemerton wetlands are some of the few remaining wetlands of the Jandakot suite of the southern Swan Coastal Plain system which are not in an agricultural setting. They are in relatively good condition, with little weed invasion and are surrounded by rich and diverse native vegetation (Semeniuk unpub.).

The vegetation on the private property has been mapped by Mattiske (1993) and is dominated by the following plant communities:

- Upper slope Open Woodland dominated by *Eucalyptus marginata-Banksia* spp. and *Kunzea ericifolia* over *Stirlingia latifolia* and mixed shrubs over *Dasypogon bromeliifolius.*
- Lower slope Open Woodland of *Eucalyptus marginata-Banksia* spp. and *Kunzea ericifolia* over *Melaleuca thymoides, Calytrix fraseri* and mixed shrubs.
- Low Closed Heath of *Pericalymma ellipticum* and *Hypocalymma angustifolium* over mixed shrubs and mixed sedges, with occasional emergent trees.
- Closed Heath of *Astartea fascicularis, Calothamnus lateralis* and *Cassytha racemosa* over mixed sedges.

On the basis of this study, the diversity of floristic and structural components of the less disturbed areas warrant protection from the effects of any mining or exploration activities (Mattiske 1993).

Mattiske (1993) has highlighted the regional importance of many of the plant communities, particularly those in wetland areas. Widespread clearing has resulted in the lack of representation of these communities elsewhere in the region, necessitating the protection of wetland areas and the minimisation of activities which are likely to impact upon these plant communities within the proposal.

The property has a history of attempted use for agriculture, including stock grazing, brush cutting and a pine timber plantation. On-site inspections found that the vegetation has recovered well from these activities and shows little evidence of weed invasion.

Fauna surveys by Ninox Wildlife Consulting (1994) showed the site is not exceptionally rich in native mammals, frogs or reptiles. No rare species were recorded during fauna surveys.

Existing policy framework

Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992

Since European settlement, more than two thirds of the lakes on the Swan Coastal Plain have been destroyed or severely degraded (EPA 1992). This has lead to the implementation of a policy to ensure the remaining wetlands on the Swan Coastal Plain have some protection from activities which may cause their destruction or degradation.

The policy, referred to as the Environmental Protection (Swan Coastal Plain Lakes) Policy, was proclaimed following extensive consultation with community groups, and private land holders.

The Lakes EPP prohibits unauthorised filling, mining, drainage or effluent discharge into nominated lakes. Lakes listed in this policy have the highest level of protection under the Environmental Protection Act and there is a presumption against approving developments that are likely to breach the intent of the policy; that is, the maintenance of genetic diversity within the wetlands in the policy area. Authorisation under the Environmental Protection Act to disturb an EPP lake, generally requires the approval of the Minister for the Environment, on advice from the Environmental Protection Authority, after a proposal has been assessed.

Comments from and negotiations with key government agencies

The Department of Conservation and Land Management provided advice indicating that there is a good prospect of the proponent replacing to an adequate level, and in some cases enhancing, wetland functions through the proposal. CALM also commented that planning overall land uses for the whole site at the start of the project would aid the long term conservation of the lakes by ensuring compatibility in the rehabilitation prescriptions applied.

Public submissions

A number of submissions commented that wetlands are scarce in the Kemerton area and that the total impact of the proposal on the area would be much greater than direct impacts on two wetlands.

The Conservation Council responded that it does not support the mining of any listed wetlands, nor the clearing of remnant native vegetation on the site. If mining was permitted the Conservation Council submitted that some of the land should be vested with the NPNCA. The council was also concerned about the impacts of traffic, mining , clearing, and light spill on flora and fauna, and for these reasons believed that the wetland area not directly affected by the proposal should be excised from the property before mining commences. This would ensure that their conservation values were protected.

4.1.3 Evaluation

The EPA has recognised the limitations of the EPP for lakes, in protecting only the water body while having little control over land uses in the surrounding catchment. These adjacent land uses may degrade the lakes over time. An opportunity existed in the assessment of this proposal to provide long term protection for a number of the EPP lakes by providing a protected buffer area to distance them from other land uses. The provision of an adequate buffer in protecting water quality will become increasingly important with the Shire of Harvey's proposal to subdivide areas near Kemerton for rural-residential purposes as part of Special Rural Area No. 8 (Shire of Harvey 1993, pers. comm., 31 August). These land uses can typically export large amounts of nutrients.

The EPA considered that it could not recommend that the disturbance of two EPP lakes was acceptable unless there was a long term net benefit to the conservation estate. This necessitated discussion with the proponent during the assessment process to develop a mechanism to ensure long term protection of a significant number of EPP lakes. To provide this benefit, the proponent has committed to a two stage vesting of portions of the property containing the EPP lakes with the State for the purpose of conservation [(Gwalia 1994, pers. comm., 2 May) see appendix 5].

Stage 1 would involve vesting six of the EPP lakes not directly affected by the proposal once the project is approved. The lakes are proposed for vesting in the National Parks and Nature Conservation Authority and management by the Department of Conservation and Land Management. Stage 2 would occur following the completion of mining in approximately 10 years. The dredge pond would be rehabilitated to the satisfaction of EPA and CALM and this area would be similarly vested. EPP lake 4 is outside the area to be vested, however, the proponent has stated that the lake would be fenced to prevent inadvertent entry (Gwalia 1993b).

As the long term protection of the EPP lakes outside the area of the dredge pond is essential to the proposal being environmentally acceptable, the vesting of six of the EPP lakes and fencing of the seventh should occur prior to the commencement of construction at the site. There is also a need to minimise the disturbance of native vegetation during construction and for careful siting of infrastructure. The proponent has committed to preparing an environmental management programme which will achieve these aims.

Recommendation 2

The Environmental Protection Authority recommends that, prior to the commencement of any clearing, the proponent shall prepare an environmental management programme for the protection of the conservation values of native vegetation at the site. The Environmental Management Programme should be prepared for approval by the Environmental Protection Authority, on the advice of the Department of Conservation and Land Management.

4.2 Groundwater changes

4.2.1 Objective

There is a potential for indirect impact on the wetlands within the project area, especially EPP lakes 3, 4 and 5 if significant groundwater changes, particularly drawdown, are associated with the mining operation. Such impacts could affect the function and the value of the wetlands, and may therefore conflict with the intent of the EPP. Such impacts should be prevented.

4.2.2 Evaluation framework

Technical information

Groundwater modelling of drawdown carried out for the proponent predicts that the drawdown on any of the EPP lakes would be less than one and a half metres (Dames and Moore 1993). The proponent has undertaken to monitor the water level and vegetation in sensitive wetland areas and to take remedial action, such as adding water to the wetlands, should monitoring indicate it is necessary (see appendix 4). As the impacts of groundwater drawdown on the biology of the wetlands is unknown at this time, a monitoring and management programme is required to ensure significant impacts do not occur. Criteria for defining significant impacts should be developed as part of the Environmental Management Programme in consultation with the Department of Environmental Protection. Maintaining a stable water table at an appropriate level in the dredge pond, consistent with that for an isolated wetland, could provide protection of the water level regime for those EPP lakes in close proximity to the dredge pond (EPP lakes 3, 4 and 5)

The proponent plans to construct a borefield to the west of the processing plant to provide supplementary water for processing. The bores would pump water from the superficial aquifer. The expected maximum net water requirement for the project is 2 900 kilolitres per day. The groundwater throughflow in the superficial aquifer beneath the property is estimated at between 3 200 and 11 200 kilolitres per day (see appendix 2).

The proponent also proposes to discharge tailings slurry into a dam at a higher point in the landscape, west from EPP lake 4. This is likely to result in a localised increase in the groundwater level.

Existing policy framework

The Environmental Protection (Swan Coastal Plain Lakes) Policy aims to provide for a diversity of habitat types and maintenance of water quality in lakes on the Swan Coastal Plain. If less water is available in the landscape to support wetland vegetation, thereby affecting wildlife, it would be inconsistent with the intent of the EPP.

Comments from and negotiations with key government agencies

The Water Authority of Western Australia made a number of comments on the PER including that the depth to the underlying Leederville Formation and the potential to affect the recharge to this aquifer needed to be considered, and that more thorough investigations of the groundwater resources and systems should have been carried out.

Public submissions

Members of the public submitted that the PER had failed to adequately predict groundwater changes through scientific modelling. A number of respondents also felt that the document lacked safeguards for the protection of wetland systems close to proposed mining areas.

4.2.3 Evaluation

The proponent has committed to a substantial groundwater monitoring programme in accordance with WAWA recommendations. The effect of the groundwater abstraction on recharge to the Leederville Formation is not expected to be significant, particularly on a regional scale (see appendix 2). Consultation by the proponent with WAWA in response to their submission suggests that the impact of the project on groundwater salinity through evapoconcentration in the dredge pond, should be small and acceptable, and that downstream effects as a consequence of this are unlikely to be noticeable.

The proponents proposal for future groundwater and wetland monitoring should ensure that the water balance of lakes closest to the dredge pond will be maintained throughout the life of the project, thereby maintaining the wetlands, their associated vegetation, and wildlife (see appendix 4).

Groundwater and wetland monitoring and management should also ensure that excessive groundwater rise does not occur as a result of tailings deposition. A significant rise in the water table could adversely affect some wetland vegetation due to periods of prolonged flooding.

Recommendation 3

The Environmental Protection Authority recommends that, prior to installing the borefield or commencing dredging operations, the proponent prepare, in consultation with the Water Authority of Western Australia, a groundwater monitoring and management plan as part of the Environmental Management Programme to protect the conservation values of EPP lakes within the project area. Groundwater changes attributable to the proposal shall not adversely impact upon adjacent EPP lakes.

4.3 Construction impacts

4.3.1 Objective

To determine, and adequately manage, the likely extent of construction impacts on the existing environment, particularly on fauna habitats and the displacement of fauna, and rare flora; and whether these impacts can be adequately managed throughout the construction period, such that the conservation significance of native vegetation is maintained.

4.3.2 Evaluation framework

Technical information

The potential for environmental impact is at its greatest during the construction phase of most mining developments when vegetation is cleared. This can be complicated by difficulties in accurately predicting the range or extent of environmental impacts at the project planning stage. No rare flora or fauna were identified in the PER at sites planned for disturbance by mining or construction. Construction is planned on an upland site which is typical of the area. The habitat type would be represented in the area to be vested in Stage 1.

To date the proposed management of construction impacts have not been adequately determined by the proponent.

Comments from and negotiations with key government agencies

CALM responded that the four species of priority flora so far identified in the locality have not been found in areas subject to mining or infrastructure construction.

Public submissions

Public submissions expressed concern about inadequate consideration of noise impacts, during construction of the plant site, as well as during mine operations. Specific comments were raised on the inappropriateness of the background monitoring programme as no noise monitoring was undertaken during calm conditions (wind speeds less than 11 kilometres per hour). These conditions are common in the area, particularly at night during summer.

4.3.3 Evaluation

In order to manage construction impacts, an environmental management programme is needed, covering the range of identified impacts and setting out in some detail how they would be managed. The proponent has recognised the importance of such a document and has committed to its preparation prior to construction (Gwalia 1993a).

The specific Environmental Management Programme would cover a range of issues including:

- minimising clearing;
- salvage of topsoil;
- fire management; and
- forest hygiene.

The EPA and CALM should be involved in the preparation of the document consistent with Recommendation 2.

Operations during the construction period are required to comply with the requirements for pollution prevention under the Environmental Protection Act, with regard to both noise and dust control.

The proponent has committed to manage both noise and dust impacts (see appendix 4) throughout its operation.

