Voyager Quarry
Avon Loc 1881, Lots 11 and 14 Horton Rd, The Lakes

BGC (Australia) Pty Ltd

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
1 May 02	**Level of Assessment set (following any appeals upheld)**	
6 Jan 03	**Proponent Document Released for Public Comment**	**40**
3 Mar 03	**Public Comment Period Closed**	**8**
14 Dec 04	**Final Proponent response to the issues raised**	**93**
26 Apr 05	**EPA report to the Minister for the Environment**	**18**

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Summary and recommendations

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by BGC (Australia) Pty Ltd (referred to in this report as the proponent) for the development of the Voyager Quarry in The Lakes, covering an area of approximately 85 hectares in the Shire of Northam.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

It is the EPA's opinion that the following factors for this proposal require detailed evaluation in this report:

a) direct impacts on flora and vegetation;
b) indirect impacts on flora and vegetation;
c) vertebrate fauna;
d) invertebrate fauna;
e) closure and rehabilitation;
f) dust;
g) ground and surface water;
h) noise from vegetation clearing and site preparation;
i) operational noise; and
j) vibration.

The EPA has also provided advice in relation to flyrock and community consultation.

Conclusion

The EPA has considered the proposal by BGC (Australia) Pty Ltd for the development of the Voyager Quarry in The Lakes, which will require the clearing of 85 hectares of vegetation and ultimately result in a quarry of 900m in length, 450m in width and a depth of 50m. Development of the proposed quarry will entail excavation of up to 2 million tonnes of gravel and approximately 12 million tonnes of clay from the quarry footprint. This will allow for approximately 60 million tonnes of granite to be excavated from the site over a 50-year period (via conventional drilling and blasting, loading and hauling, crushing and screening methods). Further details are provided in the proponent's PER (BGC 2003a, 2003b and 2003c) and proponent's response to submissions documentation (which is attached as a CD-ROM).

The EPA has concluded that the proposal is capable of being managed so that the EPA's objectives would not be compromised, provided that there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 3 and summarised in Section 4.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that it recommends be imposed if the proposal by BGC (Australia) Pty Ltd for the Voyager Quarry is approved for implementation.

These conditions are presented in Appendix 3. Matters addressed in the conditions include the following:

a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3;
b) protection of bushland on the proponent's property but outside the operational footprint of the proposed quarry;
c) preparation and implementation of a Fauna Relocation and Habitat Plan;
d) preparation and implementation of a Trapdoor Spider Relocation Programme;
e) preparation and implementation of a Closure and Rehabilitation Strategy (including a Visual Impact Strategy);
f) preparation and implementation of a Dust Monitoring and Remedial Action Programme;
g) preparation and implementation of a Ground and Surface Water Monitoring Programme;
h) preparation and implementation of Area-Specific Noise Management Plans (to address noise from clearing of vegetation or excavation of rock to a maximum depth of five metres);
i) preparation and implementation of an Operational Noise Monitoring Programme; and
j) requirement to monitor ground vibration as a result of blasting.

It should also be noted that the proposed quarry would be subject to the requirements of the *Environmental Protection Regulations 1987*, the *Environmental Protection (Noise) Regulations 1997* as well as the *Local Government Act 1995*.

The proponent will also be required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*. These approvals, where granted, will also be subject to a number of legally-binding conditions relating to the protection the environment.

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by BGC (Australia) Pty Ltd (referred to in this report as the proponent) for the development of the Voyager Quarry in The Lakes, covering an area of approximately 85 hectares in the Shire of Northam.

This proposal is also a relocation to the west of the proponent's existing quarry operations at The Lakes. The existing quarry location is located on Great Southern Highway in The Lakes, and the proposed location for the new quarry is Lot 14 Horton Road, The Lakes (Avon Location 1881).

The proposal, which was initially described within the proponent's Public Environmental Review (PER), was referred to the EPA on 19 December 2001 by the Commissioner for Soil and Land Conservation. The proposal affects approximately 85 hectares of remnant vegetation, and involves the quarrying of a resource which is an extension of a Key Extraction Area designated in the Western Australian Planning Commission's Basic Raw Materials Planning Policy Statement. The proposed relocation of the quarry also has implications for the fauna (both vertebrate and invertebrate) of the region, as well as the potential to impact upon residents in the immediate vicinity. The proposed relocation of the quarry is to an area of land owned by the proponent.

In December 2001, the EPA determined the level of assessment for the proposal at PER, and this level of assessment was subject to a two week appeals process. A number of appeals against the level of assessment were considered by the Minister for the Environment and dismissed on 1 May 2002. The subsequent PER document compiled by the proponent and their consultants, URS Australia Pty Ltd, was released for public review for a period of eight (8) weeks from 6 January 2003, closing on 3 March 2003. An extension was then provided to allow for further public submissions until April 2003. Following a review of the submissions, the proponent modified its proposal and incorporated details of additional monitoring work and data within its Response to Submissions.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 presents the EPA's conclusion and Section 6 details the EPA's recommendations.

A CD-ROM attached to this report contains a summary of issues raised in submissions and the proponent's Response to Submissions. This CD-ROM is included by way of information only, and does not form part of the EPA's report and recommendations. Key issues arising from the assessment process that have been taken into account by the EPA appear in the report itself.

2. The proposal

The proponent currently operates a quarry at The Lakes. This site is approximately 16 kilometres east of the Town of Mundaring and 47 kilometres southwest of the Town of Northam on the Great Southern Highway, Western Australia (see **Figure 1**). The proponent has been operating the existing quarry since 1990. The quarry provides crushed granite for a variety of uses, including concrete, road base and building products. The current quarry comprises an open pit, a crushing plant, noise attenuation bunds, product stockpiles, a water supply dam, a workshop, fuel storage facilities, office facilities, amenities and a weighbridge. The operation has a nominal rated throughput of approximately 900,000 tonnes per annum (tpa).

The existing quarry has less than 5 years of commercially winnable resources remaining, and in order to maintain supplies of the resource, needs to expand or relocate. An extensive review of possible locations for the relocated quarry was undertaken by the proponent, which determined that the nearest and most viable resource is situated on land located immediately to the west of the existing quarry in uncleared land on Lot 14 Horton Road (see **Figure 2**).

Development of the proposed quarry will entail excavation of up to 2 million tonnes of gravel and approximately 12 million tonnes of clay from the quarry footprint. These materials will be sold or stockpiled offsite (either at an agreed final destination or at the existing quarry site). Topsoil from the excavation will be trucked directly to the proposed revegetation area (discussed elsewhere within this report). This will allow for approximately 60 million tonnes of granite to be excavated from the site over a 50-year period (via conventional drilling and blasting, loading and hauling, crushing and screening methods).