Noise emissions from equipment that do not comply with standards are considered an offence. The Environmental Protection Authority considers that it would be appropriate for the proponent to maintain a noise level of 40 dB(A) for the period from 10 pm to 7 am. This level is considered adequate to manage the noise issue consistent with standard practice. The proponent is confident that a limit of 35 dB L_A can be met at all existing residences at all times.

4.4 Transport route

4.4.1 Objective

To determine and adequately manage the impacts, with regard to noise and safety, of the proposed trucking transport route, on local residents, and other road users.

4.4.2 Evaluation framework

Technical information

The processed silica sand is to be transported by road from the Kemerton minesite to the Bunbury Inner Harbour for export. As discussed in section 2, due to limited product storage facilities at the port, transport will involve an intensive period of campaign trucking; initially involving a 24-hour operation over two days, 10 times per year. When the operation reaches its proposed production capacity, trucking campaigns will increase to 21 campaigns of four days duration.

The original transport route as described in the PER utilised Wellesley Road as the access to the Old Coast Road, as shown in figure 3. This figure also shows the location of private residences in the vicinity of the project area.

Main Roads Western Australia guidelines were applied to assess the impacts of transport noise on neighbouring properties, and the PER proposed that a limit of 63 dB L_{A10} was acceptable, on an hourly basis. This limit was not considered acceptable by experienced noise pollution officers at the Department of Environmental Protection. 63 dB L_{A10} is the upper limit of acceptability for the 18-hour period from 6am to midnight. Between midnight and 6am lower levels are required if sleep disturbance is to be avoided. Maximum noise levels of approximately 55 dB L_A are required to ensure that only a small proportion of residents are disturbed at night.

Comments from and negotiations with key government agencies

The Shire of Dardanup expressed concern at the proposed increase in heavy transport on the single carriage-way along Wellesley Road to Old Coast Road, and recognised that a 24-hour transport operation with a truck separation of seven minutes would present a hazardous situation to other road users, particularly during the tourist season.

The Shire of Harvey requested that the proponent report on the impacts that the mine site, and in particular the trucking route, might have on the future Special Rural Area No. 8. In view of the proposed mining development, council plan to amend the boundaries of the policy area to exclude any potential for subdivision within the project site. The shire also requested a commitment from the proponent that they would suitably upgrade roads and certain intersections along the transport route.

The intersection of Wellesley Road and Old Coast Road was identified as a potential problem area by MRWA. Increases in the volume of turning traffic, during trucking periods, would increase conflicts with through traffic and traffic turning in to and out of Binningup Road. This has the potential to result in an increased number of accidents. This intersection would require upgrading prior to frequent use by heavy vehicle traffic, although it may not be feasible for the proponent to upgrade other roads due to MRWA's future plans for roadworks in the area. However these upgrades are not likely to be completed prior to the commencement of operations, although they may be substantially completed by the end of the project life.

Public submissions

The proposed transport route generated the greatest response in submissions from the public. A large number of the submissions expressed concern at the noise impact on residents living near Wellesley Road and the potential safety hazard from increases in the amount of heavy vehicle traffic, particularly at the Wellesley Road intersection with Old Coast Road.

Safety issues raised during the public review period included:

- the risks to heavy tourist traffic already travelling along Old Coast Road;
- heavy trucks and light passenger vehicles consistently sharing the same road;
- the hazardous intersection at the entry point of Wellesley Road to Old Coast Road. This intersection is already considered dangerous, and residents expressed concerns at road-trains entering Old Coast Road at an intersection without an adequate sliproad, and later re-entering across south bound traffic on return from Bunbury Port. This intersection is the only access road available to local Binningup traffic; and
- Wellesley Road is a school bus route.

Six submissions recommended that an alternative route be sought through the Kemerton area, utilising roads specifically designed and intended for use by heavy vehicles. The entry point from Marriott Road onto Australind Bypass would be at a 'tee' junction which already has an extended and established sliproad.

Some submissions also stated that the expected noise impacts from the campaign trucking operation were unacceptable.

4.4.3 Evaluation

In response to community concerns, and in consultation with community organisations, the proponent agreed to change the transport route. The proposed new transport route is included in figure 3. The new route passes through the Kemerton Industrial Park, avoiding the nearest residences, and utilises the access road from the park which is designed for heavy vehicle entry and exit with the provision of slip lanes.

The relocation of the transport route should ensure that fewer residents are effected by excessive noise impacts as a result of the trucking operation. Additionally, the proponent has determined that truck speeds will be monitored and adjusted to ensure that a maximum noise level of 55 dB L_A is maintained between midnight and 6am (see appendix 2).

The proponent's response to issues raised during the public review period, and consultation with the community resulted in substantial modifications to the chosen transport route. Through the assessment process applied to this project, an alternative was reached that is both socially and environmentally acceptable. The new route minimises the potential noise and safety impacts for residences in the Kemerton area. Accordingly, the expected noise and safety impacts arising from the transport of materials have been found environmentally acceptable.

4.5 Dieback

4.5.1 Objective

To determine the potential for dieback infection to spread as a result of the earth moving, trucking, and land clearing operations detailed in this proposal. To ascertain whether the issue of dieback presence or absence, and proposed control measures have been adequately addressed by the proponent.

4.5.2 Evaluation framework

Technical information

The presence of dieback disease, caused by *Phytophthora* species, appears likely at the site, although no testing has been carried out to date. Soil movement and handling procedures exist which can maintain the dieback hygiene status of the site, and which can be implemented as part of the daily mining and transport operations.

Comments from and negotiations with key government agencies

CALM responded that the proponent's dieback commitment is appropriate, and that a survey of the whole site to assess the existing situation and the risk of dieback spread is desirable. Any increase in the risk of dieback spread in the area could have important implications for both terrestrial and wetland birds as the banksia woodland, which can be a significant bird habitat, could become affected by dieback.

Public submissions

Five public submissions contained concerns regarding the potential for mining to spread dieback around the site, making it difficult to re-establish native vegetation. Some respondents also felt that a proper survey of the presence/absence and extent of dieback should have been conducted by the proponent and the results included in the PER, and that a definite plan for dieback control and the rehabilitation and management of the affected area is still required.

4.5.3 Evaluation

Prior to construction at the site it is important that surveys to identify the locations and extent of dieback infection are carried out, and appropriate hygiene measures implemented. The proponent has made a commitment to undertake this work (commitment No. 5). CALM's advice will be sought in the development of those plans, which should be included in the Environmental Management Programme. The Environmental Protection Authority considers that this is adequate for environmental protection purposes.

4.6 Rehabilitation

4.6.1 Objective

To determine if the proposed rehabilitation of the affected areas will re-establish and maintain significant conservation values in the project area.

4.6.2 Evaluation framework

Technical information

The proponent intends to rehabilitate the disturbed area to a stable landform that would prevent erosion and other forms of land degradation. Dry mined areas would be revegetated and the dredge pond remodelled to form a lake. It is intended that topsoil taken from disturbed areas would be salvaged and stockpiled for subsequent use in rehabilitation. For the dry mining areas it is proposed that the dried clay from the tailings pond be blended into the sandy soils to improve the soil water and nutrient holding capacity (Gwalia 1993b).

The final area of the dredge pond would be approximately 40 hectares. After completion of the project, the proponent intends to rehabilitate the dredge pond to function as a waterbird habitat.

Rehabilitation would include the creation of shallows and possibly islands, and planting of appropriate fringing vegetation.

Public submissions

A number of submissions indicated that the long term rehabilitation procedures proposed for the operation should have been incorporated in the original document, and that the rehabilitation plans that were included in the PER were not detailed enough to guarantee that an ecosystem at least equal to the current one would exist following the termination of mining.

4.6.3 Evaluation

Rehabilitation measures for the project area are at this stage conceptual. After the commencement of mining, the proponent would have a better understanding of the conditions at the site, which would allow the formulation of a detailed rehabilitation plan.

Rehabilitation of wetlands, as a specific type of rehabilitation, is in its infancy and continuing research into improved methods should be undertaken by the proponent during the ten year operational life of the project.

Recommendation 4

The Environmental Protection Authority recommends that within 12 months of any approvals pursuant to the Environmental Protection Act for the proposal to proceed, the proponent prepare and subsequently implement a rolling rehabilitation plan as part of the Environmental Management Programme required in Recommendation 2. The plan should be prepared in consultation with the Department of Environmental Protection and the Department of Conservation and Land Management. The plan should include a research component, draft completion criteria and a monitoring component to determine its effectiveness, and be reviewed and reported on annually.

5. Discussion and synthesis

In its consideration of the net environmental impacts and benefits of this proposal, the EPA took account of the fact that there were nine EPP lakes of conservation significance on the private property, comprising a system of lakes and associated damplands, which were held by one owner. The EPA notes that public submissions urged the vesting of the EPP lakes and their surroundings in the State. The EPA and the proponent discussed an agreement to conserve a majority of the system of EPP lakes in the long term, while also allowing disturbance through mining of a small part of that system. The EPA considers that, in this instance, the long term protection afforded by the vesting of the six EPP lakes in the conservation estate adequately compensates for the loss of the two EPP lakes which would be mined.

Aside from the direct disturbance to the two EPP lakes, there is a potential for indirect impact on some of the other lakes, particularly EPP lakes 3, 4 and 5, from groundwater changes, particularly drawdown, associated with the mining operation. The EPA considers there should be no significant change to the water table which may lead to degradation of the EPP lakes. Management measures, including maintaining a stable water level in the dredge pond, are required to ensure such impacts do not occur. The proponent has undertaken to monitor the water level and vegetation in sensitive wetland areas and to take remedial action should monitoring indicate it is necessary (see appendix 4).

In response to community concerns, and the likelihood of excessive noise as a result of campaign trucking, the proponent has investigated alternative transport options to direct heavy traffic away from residents in close proximity to the project area. The revised transport route would minimise noise impacts and safety hazards on local residents.

There is also a need to minimise disturbance to the relatively pristine woodland vegetation at the site during the construction phase, and to carefully site infrastructure. The proponent has committed to preparing an environmental management programme which includes minimising clearing.

6. Conclusions and recommendations

Following consideration of the PER, submissions on the proposal and the proponent's response to them, the EPA considers that the potential environmental impacts of the proposal are manageable.

In reaching this conclusion, the EPA recognised the importance of protecting the system of wetlands covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy*, however, it was considered that the mining and subsequent rehabilitation of two of the EPP lakes was outweighed by the benefit of gaining long term protection for the majority of the system comprising six of the other EPP lakes, and associated buffer, by having them vested in the State for the purpose of conservation.

Throughout this assessment, and in response to each of the issues raised, the proponent has maintained the initiative in modifying the proposal to minimise its potential environmental impacts. The proponent's willingness to favourably respond to community concerns, and to secure the conservation importance of a significant number of EPP lakes and their surroundings is to be commended. The EPA considers that, in this instance, the long term protection afforded by the vesting of the six EPP lakes in the conservation estate adequately compensates for the loss of the two EPP lakes which would be mined.