The development of the quarry will require the clearing of 85 hectares of vegetation, and it is anticipated that the project's development will occur in six stages over the life of the quarry, with Stage 1 and Stage 2 being initially developed to provide room for the new below-ground facilities and infrastructure. Subsequent stages will then be developed as the need to access further granite resources arises (see **Figure 3**). The staged approach will also ensure that excavation of the topsoil and subsoil (gravel and clay) will only occur on 6 occasions during the life of the mine. All infrastructure, crushing and screening plants and product stockpiles will be housed below ground level, and the site will be surrounded by a buffer of trees and vegetation.

As a result of this proposal, and the impacts associated with the quarry's development, the proponent has developed a package of environmental offsets which seeks to revegetate and protect approximately 120 hectares of land on the proponent's property outside the operational footprint of the proposed quarry, as well as provide protection for further remnant vegetation elsewhere.

Figure 1: Location of the Proposed Quarry.

Figure 2: Proposed Operations and Area of Disturbance

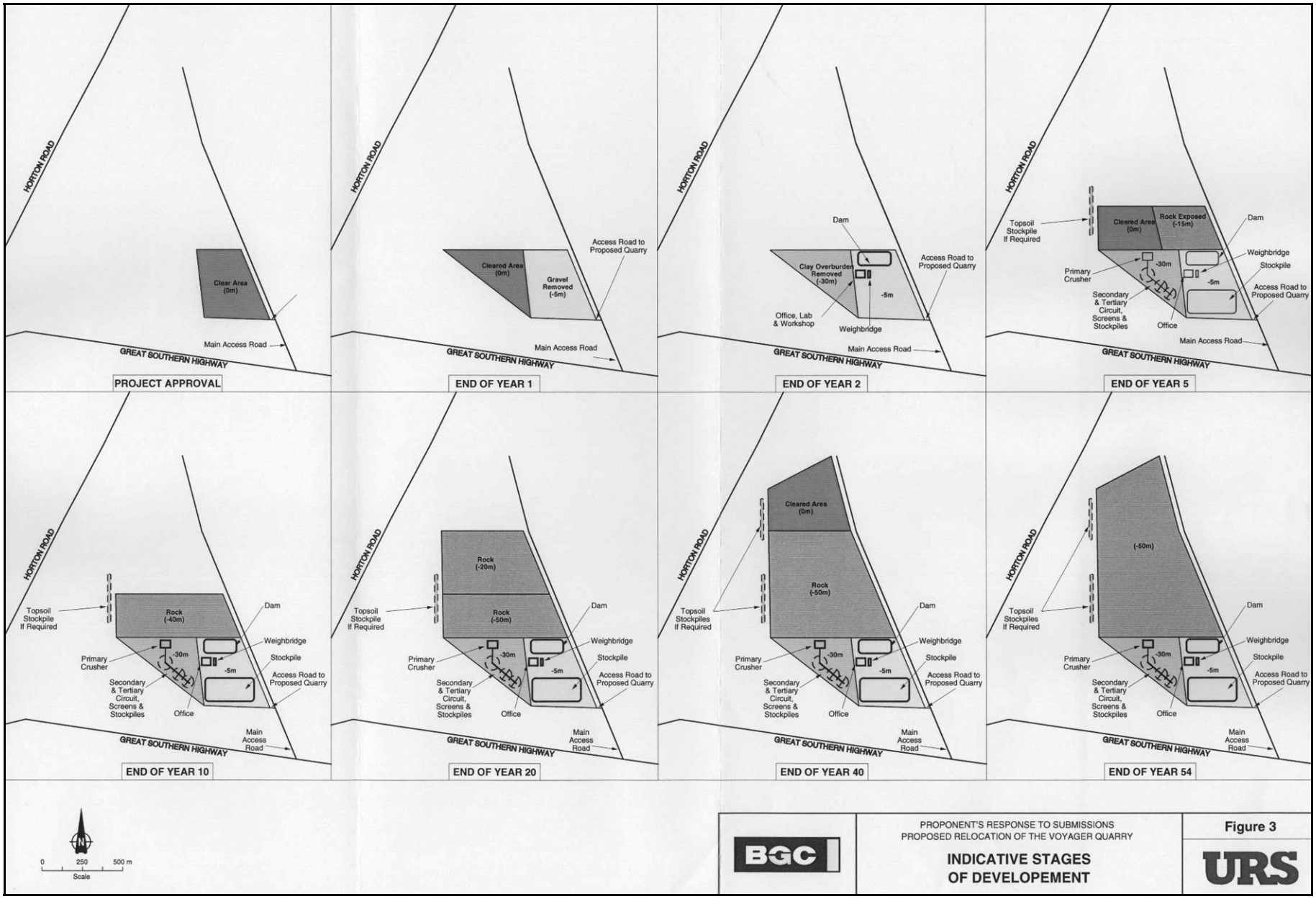

Figure 3 Indicative Stages of Quarry Development

The proposed offsets package includes:

- The conservation covenanting of approximately 120 hectares of native vegetation (including jarrah-marri woodland and heathland), and held as freehold by the proponent;
- The provision of not less than 15km of fencing materials to the Ministry of Justice (MOJ), to protect remnant vegetation and the Wooroloo Brook on land managed by MOJ as prison farms; and
- The rehabilitation of approximately 60 hectares of gravel pits and other degraded lands managed by Local and State Government agencies.

The main characteristics of the proposal are summarised in **Table 1**. A detailed description of the proposal is provided in Section 3 of the PER (BGC, 2003), and further details are provided within Section 3 of the Response to Submissions (URS, 2004).

Table 1: Key Proposal Characteristics

Element	Description
Type of Project	Hard rock quarry
Project Life	Approximately 50 years
Rate of Extraction	6,000 – 10,000 tonnes per day
Extraction Method	Conventional drilling, blasting, loading and hauling techniques
Location of Crushing and Screening Operations	Within the quarry pit, approximately 30m below the ground surface
Crushing and Screening Equipment	New equipment to be utilised onsite, incorporating improved pollution controls. Primary crusher will be housed within a noise reduction structure.
Final Quarry Dimensions	Length approximately 900m Width approximately 450m Depth approximately 50m
Footprint of Quarry pit	Approximately 59 hectares
Footprint of all Disturbances	Approximately 85 hectares
Quarry Operating Hour (Normal operating hours to be regulated by the Local Government Authority through the conditions of an Extractive Industry Licence)	Indicative Normal Operating Times 0700 hours – 0400 hours Monday to Friday 0700 hours – 1300 hours Saturday
Major Components	Quarry Product Stockpiles Water Storage Dam Infrastructure (including processing plant, administration buildings, workshop and roads)
Water Storage Dam Capacity	150,000 kilolitres (kL)
Water Supply Source	Surface runoff and groundwater seepage
Average Daily Water Requirements	Summer Approximately 380 kL Winter Approximately 80 kL
Maximum Annual Water Requirements	Approximately 95,000 kL
Anticipated Quarry Yield	Gravel 1-2 million tonnes Clay approximately 12 million tonnes Hard rock approximately 60 million tonnes
Offsets Package	• The conservation covenanting of

Element	Description
	approximately 120 hectares of native vegetation, held as freehold by the proponent • Rehabilitation of an area of native vegetation previously cleared by the proponent and situated outside the operational footprint of the proposed quarry. • Provision of not less than 15km of fencing to protect remnant vegetation on land managed by MOJ • Rehabilitation of approximately 60 hectares of gravel pits and other degraded lands

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal, and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the following factors for this proposal require detailed evaluation in this report:

a) Direct impacts on flora and vegetation;
b) Indirect impacts on flora and vegetation;
c) Vertebrate fauna;
d) Invertebrate fauna;
e) Closure and rehabilitation;
f) Dust;
g) Ground and surface water;
h) Noise from vegetation clearing and site preparation;
i) Operational noise; and
j) Vibration.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

The EPA's overarching environmental objectives for the factors described above are listed in Table 2

Details on the relevant environmental factors and related key issues are discussed in Sections 3.1 to 3.11 below. The description of the factor shows why it is relevant to the proposal, and how it will be affected by the proposal. The assessment of the factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

Table 2: EPA Objectives relevant to the proposal

Environmental Factor	EPA Objective
Direct impacts on flora and vegetation	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To maintain and enhance habitat for native fauna.
Indirect impacts on flora and vegetation	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To maintain and enhance habitat for native fauna.
Vertebrate fauna	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To maintain and enhance habitat for native fauna.
Invertebrate fauna	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge. To maintain and enhance habitat for native fauna.
Closure and rehabilitation	To ensure that closure planning and rehabilitation are carried out in a coordinated manner and are treated as an integral part of quarry development and operations, consistent with the ANZMEC/MCZ *Strategic Framework for Mine Closure* and best practice. To ensure that aesthetic values are considered and measures adopted to reduce visual impacts on the landscape and surrounding residents as low as reasonably practicable.
Dust	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land-uses by meeting statutory requirements and acceptable standards.
Ground and surface water	To maintain the quantity and quality of ground and surface water so that existing and potential uses, including ecosystem maintenance, are protected.
Noise from vegetation clearing and site preparation	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet acceptable standards.
Operational noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory requirements.
Vibration	To protect the amenity of nearby residents from vibration impacts resulting from activities associated with the proposal by ensuring the vibration levels meet statutory requirements and acceptable standards.

3.1 Direct Impacts on Flora and Vegetation

3.1.1 Area for Assessment

The area for assessment is identified as Lot 11 and Lot 14 Horton Road, The Lakes.

3.1.2 Description

As noted in Section 2 of this document, the proposal will involve the clearing of approximately 85 hectares of remnant vegetation. Flora and vegetation surveys were

conducted in 2002. Through these surveys, eleven plant communities were defined and mapped in the proposed Project Area. All site vegetation types present in the proposed Project Area are represented in the wider conservation estate (Mattiske, 2002).

The surveys identified a Priority 4 species, *Hemigenia viscida*, recorded in four of the 17 heath communities identified in the Project Area, with approximately 95% of the individuals occurring in one specific heath community (identified as H5 in the PER document). No other Declared Rare Flora (DRF), Priority Flora or other plant species of particular conservation significance were identified.

One of the key issues raised by the stakeholders who made submissions on the PER, as well as the Department of Conservation and Land Management (CALM), was in relation to the data for the populations of *Hemigenia viscida* to be provided to CALM, and management and protection of this species. Further work associated with this species noted that individuals were recorded in three "heath community" areas on Lots 11 and 14 Horton Road, and subsequent studies identified a further community which supported this species. Two of these communities are situated within the Project Area (containing approximately 65 plants and 9 plants respectively), and two communities to the west of the project area (containing approximately 1,612 plants and 20 plants respectively). Additional searches outside the lots detailed above also identified another population of approximately 110 plants located south of the Mundaring gravel pit operation off Horton Road (to the west of the Project Area).

Given this, it is apparent that a substantially larger number of *Hemigenia viscida* individuals are located external to the project area than within it. The proponent has also committed to maintaining a 50m buffer to heath community H5 where 95% of the plants of this species were recorded.

In addition to the Priority species identified above, it was noted within several submissions that the clearing of 85 hectares within the Shire of Northam would be unacceptable, particularly given that the Shire has already been cleared to below the recommended 30% national strategy level outlined in the EPA's Position Statement on the Environmental Protection of Native Vegetation in Western Australia (EPA 2002).

3.1.3 Assessment

The EPA has considered the details outlined within Section 4.5 of the PER, and within the Proponent's Response to Submissions. Of particular interest is the proponent's commitment to the implementation of an offsets strategy, which will essentially seek to replace some of the local botanical values that will be reduced through the proposed clearing activities. As noted elsewhere in this document, the proposed offsets package includes:

- The covenanting of approximately 120 hectares of native vegetation (jarrah-marri woodland and heathland), and held as freehold by the proponent;
- Rehabilitation of an area of native vegetation previously cleared by the proponent and outside the operational footprint of the proposed quarry.
- The provision of not less than 15km of fencing materials to the Ministry of Justice (MOJ), to protect approximately 100-150 hectares of remnant

vegetation and the Wooroloo Brook on land managed by MOJ as prison farms; and

- The rehabilitation of approximately 60 hectares of gravel pits and other degraded lands managed by Local and State Government agencies.

This package has been developed in accordance with the guidelines and policy outlined within the EPA's Preliminary Position Statement Number 9 Environmental Offsets, and in consultation with the Local Authorities, who have provided their support. The EPA considers that the expected benefits of implementing the proposed strategy are likely to include assistance with catchment management issues, re-establishment of biodiversity values, and the establishment of corridors and linkages for native fauna movement between areas of remnant vegetation.

Concerns have been raised regarding the unauthorised clearing of vegetation which took place on the lots in question in December 2001. The EPA notes that the proponent has made a commitment to rehabilitate cleared areas on the property external to the proposal footprint.