Recommendation 1

The Environmental Protection Authority has concluded that the proposal by Gwalia Consolidated Ltd for the Kemerton Silica Sand Project is environmentally acceptable subject to the following key points:

- **a limitation of mining to the two nominated EPP lakes;**
- **a binding agreement to be reached between the proponent and the Minister for the Environment, in relation to vesting of the six specified lakes and their surroundings in accordance with the principles contained in Appendices 4 and 5;**
- **rehabilitation of the resultant dredge pond being subject to an agreed environmental management programme and subsequent vesting; and**
- **adoption of the revised transport route.**

Accordingly, the Environmental Protection Authority recommends that the proposal could proceed subject to:

- **the Environmental Protection Authority's recommendations in this Assessment Report (Recommended Environmental Conditions are listed in Section 7); and**
- **the proponents commitments (See Appendix 4).**

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 the recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate for the Kemerton Silica Sand Project:

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 made in the Public Environmental Review, and in response to issues raised following public submissions; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement. These commitments are consolidated in Environmental Protection Authority Bulletin 741 as Appendix 4. (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 Vesting

The proponent should complete the vesting of Stage 1, including the six lakes on the eastern half of the project area that are covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy (1992),* before construction begins on the site, and the vesting of Stage 2 at the completion of mining and rehabilitation of the area specified in the Public Environmental Review.

3-1 Prior to construction, the proponent shall complete the vesting of the Stage 1 area comprising the six lakes covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy (1992)* and associated buffer. (See figure attached.)

3-2 Within six months of the completion of mining of the area outlined in the Public Environmental Review, the proponent shall have substantially initiated the vesting of Stage 2 land. (See figure attached.)

4 Protection of Remnant Vegetation

4-1 The proponent shall protect remnant vegetation on the property, outside the area to be mined, from indirect impacts of the construction and mining operations of the project.

4-2 Prior to construction, to achieve the objectives of condition 4-1, the proponent shall prepare, in consultation with the Department of Conservation and Land Management, an environmental management programme to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

4-3 The proponent shall implement the Environmental Management Programme required by condition 4-2, to achieve the objectives of condition 4-1.

5 Wetlands

The protection of those unmined lakes in the project area covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy (1992)* from impacts associated with the project is critical.

5-1 Prior to installation of the borefield and commencement of the dredging operation, the proponent shall prepare, in consultation with the Water Authority of Western Australia, a groundwater monitoring and management programme to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

5-2 The proponent shall implement the groundwater monitoring and management programme required by condition 5-1.

5-3 The proponent shall not engage in dewatering, for the purpose of increasing the depth of material available for mining.

6 Rehabilitation

6-1 The proponent shall rehabilitate the project area to a standard of rehabilitation that is consistent with the conservation values of the area to be vested for Stage 1.

6-2 Within 12 months of the commencement of mining, the proponent shall prepare a rehabilitation plan for the site, to the requirements of the Environmental Protection Authority on advice of the Department of Conservation and Land Management. This plan shall include draft completion criteria and a monitoring component to determine its effectiveness, and shall be reviewed and reported on annually.

6-3 The proponent shall implement the rehabilitation plan required by condition 6-2.

7 Decommissioning

7-1 The proponent shall satisfactorily decommission the project, remove the plant and installations, and achieve the final rehabilitation of the site and its environs.

7-2 At least six months prior to decommissioning, the proponent shall prepare a decommissioning and final rehabilitation plan.

7-3 The proponent shall implement the plan required by condition 7-2.

8 Proponent

These conditions legally apply to the nominated proponent.

8-1 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.

9 Time Limit on Approval

The environmental approval for the proposal is limited.

9-1 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.)

10 Compliance Auditing

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

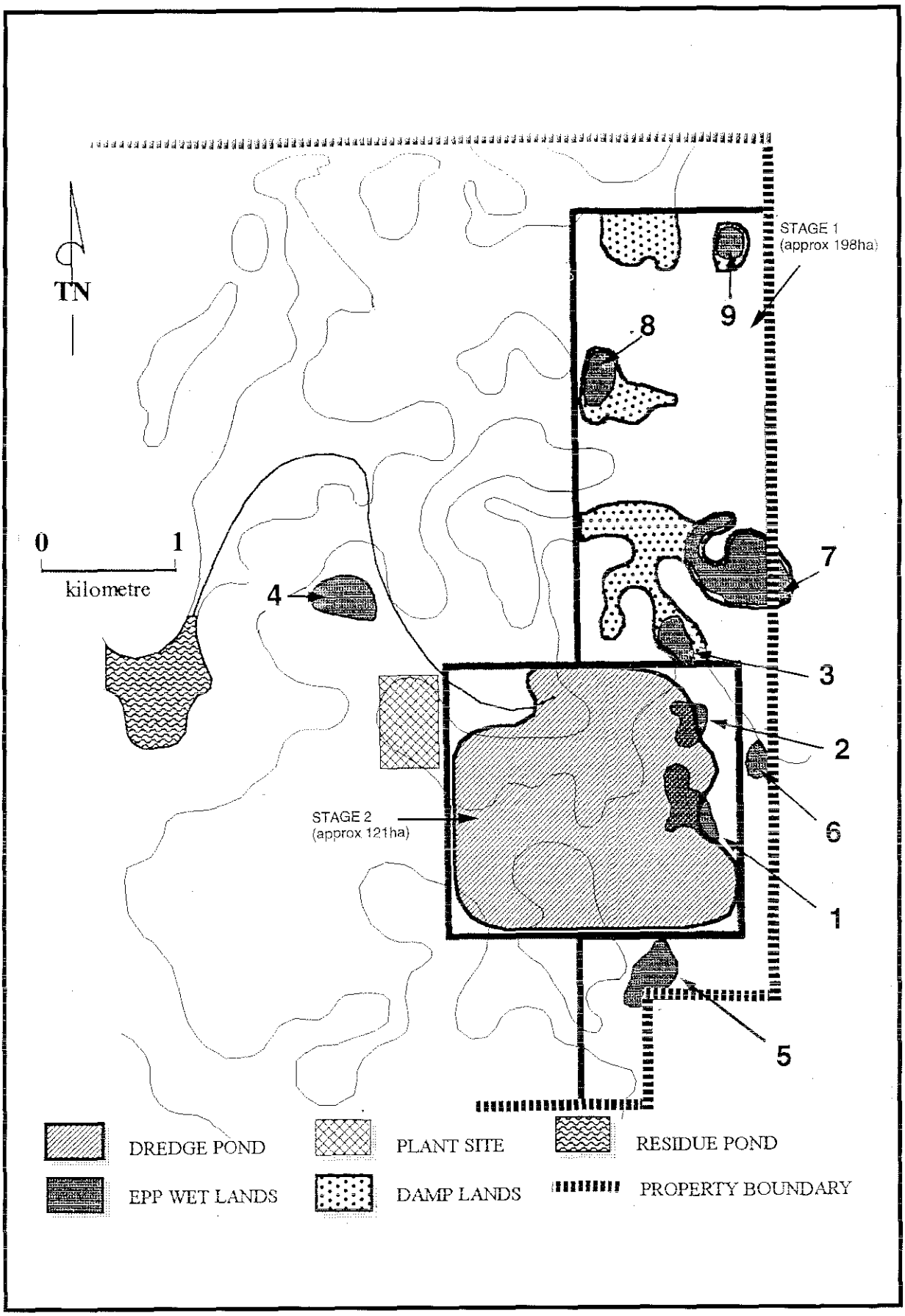
10-1 To help verify environmental performance, the proponent shall prepare periodic progress and compliance reports, in consultation with the Environmental Protection Authority.

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.

The proponent will be required to apply for a Works Approval and Licence for this project under the provisions of Part V of the Environmental Protection Act.


TN
0
1
kilometre
STAGE 1
(approx 198ha)
STAGE 2
(approx 121ha)
1
2
3
4
5
6
7
8
9
DREDGE POND
PLANT SITE
RESIDUE POND
EPP WET LANDS
DAMP LANDS
PROPERTY BOUNDARY

8. References

Dames and Moore 1993, *Hydrogeological and Geotechnical Study, Kemerton Silica Sand Project.* Report for Gwalia Consolidated Ltd, Dames and Moore, Perth.

E M Mattiske and Associates 1993, *Gwalia Consolidated Limited - Kemerton Sand Project, Updated Flora and Vegetation Report.* Report for John Consulting Services, E M Mattiske and Associates, Perth.

Environmental Protection Authority 1992, *Environmental Protection (Swan Coastal Plain Lakes) Policy (1992),* Environmental Protection Authority, Perth.

Environmental Protection Authority 1993, *Environmental Impact Assessment Administrative Procedures,* Environmental Protection Authority, Perth.

Gwalia Consolidated Ltd 1993a, *Kemerton Silica Sand Project - Development Proposal,* Gwalia Consolidated Ltd, Perth.

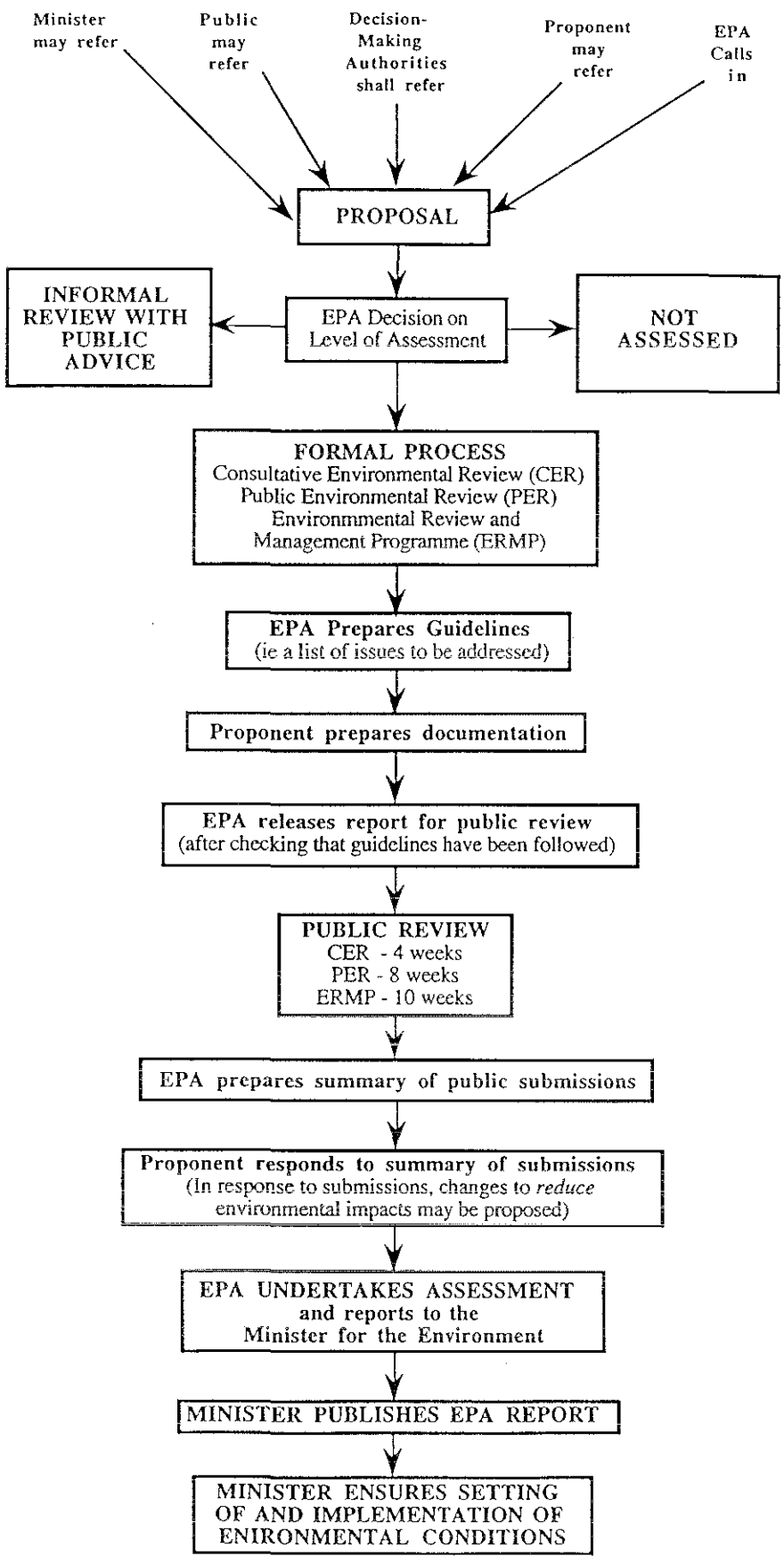
Gwalia Consolidated Ltd 1993b, *Kemerton Silica Sand Project - Public Environmental Review.* Gwalia Consolidated Ltd, Perth.