The EPA further considers that the protection of native vegetation on the proponent's property (external to the proposal footprint) should be addressed by a condition on the Minister's approval of the project. A recommended environmental condition, which is designed to complement the proponent's commitment on this matter, is provided as condition 6 in Appendix 3 of this report.

The EPA also recommends that the proposed covenanting and fencing of approximately 120 ha of bushland on the proponent's property should be in effect before any land clearing or excavation works take place and that the remainder of the offsets package should commence within 12 months after approval for the quarry is given. Environmental management commitments in relation to offset measures are provided in Appendix 3 of this report.

3.1.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objectives for this factor providing that:

- a condition is imposed requiring the proponent not to clear or otherwise disturb native bushland on Lots 11 and 14 Horton Road outside the operational footprint;.
- a condition be imposed requiring the proponent to protect that vegetation through erection and maintenance of onsite fencing;
- the proponent's commitments in relation to environmental offsets are implemented.

3.2 Indirect Impacts on Flora and Vegetation

3.2.1 Area for Assessment

The area for assessment is identified as Lot 11 and Lot 14 Horton Road, The Lakes,

3.2.2 Description

In the PER document, the proponent has put forward a regime of procedures and environmental controls that should, if fully implemented, protect the environmental values of the area of land to be affected by the implementation of the proposal.

However, several submissions raised concerns relating to the indirect impacts on flora, vegetation and fauna habitats through the risk of fire, and also the risk of the spread of jarrah dieback (*Phytophthora* spp). Section 7.5.3 of the PER notes that the majority of the proposed site is free from the symptoms of *Phytophthora* spp. infestation, and that measures will be implemented to ensure that the spread of the disease does not occur away from the main area of infestation (along Great Southern Highway). The proponent has subsequently also restricted access around the dieback infested area, and erected signage indicating the disease status of the area. A further survey has confirmed that dieback has not spread since the initial assessment undertaken in 2001.

Fire could also have a significant on the native bushland surrounding the proposed quarry. This is also a critical issue with respect to the management of the trapdoor spider species onsite (and discussed elsewhere in this document).

3.2.3 Assessment

While the proponent has indicated the intention to provide contingencies in the event of fire ignition, it is the EPA's view that this issue is of high importance. The covenanting of the land described in Section 3.1 and referred to as part of the proponent's environmental commitments will be undertaken in conjunction with CALM. The EPA understands that CALM's requirements for the covenanting arrangements will include provisions for bushfire management.

The EPA also considers the issue of dieback management to be critical in ensuring the protection of vegetation both on site and to prevent the disease spreading offsite and potentially compromising the quality of vegetation elsewhere. Given this, the EPA has recommended the imposition of an environmental condition requiring the fencing of the native vegetation on the proponent's property (outside the proposal footprint) to restrict access and reduce the risk of dieback spread.

Recommended conditions relating to the requirements for the fencing of the site are provided as a component of condition 6 in Appendix 3 of this report.

3.2.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objectives for this factor providing that:

- a condition is imposed requiring the proponent to protect the native vegetation on the proponent's property (external to the operational footprint), through the erection and maintenance of onsite fencing; and
- the proponent's commitment in relation to putting in place a covenant over that vegetation is implemented.

3.3 Vertebrate Fauna

3.3.1 Area for Assessment

The area for assessment is identified as Lot 11 and Lot 14 Horton Road, The Lakes.

3.3.2 Description

Section 7.6 of the PER notes that a desktop vertebrate fauna review and brief site inspection was undertaken in 2002, which identified a number of species which may utilise the area. Following a number of submissions relating to the lack of site-specific information, an additional fauna survey was undertaken after consultation with the Department of Environment (DOE) to provide additional information on a range of 'targeted' species. These species were listed as:

- Carnaby's Black Cockatoo, and Forest Red-tailed Black Cockatoo;
- Brush-tailed Phascogale;
- Western Brush Wallaby;
- Carpet Python and Dell's Skink;
- Rainbow Bee-eater; and
- Western Grey Kangaroo.

No sightings of conservation significant birds occurred during the targeted surveys, and it was noted that very few suitable breeding hollows exist in the project area. There was possible evidence of foraging of Black Cockatoos noted in the project area. No sightings of the Western Brush Wallaby, Carpet Python or Dell's Skink were noted, although one road-kill of the wallaby was noted at the quarry entrance. Given the few sightings of the Western Grey Kangaroo, the population is thought not to exceed 25-30 individuals.

The targeted surveys found no evidence of Phascogale use of the subject land, although two dead specimens were reported by the public after the incident of unauthorised land clearing in 2001. One single Chuditch was recorded by the survey, although the survey report notes that the area to be cleared represents a small percentage of the home range of this individual (Biota 2003). A further noteworthy fauna species sighted was an echidna.

The recommendations from this survey include investigation of the opportunities to enhance nesting resources in the project area through the installation of nest boxes, the placement of logs and other debris (resulting from land clearing) to enhance fauna habitat in rehabilitated areas and that large hollows are made available about the margins of the cleared area to provide refuge for Chuditch, as well as the recommendation that wherever possible, hollow-bearing trees should be left undisturbed.

3.3.3 Assessment

The EPA recognises that significant impacts on listed threatened fauna species appear unlikely due to the restricted area of impact of the proposal.

Given this the EPA considers that the management requirements for fauna species potentially impacted upon could be addressed through the requirement for preparation and implementation by the proponent of a "Fauna Relocation and Habitat Plan" as a

condition on the Minister's approval of the project. A recommended environmental condition to achieve the objectives of this recommendation is provided as condition 7 in Appendix 3 of this report.

3.3.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objectives for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement a "Fauna Relocation and Habitat Plan".

3.4 Invertebrate Fauna

3.4.1 Area for Assessment

The area for assessment is identified as Lot 11 and Lot 14 Horton Road, The Lakes.

3.4.2 Description

As a result of stakeholder concern, and as part of the work undertaken for the preparation of the PER document, surveys of poorly dispersing invertebrate groups were undertaken. The targeted Short-Range Endemic (SRE) fauna were trapdoor spiders and land snails.

The details regarding this work are provided in the PER and indicate that an apparently undescribed species of trapdoor spider and what would appear to be one or more undescribed species of land snails were discovered during the field surveys. Following this work, and after receiving several submissions from the public and Department of Environment, additional survey work was undertaken in 2004.