Ninox Wildlife Consulting 1994, *The Kemerton Silica Sands Project Area, Vertebrate Fauna Assessments, December 1992-December 1993.* Report for John Consulting Services, Ninox Wildlife Consulting, Perth.

Semeniuk, V. & Semeniuk C. unpub., Assessment of the Kemerton Wetlands, paper presented to the Department of Environmental Protection, Perth.

Appendix 1

Environmental Impact Assessment flow chart



EPA decides within 28 days. Anybody may appeal to the Minister within 14 days on level set; Minister may direct higher level but not vice versa

DMA cannot allow implementation unless either no formal assessment or the Minister Authorises. Process not suspended

Draft guidelines usually issued within 14 days of first meeting with proponent

EPA usually completes summary in 2-3 weeks

Report release often 3-5 weeks after receipt of response to submissions

Anybody may appeal on EPA report to Minister within 14 days. Minister may remit to EPA or take appeal into consideration when setting conditions

Proponent may appeal on conditions within 14 days of issue

Appendix 2

Summary of submissions and proponent's response

GWALIA CONSOLIDATED LTD

KEMERTON SILICA SAND PROJECT

RESPONSES TO PUBLIC SUBMISSIONS ON PER

NOVEMBER 1993

1. Introduction

Gwalia Consolidated Ltd (Gwalia) has received from the EPA copies of submissions from the following Government instrumentalities:

Health Department of Western Australia
Landcorp
Department of Aboriginal Sites
Department of Planning and Urban Development
Bunbury Port Authority
Main Roads Department (Bunbury Division)
Waterways Commission (Leschenault Inlet Management Authority)
Water Authority of Western Australia (Bunbury)
Department of Conservation and Land Management
Shire of Harvey
Shire of Dardanup

Gwalia has also received a "Summary of Submissions on PER" from the EPA – the EPA's consolidation of questions raised in non-Government submissions on the PER.

This response addresses individual submissions by Government instrumentalities, dealing with questions raised and suggestions made by those authorities, and noting other comments in those submissions.

It then addresses the specific questions summarised by the EPA from non-Government submissions.

2. Government Submissions

2.1 Health Department

RADIOLOGICAL IMPACTS

This submission noted that radiological impacts of the project were unlikely, a view confirmed by a 15 September 1993 communication from the Chemistry Centre (WA), part of the Department of Minerals and Energy showing the radionuclide contents of a representative sample of Heavy Mineral Concentrate (HMC) to be produced as a by-product at Kemerton to be as follows:

Uranium	2.0 ppm (parts per million)
Thorium	23.0 ppm

These are well below levels demanding special attention for occupational health, public health or transport safety reasons.

Moreover, the silica sand product will contain, by inference, very much lower levels of radionuclides – Uranium and Thorium are restricted to the HMC fraction, a few hundred tonnes per year. It is not considered worthwhile going into detailed analysis of these very low radionuclide concentrations, as they are as much as several hundred times lower than those in products already transported on public roads without special attention.

As suggested by the Department of Health, Gwalia will check these levels in samples taken during full-scale production, to confirm that they are well below those requiring action. Similarly, if wastes are concentrated to levels demanding it, disposal will be carried out in accordance with the Radioactive Waste Disposal Code.

2.2 Landcorp

POWER SUPPLY CORRIDOR

Landcorp asked if the proposed supply of power along the existing 132kV Bunbury-Cannington No. 1 transmission line corridor would require additional or widened easements within the Kemerton Industrial Park.

The State Energy Commission of WA (SECWA), which would supply power to the project, has advised that, while the final route for the transmission line has yet to be determined, use of the above-mentioned 132kV easement or corridor is being considered. SECWA has also advised that the existing corridor for this route is sufficiently wide to obviate the need for large-scale clearing, although some removal of vegetation might be necessary.

TRANSPORT ROUTE/ACCESS ROAD

Landcorp interpreted Figures 2 and 3 of the PER to show the access road/transport route entering the Kemerton Industrial Park. The scale of the maps may have lead to some confusion, since the access road south from the plant-site is on private land until Rhodes Road, then west along Wellesley to Old Coast Road.

The orientation of Figures 2 and 3 (north is to the left) may have lead to some confusion. The Kemerton Industrial Park area is not traversed by the proposed access road and transport route.

2.3 Department of Aboriginal Sites

Following the suggestion of the Department, Gwalia has commissioned an archaeological and ethnographic study of the area.

This work is being carried out by McDonald Hales & Associates, and is scheduled for completion by the end of November 1993. This timing allows for assessment of the study report and the planning of any action required under the terms of the *Aboriginal Heritage Act*.

Field work was completed in mid-November: no archaeological or ethnographic sites were found on the project area; a single stone flake was the only artefact discovered. The findings of the study will be reported in detail to the Department of Aboriginal Sites, and appropriate actions developed and implemented as necessary in consultation with the Department.

2.4 Department of Planning and Urban Development (DEPUD)

DEPUD's comments relate solely to planning matters within the Shire of Harvey, and recommends that the Shire take the project into account when assessing any Rural residential proposal. These non-environmental matters are considered beyond the scope of the *Environmental Protection Act 1986* and thus of this document.

2.5 Bunbury Port Authority

The Bunbury Port Authority supports the proposal, and offers to work with Gwalia to ensure minimal environmental impacts of interim and permanent loading facilities at the Bunbury Inner Harbour.

2.6 Main Roads Department (MRD)

MRD notes that planned construction of a dual carriage-way between the Wellesley/Old Coast Roads intersection is unlikely to have occurred by the time of project start-up, but would take place within the life of the project, reducing traffic impacts.

In this context, it is noted here that initial production is scheduled to be of the order of one-quarter of the full-scale level at which traffic impacts have been primarily assessed, and will progressively build up. The traffic impacts should be assessed in this light.

The recommendation by MRD that the Wellesley/Old Coast Road intersection be upgraded to MRD requirements, possibly including the provision of an acceleration lane on Old Coast Road, confirms Gwalia's past discussions with MRD and the commitment given in Section 3.7 of the PER.

2.7 Leschenault Inlet Management Authority (LIMA)

LIMA has raised 15 specific points in its submission. These are addressed below using the same numbering contained in the LIMA submission.

1. AVAILABILITY OF ENVIRONMENTAL STUDY REPORTS:

Gwalia made reports on the following studies available to EPA and other parties requesting them:

- flora and vegetation
- fauna
- water supply and water management
- noise investigations

In relation to biological studies – the focus of LIMA's comment – CALM received the flora and vegetation studies report and the fauna studies report, and have expressed their satisfaction with the management plans proposed by Gwalia.

2. TIMING OF APPROVALS AND ADDITIONAL BIOLOGICAL STUDIES

As noted in Section 4.2 of the PER, spring biological studies have been scheduled because that timing ensures a more significant and rigorous result than studies conducted at other times of the year, when many plants are not flowering and might not be recorded, and fauna are less active. Waterbird use of wetlands is being monitored on a two-monthly basis for 12 months.

The initial studies, in December 1992/January 1993, were judged to provide an adequate basis for proceeding with project assessment. The subsequent studies, which will be reported to the State, especially EPA and CALM, are designed to refine the earlier information, especially in terms of gazetted rare flora and rare and endangered fauna – a copy of the relevant reports will be made available to LIMA as required. (In this context, and as reported in the PER (Section 4.2), neither the December 1992 field-work nor the two-monthly fauna investigations have recorded the Freckled Duck, Southern Brown Bandicoot, Western Ringtail Possum or Chuditch, species which might have been expected to have been found, given the effort expended.)

It is rare for biological systems to be studied in fine detail before project commencement. It is important, however, that sufficient detail is provided to allow assessment of major communities and likely existence of "rare" flora and fauna; with the spring studies to be reported to the State before the end of 1993, well in advance of project construction, there is ample time to refine management plans to address findings of those studies. Gwalia will consult with the relevant authorities to achieve that aim.

3. MANAGEMENT OF STOCKPILE RUNOFF

Since the product is a completely inert sand material, and is freely-draining, runoff from product stockpiles presents no significant environmental problem.

All project areas will be drained so that runoff reports to the dredge pond, with silt traps provided as appropriate to minimise risks of turbidity, or to infiltration sumps.

4. LONG-TERM MANAGEMENT OF REHABILITATED DREDGE POND

Gwalia is committed to sustainable rehabilitation of the dredge pond as a wetland (see Section 4.1 of the PER). Gwalia has also undertaken to examine the feasibility of vesting the rehabilitated area with an appropriate Government instrumentality.

With regard to "contingencies", all rehabilitation operations are subject to progressive refinement. With wetlands, where rehabilitation is regarded as less problematical than is the case for other ecosystems, considerable flexibility exists. It is therefore considered unnecessary to detail potential problems at this stage; resources are probably better directed to developing the main thrusts of the rehabilitation plans and prescriptions.

5. WETLAND REHABILITATION DESIGN

It is anticipated that approval of the project will be conditional on the progressive development, to the satisfaction of the State, of appropriate rehabilitation prescriptions. At this early stage, it is considered that development of detailed prescriptions is neither necessary nor appropriate; there is no doubt that rehabilitation can be effected, and it will be more efficient to allow prescriptions to be detailed in the future as the required biological information and detailed project design becomes available.

The basic thrust of wetland rehabilitation design will be to restore and, where practicable, enhance conservation and ecological values. This will be achieved by engineering shallows to provide productivity and habitats, and the re-creation of different strata of perimeter vegetation, to provide habitats for terrestrial and avi-fauna. The target is a complex of plants, animals and micro-organisms which constitute the wetland food chains and webs

Rehabilitated wetlands will be protected against unacceptable loads of nutrients and sediments, and attention will be paid to the provision of summer drought refuge and summer feeding areas for migratory wading birds determined from the fauna studies to utilise the wetlands of the area.

6. IMPORTANCE OF WETLANDS

The importance of wetlands in general is well-addressed in the *Environmental Protection (Swan Coastal Plain Lakes) Policy* ('EPP'). The significance of the wetlands in the project area is discussed in the PER in terms of other regional wetlands

(Leschenault Inlet and Benger Swamp), and in the descriptions of wetlands in Appendix B.

The general feasibility of rehabilitation of wetlands has been discussed with CALM, and is evidenced by the existence of man-made wetlands at a number of locations in WA. As noted in Point 5 above, detailed prescriptions for wetland rehabilitation will be developed in the future – a normal process for rehabilitation design.

7. ADEQUACY OF WETLAND REHABILITATION

As noted in Section 6.1.2 of the PER, wetland rehabilitation will be carried out to the satisfaction of the EPA, on the advice of CALM.

8. IMPORTANCE OF UNDISTURBED WETLANDS

This aspect of the project is addressed in Appendix B of the PER. See also Point 6 above. It is also noted that wetlands not planned for disturbance by project activities will be protected – this includes wetlands not protected by the EPP.

9. LOSS OF FEEDING, BREEDING AND ROOSTING AREAS

The two-monthly field visits to the site are aimed at assessing precisely this aspect of the project, building on comments in the PER (Section 4.1) on the likely regional importance of project-area wetlands. The consolidated results of this work will be reported to the EPA early in 1994, as part of the report on the fauna studies commenced in March 1993 and scheduled for completion in December 1993.

The impacts of other developments on the coastal plain are beyond the knowledge and control of Gwalia.

10. WATER QUALITY

Project impacts on ground-water quality are addressed in Section 4.3 of the PER.

Surface water quality will be protected by minimising risks of turbidity through control of runoff and the use of silt traps, and by careful use of fertilisers in rehabilitation. The proposal (see Section 3.9.2) to blend dried tailings into the sandy soils to improve water- and nutrient-holding capacities will assist in minimising the risks of nutrient enrichment of surface waters, especially the rehabilitated dredge pond.

11. IMPACTS OF ROADWAYS

Roads and tracks will be developed to the minimum extent necessary to permit safe and effective operations. They will be low-speed thoroughfares, and the workforce will be made aware of potential impacts on fauna, especially at night.

12. JUSTIFICATION OF DISTURBANCE OF TWO EPP WETLANDS

The PER addresses both environmental and economic aspects of the proposal to disturb these wetlands.

The rehabilitation of disturbed wetlands can replace, even enhance, existing values, as noted in Section 4.1 of the PER, and in CALM's submission on the PER (see Section 2.9 below).

Gwalia has, during the early stages of environmental impact assessment, adjusted its proposal to avoid impacts on wetlands other than the two now proposed for disturbance. Access to the high-grade and special-quality ore beneath these two wetlands is pivotal to the commercial viability of the whole project.

13. HYDROLOGICAL IMPACTS

See response to Water Authority submission – Section 2.8 below.

14. REGIONAL SIGNIFICANCE OF WETLANDS TO WATER-BIRDS

As shown in Table 2 of the PER, less than one-third of the area of wetlands in the immediate project area will be disturbed during the life of the project – 4 hectares of a total of 12.7 hectares. Moreover, rehabilitation will add 36 hectares of wetland, an additional 280%.

Water-bird usage of the project-area wetlands is the subject of the two-monthly field studies referred to in Section 4.2 of the PER. Results to date indicate unexpectedly low usage, with the full report to be submitted to the State by the end of 1993.

15. IMPACTS ON GROUNDWATER AND SURFACE WATER FLOWS TO THE WELLESLEY RIVER

See response to Water Authority submission.

2.8 Water Authority of WA (WAWA)

The following responses summarise discussions held with WAWA since receiving its response to the PER, and the major conclusions of a report prepared by Dames & Moore dealing with impacts on groundwater. Copies of the Dames & Moore report have been submitted to the EPA and WAWA.

GROUNDWATER THROUGH-FLOW, RECHARGE AND OTHER USERS

Using regional data and data generated from on-site studies in January 1993, it has been estimated that groundwater through-flow in the superficial aquifer beneath the property is between 3,200 kL/day and 11,200 kL/day. The projected maximum net water requirement for the project is 2,900 kL/day.

Groundwater use for the project is projected to lower water tables at the nearest wetlands by between 0.5 and 1.5 metres (with a groundwater mound created beneath the settling pond). These reductions in water level are within the range of natural seasonal and inter-year fluctuations; if monitoring at wetlands sites (see next sub-section) indicates unacceptable lowering of water tables, Gwalia would divert water from the water management system to the wetland(s) so affected.

Again using regional and local data, it has been calculated that groundwater abstraction would reduce recharge to the Leederville Formation beneath the project area by 20-25%. The regional effect would be inconsequential, as users of the comparatively large Leederville Formation water resource are located many kilometres from the project area.

Licensed users of the groundwater of the superficial aquifer are located to the west of the groundwater divide of the Mialla mound, and would thus be unaffected by project groundwater abstraction. The nearest unlicensed user is located about 2 km to the south-west of the dredge pond; draw-down at this distance would be imperceptible.

GROUNDWATER MONITORING

Gwalia accepts WAWA's recommendations on monitoring, as follows:

- The five monitoring bores installed for the water management investigation will be surveyed to WAWA's standards, levels will be monitored monthly in the first instance and chemical analyses performed at least once a year. Once a stable baseline has been established by the monitoring, Gwalia will discuss with WAWA a reduction in the frequency of level-monitoring.

- Additional monitoring bores will be established around the settling pond and monitored as described above

- All groundwater volumes abstracted will be measured and reported to WAWA on an annual basis

- Water levels at Wetland Nos 3, 4 and 6 will be monitored at least quarterly, and compared with "control" levels at wetlands remote from the operational area, to allow assessment of potential impacts on local groundwater levels

- Vegetation at the perimeters of wetlands will also be monitored by quarterly inspection, the data being used to initiate any remedial action required

- All monitoring data will be reported with an interpretive commentary

WATER QUALITY

No chemicals (other than degradable flocculant to promote residue consolidation) will be added to process water streams, of which an estimated 78% returns to the superficial aquifer.

Salinity naturally increases with distance east: from around 600 mg/L at the project area to more than 1,500 mg/L at Benger Swamp.

The impact of the project on groundwater salinity can be assessed empirically by calculations using the dredge pond depth of 15 metres and an annual net evaporation of 1.4 metres. This gives a salinity "concentration" in the dredge pond of less than 10% (1.4/15), so that pond salinity could be increased from 600 to 660 mg/L. Given that this calculation does not allow for the dilution effects of rainfall recharge to and through-flow of the aquifer, it is regarded as being small and acceptable – "downstream" effects are unlikely to be noticeable.

2.9 Department of Conservation and Land Management (CALM)

WETLAND REHABILITATION AND LAND-USE PLANNING

Noting that Gwalia's proposal has the potential to replace, even enhance wetland functions, and that the key elements of wetland rehabilitation have been addressed in the PER, CALM suggests that a land-use plan for the entire site could be developed. While such a plan would at this stage be very general, because of the large number of options open (wetlands, agriculture, forestry, wildflower production, conservation *etc.*) Gwalia accepts the advice and will consult with CALM and other relevant authorities to develop at least a concept plan addressing options and a preliminary review of their feasibilities. This will finalised before the commencement of construction.

As suggested by CALM, Gwalia will consider permanent as well as floating islands in rehabilitation plans, and will pursue the question of vesting, as suggested by CALM, at an appropriate time in the future.

Gwalia is committed in principle to the concept of providing long-term protection for both undisturbed wetlands and their immediate surrounds, but notes that questions of vesting agency, possible compensation and legal liability – as well as evolutionary changes in perceptions of conservation values – cannot be prescribed ten years in advance. It is on this basis that Gwalia, as noted in the PER, has undertaken to continue to assess the feasibility of affording long-term protection to wetlands on the project area; that assessment might be the subject of formal triennial reporting to the EPA and the Minister for the Environment.

CALM raises the question of possible inclusion of rehabilitated lakes in the Swan Coastal Plain Lakes EPP. Gwalia sees no technical impediment to such action after the completion of mining and rehabilitation; indeed, the prospect is seen to underscore the viability of the wetland rehabilitation proposed.

FOREST DISEASE MANAGEMENT

As noted by CALM, the whole project site will be surveyed for forest disease (dieback) prior to construction, and detailed hygiene plans developed. CALM's advice will be sought in the development of those plans.

FAUNA ASSESSMENT AND MANAGEMENT

The fauna report by Ninox Wildlife Consulting has been forwarded to CALM. That report, and the studies currently in progress, addresses terrestrial as well as wetland birds, including those with banksia woodland habitats. Should spring fauna-trapping or subsequent work reveal the existence of threatened mammals (Southern Brown Bandicoot, Chuditch, Ringtail Possum – no sighting or sign of which have yet been recorded), CALM would be consulted to ensure appropriate conservation of the populations.

PRIORITY PLANT SPECIES AND VEGETATION CONSERVATION

As noted by CALM, the four species of Priority Flora recorded to date have not been found in areas planned for disturbance.

At the completion of all botanical studies, Gwalia's consultants will provide an assessment of the regional conservation significance of vegetation associations and landforms on the property, and will discuss them with CALM. To the extent that is practicable, Gwalia will assist in the conservation of important and significant areas.

2.10 Shire of Harvey

The Shire's submission notes the Council's August 1993 resolution of support for the project, subject to the development of a detailed environmental and rehabilitation programme, the upgrading of Wellesley Road and the Wellesley/Old Coast Roads intersection, and the conduct of a noise study at a property near the Wellesley/Old Coast Roads intersection.

Gwalia has agreed to these requirements. An additional request by the Shire was for the sealing of Rhodes Road – discussions with the Shire on this matter are proceeding, to determine the desirability and advantages of sealing this limited-use road.

The potential impacts of transport on planning for development in the area near the project is also being discussed with the Shire.

2.11 Shire of Dardanup

The Shire's concern is traffic hazards associated with product transport, and construction of a dual carriage-way is proposed.

The response to MRD's submission (see Section 2.6 above) is considered to adequately address the matters raised. Additionally, Gwalia is committed to scheduling product transport campaigns to avoid holiday periods.

The possibility of rail transport of product, raised by the Shire, was investigated during early project feasibility studies. The cost of providing railhead and loading/unloading facilities alone was shown to make the project financially non-viable.

3. Non-government Submissions

3.1 Mining and Processing

3.1.1 *It is stated in the PER that approximately 20 hectares of low alumina dunes would be dry mined and many of these would be subject to further mining by dredge. The area of the dredge pond shown on Figure 2 does not encompass many of the low alumina dunes. Is this a misrepresentation of the situation?*

Since the original production of Figure 2, the area of the dredge pond has been modified to minimise potential impacts on wetlands. It is thus now more accurate to state that *some* of the low alumina dune areas will subsequently be dredge-mined.

3.1.2 *Why would areas that had been dry mined be subsequently dredged. Should it not all be done by dry mining methods?*

Dry mining is feasible only for elevated (dune) areas. Deeper ore is close to or below the water-table, making dredge-mining the only practicable mining method.

3.1.3 *Could the waste disposal at the site be used to dispose of the waste from the SCM operation currently being disposed of at Gelorup?*

The tailings from the silica sand washing process at Kemerton is an inert waste which will be solar-dried and used in rehabilitation to improve the water- and nutrient-holding capacities of the sandy soils of the project area.

Gwalia is not aware of the full details of the nature of either the SCM waste mentioned or the current method of management of that waste. However, it is understood that a relatively impermeable area is required to store and manage that waste – such conditions will not be provided by Gwalia at Kemerton.

Moreover, there are difficult legal and ethical questions surrounding co-disposal of wastes from different operations.

3.1.4 *Light spill upwards and to areas other than where it is intended can impact activities such as astronomy and also waste energy. Would full cut off optical systems be incorporated in the lighting system to prevent light pollution during night time work? Light pollution can affect both human and animal residents.*

Section 4.7 of the PER addresses light spill.

For energy-conservation/economic reasons alone, Gwalia will minimise light spill, consistent with providing a safe working environment. As implied in the question, it is not difficult to install shaded and directional lighting to achieve this end.

3.1.5 *It has been stated that the profitability of the project is marginal. This means that costs associated with the operation will need to be as low as possible. It is important that rehabilitation standards are not relaxed to save money as this would shift the cost from the developer to the community as a whole. Consideration should be given to requiring a bond from the proponent to ensure rehabilitation is carried out. Is this an appropriate measure to ensure sound environmental management?*

There are several aspects to this question, as follows:

(i) While the projected profit per unit of production is small, it is not accurate to state that the **profitability** of the project is marginal. Despite the small unit margin (revenue per unit of product minus cost per unit of product), the project is, as evidenced by the very fact that it is proposed, potentially quite profitable – it does, however, require sustained high levels of production and sales.