Trapdoor Spiders

Trapdoor spiders are poorly-dispersing, long-lived animals. It is known that females of trapdoor spiders may live at least 24 years in the wild, always inhabiting the same burrow. The findings of the additional survey work completed in 2004 for the trapdoor spiders of Lots 11 and 14 found that the core population of spiders (approximately 79 burrows) is located within the Project Area, and that the long-term viability of the entire population (approximately 54 burrows left undisturbed on Lots 11 and 14) may be dependent on this core population of breeding "matriarch" females. That is, the spider population may not be able to persist in the long term if the 'core' population is destroyed. Following extensive targeted searches in other areas with similar habitat, another population of trapdoor spiders (some 25 burrows) was located at the intersection of Beraking Pool Road and Brookton Highway. It has not been determined at this time whether this population is the same species as those found at the project area.

Translocation of large populations of trapdoor spiders has not yet been attempted in the field (although translocation to artificial accommodation such as flower pots of soil maintained in a laboratory has had some success with one specimen of another species being successfully transplanted). However the likely success of transplanting large numbers of individuals is unknown.

Land Snails

The initial survey work undertaken in 2002 found that the diversity of species suggested an impoverished molluscan fauna within the survey area. Three particular species were identified, and were the subject of a number of submissions relating to their status and management.

As with the trapdoor spiders, further survey work was undertaken for land snails in 2004, which focussed on the three poorly known and unnamed species found in the 2002 survey. The surveys covered areas within the Project Area and within the surrounding State Forest.

The survey work provides a number of conclusions regarding these land snail species. Firstly, given that a number of specimens of the taxa belonging to the genus *Bothriembryon* and the genus *Westralaoma* were found at a number of survey stations within the State Forest (in an area which will not be disturbed by the proposal), it is unlikely that these taxon are at threat as a result of the development.

The specific identity and conservation status of the third snail, a taxon belonging to the family Charopidae, is unclear. However the northern part of lot 14 where the shells of this snail were found in 2002 will not be cleared and will be kept vegetated in perpetuity. This measure will safeguard the habitat and its resident population of charopid snails.

3.4.3 Assessment

The information collected to date indicates that the trap door spider may be a new species whose survival may be threatened by the construction of the new quarry. However, in the case of the land snails, it is not considered that the new quarry poses an unacceptable threat to the survival of any species because two of the species appear to be widely distributed outside the project site and, for the third species, secure habitat will be retained in perpetuity in bushland adjacent to the proposed quarry.

The key issue therefore is the trapdoor spider and the EPA therefore concludes that any development needs to take a precautionary approach. Further work is required to determine whether the species of *Gaius* spiders at Brookton Highway is the same as that found on Lot 14. If it is determined that the spiders at Brookton Highway are not the same species, further investigation is required to determine whether a dense population of the Voyager Quarry *Gaius* sp. exists elsewhere, if possible in the conservation estate to provide greater confidence that the species will persist in the long term. If it can be demonstrated that at least one other secure population of the species exists elsewhere, it is considered that the proposal can proceed without unacceptable risk of loss of the species. Notwithstanding this, it is considered appropriate to require the proponent to attempt to translocate spiders from the area to be affected by the proposed quarry.

The EPA therefore recommends that, given the potential significance of the trapdoor spiders associated with the Project Area, the management requirements of the potential risks to these short-range endemic fauna should be addressed through the requirement for further investigation and research on trapdoor spiders. In addition, the proponent should be required to prepare and implement a "Trapdoor Spider Translocation Programme" as a condition on the Minister's approval of the project. A

recommended environmental condition to achieve these objectives is provided as condition 8 in Appendix 3 of this report.

3.4.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objectives for this factor providing that:

- a condition is imposed requiring the proponent to undertake further research and investigation on trapdoor spiders. In addition the condition should require the proponent to prepare and implement a "Trapdoor Spider Translocation Programme".

3.5 Closure and Rehabilitation

3.5.1 Area for Assessment

The area for assessment is identified to be Lot 11 and Lot 14 Horton Road, The Lakes, and surrounding areas which have the potential to be impacted upon by the proposed operations.

3.5.2 Description

As discussed elsewhere within this report, the proposal affects approximately 85 ha. The void itself will ultimately cover approximately 61 hectares, just over 71% of the total area to be disturbed. Closure and rehabilitation of such voids presents specific problems, particularly when a final land use for the site and void is yet to be determined.

It is obvious from the variety and number of submissions received that full achievement of agreed rehabilitation and closure completion criteria should be regarded as a critical matter to the environmental acceptability of the proposal.

In addition, issues associated with visual amenity, particularly of quarry proposals, have become more prominent in recent years. Several proposals have recently been reviewed by the EPA and the Department of Environment. The findings of these reviews have suggested that visual impact is one of the main areas of concern, particularly for sites that do, or have the potential, to encroach on local communities.

Whilst studies undertaken as part of the PER process suggested that there is no direct line of sight between the residences and the new quarry, the response to submissions is less conclusive, and in fact suggests that an area of the proposed quarry may be visible from residences, but that further studies would be required to determine whether this is the case.

Other considerations that were raised within the documentation and submissions, include the use of vegetated buffers to reduce visual impacts, and the potential issues associated with light overspill. These issues require further work prior to the commencement of activities onsite.

3.5.3 Assessment

The EPA recognises and accepts that projects of this size and nature have associated impacts of disturbance, and notes that the proponent has indicated an intention to minimise impacts through a variety of means. These include the staging of the quarry over its 50-year life span, a commitment to limit disturbance to 85 hectares and the modification to the operations to ensure that no topsoil or overburden stockpiles are placed onsite. Whilst the EPA is mindful of the commitments made by the proponent in this regard, it also has concerns relating to the ongoing management of the area after operations have ceased.

While the commitments made by the proponent in regard to visual assessment are also noted, the EPA has concerns relating to the management of these issues, particularly in light of recent similar cases. If managed inappropriately or poorly, the visual impacts associated with the development could present an ongoing risk to the environmental values of the area, both during operation and post-closure.

Although the proposed quarry is not regulated under the *Mining Act 1978*, the EPA recommends closure and rehabilitation planning should be carried out to best practice standards equivalent to requirements for a mine of equivalent scale. In particular closure planning should be carried out consistent with the ANZMECC / MCA *Strategic Framework for Mine Closure*.

To this end, the EPA recommends imposition of an environmental condition requiring the preparation and implementation of a Closure and Rehabilitation Strategy as a condition on the Minister's approval of the project. A component of this condition will incorporate the formulation and implementation of a Visual Impact Strategy, which will be designed to manage and ameliorate potential visual impacts (including impacts from artificial lighting) of the operations.

Recommended conditions relating to the requirements described above are provided as condition 9 in Appendix 3 of this report.