(ii) In assessing project viability, environmental costs – especially rehabilitation – have been factored into evaluations. Allowances have been made for the creation of shallows and islands as part of the mining plan, the salvage and replacement of topsoil, the landscaping on dry-mined areas, the incorporation of dried clay tailings into dry sandy soils, the planting, sowing and fertilising of plants to re-establish various vegetation strata in all disturbed areas, the monitoring of the success and ongoing management of re-vegetation.

(iii) These rehabilitation concepts have been committed to in the PER, and it is anticipated that project approval would be conditional on detailed rehabilitation plans being developed to the satisfaction of CALM and the EPA and submitted to the Minister for the Environment. Should Gwalia fail to comply with these commitments, it is open to the Minister, under the terms of Section 48(4) of the *Environmental Protection Act 1986* and as advised by the EPA, to enforce compliance – even to the point of closing the operation down. The Minister can also, under Section 48(5) of the Act, order the carrying out by another party of the work required by the commitment, at Gwalia's cost.

(iv) Environmental costs are small as a percentage of total project costs. It is common for environmental costs in the mining industry to constitute significantly less than 1% of total operating costs, and capital environmental costs are even smaller; this is the situation with the Kemerton Silica Sand proposal.

(v) The general question of the desirability of rehabilitation bonds is a moot one. While it is possible to make a sound case for such bonds for known poor performers, it is equally possible to argue that bonds represent a negative, de-motivating approach which fosters minimum compliance and recalcitrance.

3.1.6 *Further biological studies are scheduled for the Spring of 1993 and early 1994. How can final environmental approval be given until the results of these studies are available?*

Studies carried out in late 1992 and early 1993 have been used as evidence of the broad environmental feasibility of the proposal. The follow-up studies in late 1993 and early 1994 are aimed at providing greater detail to facilitate development of rehabilitation and other environmental management plans and prescriptions. This is normal procedure for a project of this type.

With regard to fauna, the two-monthly studies carried out since January 1993 have not recorded any of the rare species which might be expected to occur in the project area. This is surprising in view of the effort expended to search specific habitats.

Flora studies carried out in April and May of 1993 identified four Priority species in areas remote from proposed project activities; the appropriate protection of these locations and species will be effected through consultation with CALM. Should any Rare and Priority Flora be recorded during the spring 1993 field-work, CALM and EPA will be consulted to determine the most appropriate methods of management and protection.

CALM's attitude to the proposal is also important here. The following comment is taken from CALM's submission to the EPA (see also Section 2.9 above):

> "The undertakings in the PER appear to be satisfactory for the management of conservation values on the site."

3.2 Transport and Loading

3.2.1 *The use of Wellesley Road as a haulage route will substantially increase the potential for road accidents at the intersection with Old Coast Road. Trucks will be entering the intersection without an adequate slipstream and crossing the south bound lane of the road on the return from Bunbury. What will be done to address this situation?*

In Section 3.7 of the PER, Gwalia has committed to providing merging (slipstream) and turning lanes at the Wellesley/Old Coast Roads intersection.

MRD's medium-term plans for construction of a dual carriage-way between this intersection and Eaton will provide further levels of traffic management (see Section 2.6 above).

Gwalia has also committed to avoiding periods of high traffic density such as holidays (see Section 2.11 above).

3.2.2 *Consideration should be given to the provision of a road along the easement of the Harvey-Kemerton SECWA power line from Rhodes Road through the Kemerton industrial areas to Marriott Road and then using existing heavy vehicle access to the Old Coast Road. This route would be shorter than the proposed route and far safer as it would separate the heavy traffic from the public vehicles on the single lane section of the Old Coast Road and by-pass the Wellesley Road intersection. Since the junction of Marriott Road with Old Coast Road already has merging and turning lanes in place, construction of an unsealed road along the power line would be cheaper than providing merging lanes at the junction of Wellesley and Old Coast Roads. Has this alternative been considered? Would it be used?*

This option for product transport has been discussed with Landcorp, CALM, the South West Development Authority and the Shire of Harvey. Agreement in principle was reached in early November, and the parties are proceeding to evaluate the proposal in greater detail.

The proposed road route has been assessed botanically, and no Declared Rare Species or Priority Flora have been recorded. The recently-conducted Aboriginal Sites study recorded no ethnographic or archaeological sites on the route.

Gwalia plans to proceed, in consultation with the relevant authorities, to determine the ultimate feasibility of using this route for product transport. Preliminary cost estimates indicate that construction of this road through the Kemerton Industrial Park might be more expensive than the option described in the PER, but Gwalia considers the advantages of the Kemerton option to significantly outweigh those additional costs – especially in relation to traffic noise, safety and access to and from Binningup.

Gwalia will continue to keep the EPA and other relevant authorities informed of developments as they occur, and formally notify involved parties once a final decision is made. Until the full feasibility of the Kemerton route is demonstrated, both it and the original (Wellesley Road) option are being kept active.

3.2.3 *How would dust be controlled at the Inner Harbour during product storage and loading?*

Being a washed sand, the product is not inherently prone to dust-generation; normal procedures for handling sand are considered adequate for controlling dust during materials-handling operations. Product-quality considerations will ensure that the washing process at the mine-site removes most of the fine material, which could otherwise generate dust.

The damp product will be dumped directly from trucks to a ship-loader hopper and conveyed on a covered conveyor into the ship hold.

Product will be direct-loaded from truck to ship – no storage is required at the port.

3.2.4 *The map in Figure 10 of the PER does not show Marriott Road in its proper alignment where it meets the main road. The point marked •3 is not on Marriott Road but Parkfield Road. Is this an oversight?*

Yes. Point 3 is in fact closer to Old Coast Road. The difference is considered inconsequential.

3.2.5 *The 24 hour truck transport of the product over a 2 or 4 day duration with a truck separation of 7 minutes will present a hazardous situation to other road users, particularly during the tourist season. The highway should be made a dual carriage-way as soon as possible. How will the safety issue be addressed?*

Gwalia has committed to avoiding peak traffic periods during public holidays for product transport.

The Wellesley/Old Coast Roads intersection will be upgraded, with acceleration and turning lanes as appropriate (as advised by MRD).

MRD has flagged plans for a dual carriage-way, certainly during the life of the project. Even though this upgrade is unlikely to be in place by the time of project commencement, it should be noted that initial production will be around 200,000 tonnes per year, about one-quarter of full design capacity – this would require only 10 two-day trucking campaigns a year, or five four-day campaigns.
(See also Section 2.6 above.)

3.2.6 *Neither Wellesley Road nor the section of the Old Coast Road from the Binningup crossroads to Marriott Road are designed for and in any sort of condition to withstand the weight and frequency proposed. How will this be addressed in the short and long term?*

Section 3.7 of the PER explains Gwalia's commitments to upgrade Wellesley Road and the Wellesley/Old Coast Roads intersection to standards (as advised by the Shire of Harvey and MRD) appropriate to the weight and frequency of trucking envisaged.

Old Coast Road between the Binningup turn-off and Marriott Road already carries heavy transport – container freight, sand and earth trucks and log trucks. The loadings involved in transport of the silica sand product will meet the relevant regulations and standards, and are no different from those currently experienced on this section of road.

See also Section 3.2.1 above.

3.2.7 *What storage facilities would be used at the Inner Harbour?*

As noted in Section 3.2.4 above and in Section 3.7 of the PER, no storage facilities are required in the short term – product will be loaded directly from truck to ship with a mobile loader.

In the longer term, as part of the development of the Port of Bunbury, mineral sand loading facilities are planned on the north side of the Inner Harbour. Until these facilities are developed, the General Cargo wharf on the south side of the Inner Harbour will be used.

3.3 Noise

3.3.1 *The noise levels shown in Table 3* [of the PER] *indicate that background noise levels at Lot 52 Ridgeview Way are very low. The noise levels from the mine operation would be unacceptably high for a 24-hour operation. How would this impact be managed?*

Lot 52 Ridgeview Way is approximately 4.5 kilometres from the mining/processing area. As explained in Section 4.5.3 of the PER, noise emissions from mining and processing operations will comply with the proposed new noise regulations developed by EPA – these regulations include lower permitted noise levels at night.

3.3.2 *The validity of the Main Roads Department guidelines for application to this proposal should be questioned. The Main Roads Department guidelines would apply for normal traffic flows; not for campaign trucking over a 24 hour period. Thus there would be high levels of noise outside normal working hours and on minor roads. The proposed Environmental Protection (Noise) Regulations would be more appropriate in this situation. Could these limits be met at the nearest residences during campaign trucking? If not, what noise management methods could be used?*

The proposed *Environmental Protection (Noise) Regulations (1993)* (see Section 2.6 above) explicitly exclude application to traffic. Gwalia was advised by EPA during development of the PER that, in the absence of any directly-applicable regulatory mechanism, the MRD guidelines should be used to assess impacts of transport noise. To adopt any other approach would involve considerable subjectivity, making the assessment of noise impacts virtually indeterminate.

3.3.3 *The noise imposition on the residents on Wellesley Road will be very high given the unusually quiet nature of the road, especially at night. How could this be managed?*

Two residences are located close to Wellesley Road; one is also close to the Old Coast Road, and can be expected to already experience noise from that source.

The noise studies carried out show that noise levels at these residences will meet MRD guidelines (see also Section 3.3.2 above). Should transport noise still be a problem, the construction of earthen bunds and the establishment of screen tree plantings to attenuate noise could be considered.

3.3.4 *The PER states that the residences closest to Wellesley Road would experience noise with an L_{10} of 63 dB(A). Does this allow for the increased noise expected during acceleration and deceleration up and down the hill on Wellesley Road, about 500m from the Rhodes Road intersection?*

It is anticipated that trucks heading west will be at or close to full speed within 500m of the Rhodes Road intersection, and that deceleration by east-bound trucks would not be commenced until a point closer to Rhodes Road. On this basis, the assessments made in Section 3.5.3 of the PER are considered appropriate: MRD guidelines would be met.

3.3.5 *Would noise from the proposal impact adversely on properties in Runnymede Road?*

The Runnymede Road property nearest to the project is approximately 2.5 km from the proposed plant site. As explained in Section 3.5.3 of the PER, this and other residences would not experience project-sourced noise in excess of the levels proposed in the *Environmental Protection (Noise) Regulations*.

Similarly, Runnymede Road residences are at least 1.5 km distant from Wellesley Road, and would not experience transport noise outside MRD guidelines.

3.3.6 *The proponent has indicated that noise from the treatment plant will be below acceptable levels. It is preferable that noise emissions be free from tones rather than at a reduced level to compensate for the presence of tones. Given the low ambient noise levels in the area of the mining and treatment plant, noise which is tonal in nature is likely to be audible and intrusive at the nearer residences. How will this be managed?*

The noise levels discussed in Section 3.5.3 of the PER include allowance for tonal effects, as required by the proposed *Environmental Protection (Noise) Regulations*. It is understood that those Regulations are based on sound scientific and internationally-applied principles, so that compliance with them would meet appropriate standards. Nonetheless, Gwalia will examine possibilities for reducing tonal impacts, especially for equipment located or operating outside the main building at the processing plant.