3.5.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objectives for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement a Closure and Rehabilitation Strategy, incorporating a visual impact strategy to provide for screening of the quarry (and associated artificial lighting) from surrounding residents.

3.6 Dust

3.6.1 Area for Assessment

The area for assessment is identified to be Lot 11 and Lot 14 Horton Road, The Lakes, and surrounding areas that have the potential to be impacted upon by the proposed operations.

3.6.2 Description

Management of dust is a key issue for all extractive industry operations. Whilst it is accepted that some dust generation is unavoidable during most types of ground disturbing activity, it is unacceptable for this dust to have health or significant amenity implications for the surrounding community.

A large number of submissions was received on this particular issue, and the majority of these referred to the perception that the proponent's current operations were performing poorly with respect to management of dust, and concern with respect to the impacts of dust on nearby residents' health, well-being and amenity.

In responding to submissions, the proponent identified that a number of actions have been undertaken over the last few years to improve dust management and other environmental issues at the existing quarry. Reports of inspections performed by the Department of Industry and Resources for worker occupational heath and safety purposes, note that dust management from the site, particularly, for example, associated with material processing activities, was of a high standard. A site audit carried out by Sinclair Knight Mertz and commissioned by the DoE has made a number of recommendations for further improved dust management practices at the existing quarry site.

Concerns have also been raised by residents about dust from blasting. The potential for unacceptable off-site impacts from dust associated with blasting is most affected by the prevailing wind direction. In the existing quarry operation, the proponent has modified its blasting practices to minimise the potential for blast dust to reach residences and has set blasting for Monday or Tuesday with the aim of delaying blasting in the event that wind conditions are unfavourable. However, because regulations forbid explosives being left unattended in the ground when the quarry is closed, they must be detonated on Friday afternoons under less than optimal wind conditions if it has not been possible to detonate them earlier in the week. It is expected that such circumstances would arise only on a few occasions each year.

3.6.3 Assessment

There are two main dust issues: dust associated with general operations such as lift-off from stock piles or generated by processing or moving machinery, and dust associated with blasting. In light of the proximity of the proposed quarry to residences the EPA is of the opinion that it is essential that dust management at the proposed site be to industry best practice standards. The EPA notes that the proponent has committed to managing dust throughout the life of the operation through a variety of means. These include, but are not limited to:

- Development of the quarry over 5 stages, with minimum clearing for each stage at any one time;
- Undertaking of clearing only during favourable weather conditions;
- Implementation of dust control mechanisms where and as required;
- Monitoring of dust at the premises' boundary;
- Ongoing communication with residents;
- Positioning of the stockpiles and crushing equipment below ground level at the quarry floor;
- Enclosure of all crushing plants and conveyors; and

- Mechanical filtration of exhaust air.

The DoE commissioned an independent desk-top study on the potential impacts of dust on residents' health and amenity. The report, by BenchMark Toxicology Services, concluded that: "the community in the immediate vicinity of the quarry is not being subjected to an unacceptable risk of developing silicosis". The main supporting reasons for this are that:

(i) estimated ambient levels of silica are unlikely to pose a risk of silicosis provided that respirable dust levels at local residences comply with ambient air quality standards;
(ii) according to the World Health Organisation, there are no records of adverse health impacts associated with non-occupational exposure to silica;
(iii) the US EPA considers that the risk of silicosis from exposure to silica in ambient air is close to zero; and
(iv) that reduction of exposure in the workplace in the last 50 years has resulted in a considerable reduction in the incidence of silicosis associated with occupational exposure in Western Australia in the last two decades.

Overall, the report concluded that: "Provided that the respirable dust concentrations outside the boundary of the Voyager Quarry do not exceed Australian ambient air quality standards or guidelines, the local residents are unlikely to be at an increased risk of developing silicosis, other illnesses, or adverse effects from any dust generated from the quarry" (BenchMark 2004).

Whilst the proponent has noted that the standards and goals set out in the National Environment Protection Measure (NEPM) for Ambient Air Quality (NEPC 1998) are designed for use in assessing regional air quality (and are not intended for use as site boundary criteria), the EPA is of the view that in the absence of more appropriate criteria, the NEPM standards should at least be referred to and acknowledged within any management programme for the site.

Given that this matter is one of the key areas of concern for many local residents, the EPA is of the view that the management and control of dust emissions from site activities should be addressed through the requirement for preparation and implementation by the proponent of a "Dust Monitoring and Remedial Action Programme" as a condition on the Minister's approval of the project.

A recommended environmental condition to achieve the objectives of this recommendation is provided as condition 10 in Appendix 3 of this report.

3.6.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objective for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement a Dust Monitoring and Remedial Action Programme.

3.7 Ground and Surface Water

3.7.1 Area for Assessment

The area for assessment is identified to be Lot 11 and Lot 14 Horton Road, The Lakes, and surrounding areas that have the potential to be impacted upon by the proposed operations.

3.7.2 Description

The proposed quarry site is located near the top of a catchment divide, in the south east corner of the Wooroloo Brook catchment. This catchment forms part of the larger Swan-Avon catchment. The site is also located in a proposed Priority 3 Drinking Water Source Area.

The quarry site itself is in the western side of a small valley with drainage in this valley flowing from the south to the north. There are no substantial drainage lines, wetlands or sensitive water bodies in the area that will be disturbed by the proposal. The site is also located in a proposed Priority 3 Drinking Water Source Area.

The requirements for water use for the proposed operations are essentially similar to those for the existing operations. These are approximately 380 kilolitres/day in summer and 80 kilolitres/day in winter.

There was a number of submissions regarding the management of water from the site. These related to the potential impacts of the operations on both groundwater and surface water.

Groundwater

The area in question has been subjected to extensive groundwater investigation as a result of the proposal. These have determined that there will be small groundwater seepage into the quarry pit. This groundwater will then be stored within a storage dam, together with rainfall collected in the pit, for use in dust suppression and operational activities. As a result, there is likely to be some marginal reduction of groundwater levels in the immediate vicinity of the quarry, but there is not expected to be any impact outside the project area as the 'cone of depression' will be of limited extent.

Overall, the work undertaken by the proponent, and the ongoing investigation of groundwater monitoring through a census of existing bores, wells and soaks, the installation of an additional 11 monitoring bores in 2004, seepage inflow tests and refinement of a water balance model for the existing and proposed quarries all indicate that the project is unlikely to have an impact on the quality or quantity of groundwater in the immediate vicinity of the proposal.

Surface water

As noted above, the quarry site is on the western side of a small valley with drainage flowing from the south to the north. There are no substantial drainage lines, wetlands or sensitive water bodies in the area that will directly be disturbed by the proposal. A small stream passes to the east of the existing quarry ('eastern stream') and joins with

a small stream from the west ('western stream'). These streams are ephemeral, flowing mainly in winter.

It is proposed that all onsite runoff will be directed via a series of diversion drains to onsite sumps that will temporarily store the water before use in dust suppression or processing. There will be no uncontrolled discharge from the site, and the only discharge likely to occur will be in the event that excess water is received within the onsite sumps. In these instances, this excess water will be discharged to the western stream after water quality testing confirms its suitability for discharge. The eastern stream is part of the headwaters of Wooroloo Brook. Modelling has shown that the amount of water released will be small in the context of existing flows in Wooroloo Brook, and increased flows will be noticeable for only 2-4 km downstream of the quarry. The discharge of water from the quarry will result in a reduction of salinity of the stream flow.

All diversion drains and onsite channels will be constructed to ensure that they are stable and do not cause downstream erosion, and onsite pollution control practices will ensure that spills of pollutants will not be transported to clean runoff water storage areas.

Monitoring of the proposed site, the current quarrying operations and their surrounds also suggest that issues of surface salinity in the vicinity of the existing operations are likely to be the result of previous upstream agricultural clearing, as opposed to current quarry activities. This is supported by aerial photographs from the catchment taken before the operations commenced, which show salt scalds and seepage prior to the development of the quarry.

Modelling commissioned by the proponent, and reviewed by the Department of Environment, predicts that increased streamflow in the ephemeral streams adjacent to the new quarry, when water is released outside the summer period, will result in dilution of streamflow salinity (to a lower concentration than for the existing quarry). However the modelling predicts that salinities within the streams may increase in summer, as all water inflow and runoff will be contained within the quarry. These effects will be localised and are not expected to be significant in terms of the salinity status of the catchment.

3.7.3 Assessment

The EPA notes the number of submissions that relate to aspects of the current quarry's operations and impacts on groundwater and salinity. The EPA has taken these concerns into consideration when reviewing the documentation available on groundwater and surface water impacts.

The EPA recognises the work undertaken by the proponent in the investigation of the potential environmental impacts of the quarry's development on groundwater and surface water resources. The EPA concurs with the conclusions reached by the proponent that aside from marginal reductions of groundwater levels in the immediate vicinity of the quarry, there are unlikely to be any significant environmental impacts on ground or surface water as a result of the development of the site.

Despite this, the EPA is mindful of the submissions received and the concerns these raised in relation to water and water quality management. As such, the EPA feels it appropriate to recommend that the management and control of water and water quality as a result of the site's activities should be addressed through the requirement for preparation and implementation by the proponent of a "Ground and Surface Water Monitoring Programme" as a condition on the Minister's approval of the project. A recommended environmental condition to achieve the objectives of this recommendation is provided as condition 11 in Appendix 3 of this report.

3.7.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objective for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement a Ground and Surface Water Monitoring Programme.

3.8 Noise from Vegetation Clearing and Site Preparation

3.8.1 Area for Assessment

The area for assessment is identified to be Lot 11 and Lot 14 Horton Road, The Lakes, and surrounding areas that have the potential to be impacted upon by the proposed operations.

3.8.2 Description

The development of the quarry will require the clearing of 85 hectares of vegetation, excavation of up to 2 million tonnes of gravel and approximately 12 million tonnes of clay from the quarry footprint. This will allow for approximately 60 million tonnes of granite to be excavated from the site over a 50-year period (via conventional drilling and blasting, loading and hauling, crushing and screening methods).

It is anticipated that the removal of the vegetation, gravel and clay described above (site preparation works) will occur in six stages over the life of the quarry, with Stage 1 and Stage 2 being initially developed to provide room for the new below-ground facilities and infrastructure. Subsequent stages will then be developed as the need to access further granite resources arises (see **Figure 3**). The staged approach will also ensure that excavation of the topsoil and subsoil (gravel and clay) will only occur on 6 occasions during the life of the mine. All infrastructure, crushing and screening plants and product stockpiles will be housed below ground level, and the site will be surrounded by a buffer of trees and vegetation.

3.8.3 Assessment

A review of the available documentation and work undertaken by the proponent, suggests that the operations have the potential to breach the assigned levels detailed within the *Environmental Protection (Noise) Regulations 1987* during the vegetation clearing and site preparation activities (including excavation of overburden to a depth of approximately 5 metres).

In addition, the activities associated with the construction stage of the development (including topsoil, subsoil and overburden removal) are potentially not regulated

through the *Environmental Protection (Noise) Regulations 1987,* as construction activities are not covered within ambit of these Regulations. Given this, the EPA had concerns regarding the available mechanisms for regulating activities associated with onsite construction and site preparation. The EPA is mindful of the issues raised within submissions to the PER.

Whilst the EPA recognises that the proponent has proposed a large number of management actions to minimise the risks posed by site preparation work, the EPA considers that there is a need for full confidence that the impacts of noise associated with vegetation clearing and excavated is managed in a way that protects the amenity of the surrounding community. The EPA therefore considers that these particular aspects of the project need to be addressed in the conditions imposed by the Minister for the Environment for the implementation of this proposal, including specific noise limits for this aspect of the project.

Specifically, the EPA considers that the management requirements associated with vegetation clearing and site preparation should be addressed by the requirement for preparation and implementation by the proponent of a series of "Area Specific Noise Management Plans" for each of the six proposed stages of vegetation and site preparation. The EPA's recommended environmental condition to achieve the objectives of this recommendation is provided as condition 12 in Appendix 3 of this report.

3.8.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objective for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement an Area Specific Noise Management Plan for each of the six proposed stages of vegetation and site preparation.

3.9 Operational Noise

3.9.1 Area for Assessment

The area for assessment is identified to be Lot 11 and Lot 14 Horton Road, The Lakes, and surrounding areas that have the potential to be impacted upon by the proposed operations.

3.9.2 Description

There are two key aspects to the proposal that relate to noise. These are the general operational noise issues (including, but not limited to, truck movements, crushing and screening activities, stockpiling of material), and the impacts associated with blasting activities (air-blast overpressure and ground vibration). The nearest resident to the Project Area is approximately 560m to the west of the site, whilst a residence to the north is 1km away. Noise issues are essentially managed through the provisions of the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations), and ground vibration limits were until recently detailed within Condition of Licence set by the Department of Environment.