3.3.7 *The PER proposes that 63 dB $L_{A\ 10}$ is acceptable on an hourly basis. This proposal is not seen as acceptable. 63 dB $L_{A\ 10}$ is the upper limit of acceptability for the 18 hour period of 6 a.m. to midnight. Between at least midnight and 6 a.m. lower levels, to a maximum of about 55 dB L_A, are required if sleep disturbance is to be avoided. How can this be achieved?*

Cantwell Ct and Wellesley Rd are examples of this problem. Residences at Cantwell Ct appear to be only 100 metres from the truck route. From Figure 4.2 of the SVT report a figure of 63 dB L_A appears likely while sand transport is in progress. At other times Figure 3.1 of the SVT report indicates that 45 to 55 dB $L_{A\ 10}$ is typical. Maximum truck noise would be about 65 to 70 dB L_A at these residences. This is likely to result in sleep disturbance to many residences in this area. How will this be managed? Can sand be stockpiled at the loading point during the day to avoid trucking at night?

The 55 dB can be achieved by reducing truck speeds to 60 km/h (see Figure 12 of the PER. Such action would only be required near Residence 5 on Wellesley Road, as shown on Figure 11 of the PER; trucks would already be travelling slowly near Residence 4, which is located close to the Wellesley/Old Coast Roads intersection, and near East Bunbury, where 60 km/h speed limits apply.

If experience proves such action to be appropriate, Gwalia will arrange for truck-drivers to adjust speeds accordingly.

Trucking only during the day to a port stockpile (and loading at night) would effectively double the density of truck traffic, with negative implications for both road safety and truck noise. It would also impose a very high additional cost (due to the need to construct a storage area at the port and to double-handle product) on an operation already extremely sensitive to costs.

3.4. Drainage

3.4.1 *How will Gwalia minimise and monitor the impact on vegetation and wetlands associated with increased turbid runoff from the operation?*

All runoff from project areas will be directed to silt traps to settle water before delivery to the dredge pond, or to purpose-built sumps, for infiltration.

Monitoring will be carried out by visual inspection.

3.4.2 *Changes to the water table of wetland No. 3 are said to be less than 1 metre. This is in addition to the natural fluctuations, so the potential change may well exceed 1 metre, which could have an adverse impact on the wetland. How will this be managed?*

The PER figure for change in water-table at Wetland No. 3 of less than one metre (Section 4.1) is acknowledged to be imprecise – the figure was derived from preliminary assessment of impacts of bore-field operation. In fact, Wetland No. 4 is closer to the proposed bore-field and, as noted in Section 4.3, would be subjected to a 0.5-metre impact in the worst case of no infiltration recharge (from tailings decant-return water) for 70 days. Such a situation might prevail during project start-up, but is not anticipated during steady-state operations.

Thus, it is expected, on the basis of modelling carried out as part of the water supply and management study, that impacts of operations on water levels in

non-disturbed wetlands will be almost undetectable. Nonetheless, monitoring bores will be operated to allow assessment of water levels, and appropriate adjustments to operations made if adverse effects are detected.

3.4.3 *Wetland No. 4 may experience a rise in water table which could have a detrimental effect on the wetland over the 10 year life of the project. Given the high conservation value of this particular wetland changes to water level would need careful management. How would this be done?*

Being close to the bore-field, it is considered that Wetland No.4 is possibly more likely to experience small lowerings of water-table, as discussed in 3.4.2 above. However, this wetland is also located near the tailings decant-return channel, through which aquifer recharge will take place *via* infiltration – counter-acting effects of bore-field operation.

These considerations demonstrate the problems associated with predicting small changes in water-table. In any event, the extent of changes considered are unlikely to significantly affect the wetland's viability: in relation to invertebrates, for example, CALM have indicated (Section 3.9.3 of the PER) that increased "dry-ness" or "wet-ness" simply results in a change in the suite of species of a wetland, with function maintained.

As part of the water-monitoring programme to be developed for the project, water levels in and near wetlands will be monitored. Should unforeseen and undesirable impacts develop, there is sufficient flexibility in the project water management system to remedy those impacts: e.g. by adjustment of bore locations, control of volume of decant-return water, adjustment of dredge pond level.

3.5 Flora and Fauna

3.5.1 *What is the proposed management if the future flora and fauna surveys find declared rare species in the mining area or close by?*

It should be noted that, despite considerable effort, none of the rare fauna considered likely to be found in the project area (Southern Brown Bandicoot, Chuditch, Ringtail Possum, Freckled Duck) have yet been recorded. Four Priority Listed plant species (but no Declared Rare Flora) have been found in areas remote from proposed project activities.

With all "rare and endangered" species discovered, CALM will be consulted to develop the most appropriate means of management. With fauna, relocation will be considered, as CALM has in train programmes for such protection measures. With rare or priority flora, protection of sites from disturbance will be effected.

3.5.2 *What is the proposed specific management to ensure the construction phase of the proposal does not lead to environmental impacts.*

Prior to starting construction, Gwalia will develop with the relevant authorities a specific environmental management programme addressing:

- minimisation of clearing to that required for safe and efficient operations
- forest hygiene procedures, based on disease mapping and including clean-down procedures for incoming and outgoing vehicles and equipment, intra-site movements and designation of "dieback-safe" and "unsafe" access-ways
- flora and fauna protection
- surface water and groundwater management
- salvage of topsoil from disturbed areas, for subsequent use in rehabilitation
- fire management
- exclusion of pets from site

3.5.3 *The site is highly susceptible to dieback and is likely to be infected already. A dieback survey to determine the presence/absence and extent of dieback should be carried out as a matter of priority and hygiene measures put in place. Will this be done and what would the likely effectiveness be?*

As noted above in Sections 2.9 and 3.5.4, a forest disease survey will be carried out before construction. Current plans are to conduct the survey in late summer, when drought stress amplifies disease impacts and facilitates definition of disease. The survey, its results and the appropriate management plan will be developed in consultation with CALM.

The effectiveness of any forest disease management programme is difficult to predict. In this case, the property has been subjected to a range of human activities – agriculture, timber-harvesting, mineral and hydrocarbon exploration (other than recent work by Gwalia) and others – for many decades, so that dieback (and possibly other diseases) may be widespread and as yet unexpressed. Nonetheless, using the experiences of CALM and of other mining operations, an effective programme can be developed to sensibly minimise the risk of disease spread.

3.5.4 *Wetlands 1 and 2 have local conservation significance according to the consultant's report; not moderate as stated in the PER. How would this affect the proposal and its management?*

Assessment of the significance of wetlands was carried out separately by botanical and fauna consultants, using the questionnaire in EPA Bulletin 374 ("A Guide to Wetland Management in Perth", November 1990). Local, regional and "overall" significances were ascribed, with the classification "moderate" being applied by the fauna consultant to Wetlands 1 and 2 in terms of local significance; the botanical consultant ascribed a "high" local significance but a "moderate" regional significance. On this basis, a broad "moderate"

classification was used. It is noteworthy that wetlands given "high" or "very high" classifications by the consultants will not be disturbed by project activities, and in fact will be protected.

Given that, as supported by CALM's submission on the PER, rehabilitation can re-establish or even enhance wetland values, debate over "middle-range" and somewhat subjective classifications is considered to be of little value.

3.5.5 *The flora and vegetation report highlights the need for long-term protection of communities identified as having regional conservation significance. Would this recommendation be carried out and if so how?*

The area to be disturbed by project activities is a small proportion of the total area of the private property on which the project is located, and the areas of conservation value delineated in the flora and vegetation report are generally located away from proposed project activities. Gwalia will consult with CALM to determine means by which sensitive communities can practicably be protected: control of access and, in the longer term, ownership and vesting, will be addressed.

3.6 Rehabilitation

3.6.1 *Wetland rehabilitation is extremely difficult. How can Gwalia guarantee that the wetlands affected can be rehabilitated to meet the requirements of the Environmental Protection Policy?*

Compared with other rehabilitation challenges – e.g. Darling Range mining areas – wetland rehabilitation can in fact be regarded as easy. Indeed, existing examples at Capel and (by Gwalia) at Greenbushes show that industry can develop sustainable wetlands after mining.

This view is supported by CALM's submission to the PER (see Section 2.9 above) and its comments about invertebrate fauna re-colonisation in Section 3.9.3 of the PER.

The fundamental issues in wetland rehabilitation, as defined in part by CALM, are:

- provision of appropriate shallow areas of water
- re-establishment of fringing vegetation (*via* topsoil replacement or seeding and planting)
- provision of protection from predators (dense vegetation and islands)
- protection of water from physical and chemical degradation.

Gwalia is committed to consulting with CALM to properly address these issues.

3.6.2 *Exploration activities have already caused damage to the majority of wetlands on the site. How and when will these be rehabilitated.*

Exploration for minerals and hydrocarbons by parties other than Gwalia have taken place on the property in the past, as have agricultural and timber-harvesting activities. These activities have resulted in clearings and other disturbances for access and work areas.

Areas on the project site disturbed by mining and ancillary activities, including activities by parties other than Gwalia, will progressively be rehabilitated as part of the rehabilitation programme being developed for the project. (It is of course not practicable to redress impacts of agriculture and timber-harvesting, except where areas so impacted become part of the project area.) Rehabilitation of wetlands other than the two proposed for dredge-mining will be included in this programme.

Appendix 3

List of submissions

State and local government agencies

Bunbury Chamber of Commerce (Inc)
Bunbury Port Authority
Department of Aboriginal Sites
Department of Conservation and Land Management
Department of Planning and Urban Development (South West Region Planning Committee)
Department of Planning and Urban Development (South West Branch)
Health Department of Western Australia
Landcorp - Western Australian Land Authority
Leschenault Inlet Management Authority
Main Roads Western Australia (Bunbury Division)
Shire of Dardanup
Shire of Harvey
Water Authority of Western Australia (Bunbury)

Members of the public

G J Ackinclose
Binningup Community Association Inc
Boonilup Region Interest Group
R Campbell-Hicks
Conservation Council of Western Australia Inc
P Eckersley
R M Edwards
Ghasseb Pty Ltd
Hart Simpson & Associates Pty Ltd
J Miller
PRIMA Group Pty Ltd
P Shelley
M F & J A Short
South West Environment Centre
The Astronomical Society of the South West (Inc)
G Tothill
K Warnes
Waterbird Conservation Group Inc
Wetlands Conservation Society (Inc)
P N Wines

Appendix 4

Proponent's commitments

KEMERTON SILICA SAND PROJECT (795)

GWALIA CONSOLIDATED LTD

Gwalia Consolidated Ltd

KEMERTON SILICA SAND PROJECT

AMENDED SUMMARY OF ENVIRONMENTAL COMMITMENTS

November 1993

The commitments made in Section 6 of the July 1993 PER have been supplemented in light of additional commitments made in the process of responding to public and government submissions on the project. The following is a consolidated list of all commitments.

1. Rehabilitation

1.1 Rehabilitation of Areas Subjected to Dry Mining

Areas subjected to dry mining and not subsequently included in dredge mining operations will progressively be rehabilitated to stable landforms, to the satisfaction of the EPA, on the advice of CALM. Rehabilitation will include:

- The battering down of slopes agreed with the Department of Minerals and Energy
- Where necessary, the provision of erosion-control facilities, to manage runoff and prevent sheet and gully erosion
- Scarifying, ripping or ploughing on contour of salvaged and replaced overburden and topsoil
- Planting and/or seeding of suitable plant species
- Maintenance of revegetation through fertiliser application, fire management and the like, to encourage a self-sustaining system

1.2 Rehabilitation of Dredged Areas

As part of a strategic plan to replace, if not enhance, the pre-mining wetland values of the mining area, areas subjected to dredge mining will be progressively reconstructed as wetlands, to the satisfaction of the EPA and as advised by CALM. This reconstruction will include:

- Establishment of shallows (no deeper than 2 metres) over a 100 metre-wide perimeter of the dredge pond
- Replacement of salvaged topsoil around the pond perimeter, to facilitate re-establishment of lake-side vegetation

- Planting and/or seeding of lake-side vegetation, based on flora and vegetation studies carried out in December 1992 and to be carried out in the spring of 1993 – both species diversity and vegetation structure will be accommodated, to re-establish representative flora and fauna habitat values

- Examination of the desirability and feasibility of establishment of floating islands, to provide protection to fauna (especially waterbirds) from predators

1.3 Re-use of Dried Process Tailings

Solar-dried tailings will be re-won from the tailings dam and used in rehabilitation programmes to enhance the water- and nutrient-holding properties of the sandy soils of areas being rehabilitated. Tailings will be blended into the sandy soils, by rotary hoeing or other means of tillage.

At the end of the project, remnant tailings on the floor of the tailings dam will be similarly incorporated into the sandy soils underlying the tailings dam, and the area re-vegetated, using relevant parts of the prescription described in Section 1.1 above.

1.4 Vesting of Rehabilitated and Other Areas

Investigate the feasibility and desirability of vesting rehabilitated and other areas with appropriate authorities, to ensure long-term management of ecological values either protected from disturbance during operations or created by rehabilitation programmes. Of particular interest are wetland areas: two such areas covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* will be disturbed by project operations, and another seven such nearby areas will be protected from disturbance by project operations.

2. Protection of Wetlands

2.1 Protection of EPP Wetlands

Seven of the nine wetlands in the project area covered by the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* will not be directly disturbed by project activities. These wetlands will be protected from indirect and/or inadvertent disturbance by fencing, signposting, access-control, workforce awareness and other appropriate means.

2.2 Monitoring of Wetlands

Water levels and the condition of surrounding vegetation at wetlands not directly disturbed by the project will be monitored on a quarterly basis, and water from the water management system delivered to wetlands where unacceptable changes resulting from project-related groundwater abstraction occur.

2.3 Protection of Wetland Water Quality

Runoff will be directed *via* engineered drains to silt traps to reduce sediment loads before being allowed to enter wetlands, and care will be taken to minimise the addition of nutrients to wetlands as a result of project operations such as fertiliser treatment of rehabilitated areas.

3. Biological Investigations

3.1 Study Schedule

Building on the December 1992 studies, intensive flora and fauna studies will be carried out in the spring of 1993, and brief studies bi-monthly until February 1994, to:

- Define more precisely the status of any species on CALM's Declared Rare Flora and Priority Species List, and of any rare and endangered fauna
- Provide a quantitative baseline for the planning of rehabilitation/revegetation, especially in terms of habitat requirements
- Provide a basis for ongoing monitoring of biological impacts and the subsequent development of appropriate management plans
- Assess patterns and nature of waterbird use of wetland areas
- Delineate habitats of sensitive species and provide appropriate protection

3.2 Reporting

Reports on biological studies will be submitted to the EPA and other relevant organisations

3.3 Rare and Endangered Flora and Fauna

Gazetted Rare Fauna and Declared Rare and Priority Flora recorded in the project area will be reported to CALM, with whom agreement will be reached on the most appropriate methods of management.

4. Groundwater Monitoring

- The five monitoring bores installed for the water management investigation will be surveyed to WAWA's standards, levels will be monitored monthly in the first instance and chemical analyses performed at least once a year. Once a stable baseline has been established by the monitoring, Gwalia will discuss with WAWA a reduction in the frequency of level-monitoring.

- Additional monitoring bores will be established around the settling pond and monitored as described above

- All groundwater volumes abstracted will be measured and reported to WAWA on an annual basis

5. Dieback Management

5.1 Dieback Mapping

Map the project area to assess the incidence of dieback.

5.2 Dieback Hygiene

Develop and implement a dieback management programme aimed at minimising the risk of plant disease movement to and from the project area, to the satisfaction of the EPA on the advice of CALM.

6. Noise Management

6.1 Noise from Mining and Processing

Ensure that noise from mining and processing operations, including the loading of product for trucking to the Port of Bunbury, does not result in noise levels at existing residences in the vicinity of the project area in excess of 35 dB(A) (15-minute L_{10}), including allowance for tonal components.

6.2 Noise from Product Transport

Ensure that noise from transport of product to the Port of Bunbury does not exceed an L_{10} of 63 dB(A) at existing residences in the vicinity of the transport route.

7. Dust Management

Apply water or other treatments, and install appropriate dust control equipment on processing facilities, to ensure that vehicular movement and equipment operation does not cause dust nuisance.

8. Control of Light Spill

Design and operate lighting facilities so that light spill does not cause a nuisance to neighbours.

9. Radiological Assessment

Gwalia will check the levels of Uranium and Thorium in production samples, to confirm the very low levels of these radionuclides determined to date. If wastes are concentrated to levels demanding it, disposal will be effected in accordance with the Radioactive Waste Disposal Code.

10. Aboriginal Sites

Gwalia will complete an archaeological and ethnological study of the project area by the end of 1993 and report the findings to the Department of Aboriginal Sites, with whom consultation will be held to decide on any action required as a result of the study.

11. Construction Management

Prior to starting construction, Gwalia will develop with the relevant authorities a specific environmental management programme addressing:

- minimisation of clearing to that required for safe and efficient operations
- forest hygiene procedures, based on disease mapping and including clean-down procedures for incoming and outgoing vehicles and equipment, intra-site movements and designation of "dieback-safe" and "unsafe" access-ways
- flora and fauna protection
- surface water and groundwater management
- salvage of topsoil from disturbed areas, for subsequent use in rehabilitation
- fire management
- exclusion of pets from site

Appendix 5

Proponent's vesting proposal

GWALIA CONSOLIDATED LTD
ACN 009 131 971

GWALIA
QUALITY AUSTRALIAN MINERALS

MJH:IF:740
A.0221 E55 01

2 May 1994

The Chairman
Environmental Protection Authority
Westralia Square
141 St George's Terrace
PERTH WA 6000

Dear Sir

KEMERTON SILICA SAND PROJECT

In July 1993 Gwalia Consolidated Ltd ("Gwalia") lodged its Public Environmental Review ("PER") for the Kemerton Silica Sand Project ("the Project") with the Environmental Protection Authority ("EPA") [now the Department of Environmental Protection ("DEP")].

As noted in Section 3.2 of the PER, the silica sand deposit is located on 1,620 hectares of freehold land contained in certificate of title volume 1842 folio 350 and volume 1830 folio 340 ("the Land"). Gwalia has an option to purchase the Land which will only be exercised if all necessary approvals required for the Project, including that of the EPA, are received and a decision is made to proceed with the Project.

The Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 applies to nine (9) wetlands on the Land in the vicinity of the Project. A map showing the location of the wetlands in relation to the proposed plant site and dredge pond is attached. Only two of the wetlands would be directly impacted by the Project with the remaining seven wetlands protected from direct and indirect impact - refer PER Section 4.1.

The PER sets out in detail how the Project will be managed so as to protect those areas and wetlands not directly affected by the Project. Additionally, it contains a firm commitment by Gwalia to rehabilitate, to the satisfaction of CALM and the EPA, areas which are directly affected. It is our expectation, based on advice from CALM and our environmental consultants, that this

75023

16 Parliament Place, PMB 16, West Perth, Western Australia 6872
Tel (61-9) 481 1988 Fax (61-9) 481 1271 Telex AA95797

rehabilitation will restore wetland form and function; indeed, the area of wetland will be significantly increased over the life of the Project.

In addition to its commitment to protection and rehabilitation of wetlands in the vicinity of the Project, Gwalia undertook to investigate the feasibility and desirability of vesting rehabilitated and other areas with appropriate authorities to ensure long term management of ecological values. This undertaking is contained in Section 6.1.4 of the PER and Section 1.4 of the November 1993 "Amended Summary of Environmental Commitments" lodged with the DEP as part of Gwalia's response to submissions received on the PER.

The vesting proposal was developed further in Gwalia's presentation to the EPA on 10 February 1994. Gwalia is prepared to make a firm commitment to vest certain areas of land in the Project area with an appropriate authority agreed by Gwalia and the EPA. As previously discussed with the EPA and DEP, there are certain conditions which have to be satisfied before the Project, and consequently the vesting proposal, can proceed. They are -

(1) Gwalia and its joint venture partner deciding to proceed with the Project as described in the PER;

(2) Gwalia exercising its option to purchase the Land on which the Project is located and becoming the registered proprietor of the Land;

(3) the Minister granting approval for the Project;

(4) approval from the necessary government or statutory authorities to the vesting proposal (to the extent that such approval is required for subdivision or similar);

(5) execution of an agreement by the EPA, Gwalia, and the authority in which the land will be vested recording the terms on which the vesting will take place including the following matters -

(a) **Ownership of Minerals**

As the Land was alienated in fee simple from the Crown before 1 January 1899, the owner of the Land owns all minerals on or below the surface of the Land (other than gold, silver and other precious metals) unless ownership of minerals is excluded from any dealing with the land. In vesting the land, Gwalia wishes to retain ownership of minerals on or under the vested land.

(b) **Restriction on Assignment**

Gwalia expects that if the relevant authority decides that it no longer wishes to hold the land for conservation purposes, that land would be transferred back to Gwalia at no cost. Any dealing with the vested land would require Gwalia's prior consent.

(c) **Management**

A management working group which would include Gwalia should be established to provide for appropriate management of the land until such time as the land is vested.

Assuming these conditions are satisfied and the Project proceeds, Gwalia would vest approximately 198 hectares of land shown on the attached map as "Stage 1", with an appropriate authority agreed between the EPA and Gwalia. The land would be vested as soon as practicable after the conditions noted above are satisfied.

Approximately 121 hectares of land shown on the attached map as "Stage 2", would be vested upon completion of mining by Gwalia and rehabilitation of the land to standards agreed with the EPA and CALM (in accordance with the PER).

In addition to vesting the Stage 1 and Stage 2 land, Gwalia will ensure the protection of wetland number 4 shown on the map, which is outside the area to be vested, by erecting a stock-proof fence and appropriate signs prior to commencing operations on the Land. This commitment is noted in Section 6.2 (on page 33) of the PER and was reaffirmed in paragraph 2.1 of the "Amended Summary of Environmental Commitments" dated November 1993.

The total area of land which would be vested is approximately 319 hectares which represents approximately 20% of the land Gwalia will acquire if it exercises the option to purchase.

The land to be vested, taken alone and without ascribing any value to minerals situated on or under the land, is a valuable asset. Gwalia's commitment to vest the land is a significant acknowledgment which guarantees the long term security of the wetlands in question.

As previously advised to DEP officers, if the Minister approves the Project Gwalia intends to immediately seek the relevant statutory approvals to extend the Project area to the west of the Stage 2 land indicated on the attached map. This western extension does not include any lakes gazetted under the Environmental Protection (Swan Coastal Plain Lakes) Policy 1992 ("EPP") or otherwise. Consequently the conservation issues relevant to mining the Stage 2

land (which is covered by the EPP) and which were the focus of the PER, do not arise. It is for this reason that a proposal to mine the land to the west of the Stage 2 land is not included in the PER.

We look forward to your response to the proposal. If it is acceptable, we suggest that we proceed as soon as possible to prepare a more formal agreement on the basis of this letter.

Yours faithfully

M J Hillbeck

M J HILLBECK
GENERAL MANAGER, GROUP OPERATIONS
Att