General Operational Noise

A number of submissions received regarding the noise issues related to the perception that the current operations are not complying with their statutory requirements relating to noise and vibration. The modelling work undertaken for the existing quarry indicates that the proposed new operations have the potential to breach the assigned levels detailed within the Noise Regulations at a number of residences surrounding the operations during certain times and under certain atmospheric conditions. This matter was raised by the Department of Environment in its submission to the PER.

The proponent has undertaken a large quantity of work with regards to the investigation of noise from the proposed operations. Additional studies (incorporating modelling) were commissioned by the proponent, and have been peer reviewed by an appropriately qualified expert. A number of additional issues raised through submissions were also considered during this work.

This work indicates that the measures that are proposed for the operations will ensure that, once the operations reach approximately 20m below the ground surface, exceedance of the Noise Regulations would be extremely unlikely, but that there is potential for exceedances when working at shallower depths if operations are not managed appropriately.

Air-blast Overpressure and Ground Vibration

As with general operational noise from the existing operations, there have been ongoing concerns regarding the effects of blasting at surrounding residences. These concerns (also raised as submissions) relate to both the impacts associated with potential exceedances of assigned air-blast overpressure limits as well as exceedances of the ground vibration limits previously stipulated within the Department of Environment's Conditions of Licence. The Department of Environment also raised concerns in its submission on this matter, and suggested that given the variability of results sourced from the existing quarry operations, there was a high potential for the assigned levels for ground vibration to be breached.

The proponent has recognised the importance of this issue and has commissioned a number of studies on the matter. These studies (which included an array of modelling exercises) support the proponent's assertions that air-blast overpressure and ground vibration associated with blasting at the proposed new quarry will not exceed the relevant statutory limits and will not cause damage to adjacent residences. The studies do however provide information on appropriate management measures which should be implemented prior to, and during each blast, to ensure that all statutory limits are adhered to.

The Department of Environment has also recently provided advice in relation to managing ground-vibration impacts. As ground-vibration impacts are not directly related to a Prescribed Activity as defined within the *Environmental Protection Regulations 1987*, they cannot be regulated through the imposition of Conditions of Licence.

3.9.3 Assessment

The EPA is mindful of the concerns raised within submissions about noise and vibration. Whilst the EPA recognises that the proponent has proposed a large number

of management actions to minimise the risks posed by operational noise and blasting, the EPA considers that there is a need for full confidence that the impacts of operational noise and blasting will be managed in a way that protects the amenity of the surrounding community.

The EPA considers that the management requirements should be addressed by the requirement for preparation and implementation by the proponent of an "Operational Noise Measurement Programme" as a condition on the Minister's approval of the proposal. In addition, the EPA considers that the management of ground-vibration should be addressed by the requirement for a condition relating to "Vibration" which stipulates limits to be met and monitoring requirements. The EPA's recommended environmental conditions to achieve the objectives of these recommendations are provided as condition 13 and condition 14 in Appendix 3 of this report.

3.9.4 Conclusion

The EPA concludes that the proposal can be managed to meet its objective for this factor providing that:

- a condition is imposed requiring the proponent to prepare and implement an Operational Noise Measurement Programme; and that
- a condition is imposed requiring the proponent to meet specific ground-vibration levels associated with blasting and incorporating monitoring requirements for vibration.

3.10 Other Advice

3.10.1 Flyrock

Operations at the current quarry site have raised a number of queries and concerns regarding the management of flyrock from blasting practices. Submissions on the PER suggest that blasting practices at the existing quarry have caused large pieces of flyrock to land more than 100m from the pit, with associated risks to people and animals.

The Department of Industry and Resources has reviewed the PER document, and has suggested that the issues associated with flyrock appear to have been adequately addressed by the proponent and that blasting practices have been substantially modified, with blasts being video-taped to monitor the distances rock is thrown from the blast site. The EPA understands that management of flyrock will be addressed through the provisions of the mine safety legislation, administered by the Department of Industry and Resources, as well as the Local Government Authority's Extractive Industries Licence.

3.10.2 Community Consultation

One of the key aspects associated with the environmental performance of any operation is the issue of ongoing community consultation. The EPA notes that, to this end a Community Liaison Group has been set up and is now functioning under an independent Chair.

4. Conditions and Commitments

Section 44 of the Environmental Protection Act 1986 requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the project and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 3, should be made enforceable. Where these commitments or other material discussed in the PER cover matters subject to environmental conditions, the requirements of the condition should apply to the extent of any inconsistency.

4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that it recommends be imposed if the proposal by BGC (Australia) Pty Ltd for the Voyager Quarry is approved for implementation.

These conditions are presented in Appendix 3.

Matters addressed in the conditions include the following:

a) that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 3;
b) protection of bushland outside the proposal area;
c) preparation and implementation of a Fauna Relocation and Habitat Plan;
d) preparation and implementation of a Trapdoor Spider Relocation Programme;
e) preparation and implementation of a Closure and Rehabilitation Strategy (including a Visual Impact Strategy);
f) preparation and implementation of a Dust Monitoring and Remedial Action Programme;
g) preparation and implementation of a Ground and Surface Water Monitoring Programme;

h) preparation and implementation of an Area-Specific Noise Management Plan (to address noise clearing of vegetation or excavation of rock to a maximum depth of five metres);
i) preparation and implementation of an Operational Noise Measurement Programme; and
j) requirement to monitor ground vibration as a result of blasting.

It should also be noted that the proposed quarry would be subject to the requirements of the *Environmental Protection Regulations 1987*, the *Environmental Protection (Noise) Regulations 1997* as well as the *Local Government Act 1995*.

The proponent will also be required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*. These approvals, where granted, will also be subject to a number of legally-binding conditions relating to the protection the environment.

5. Conclusions

The EPA has considered the proposal by BGC (Australia) Pty Ltd for the development of the Voyager Quarry in The Lakes, which will require the clearing of 85 hectares of vegetation and ultimately result in a quarry of 900m in length, 450m in width and a depth of 50m. Development of the proposed quarry will entail excavation of up to 2 million tonnes of gravel and approximately 12 million tonnes of clay from the quarry footprint. This will allow for approximately 60 million tonnes of granite to be excavated from the site over a 50-year period (via conventional drilling and blasting, loading and hauling, crushing and screening methods). Further details are provided in the proponent's PER (BGC 2003a, 2003b and 2003c) and proponent's response to submissions documentation (which is attached as a CD-ROM).

The EPA has concluded that the proposal is capable of being managed so that the EPA's objectives would not be compromised, provided that there is satisfactory implementation by the proponent of its commitments and the recommended conditions set out in Appendix 3 and summarised in Section 4.

6. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the development of the Voyager Quarry in The Lakes, covering an area of approximately 85 hectares in the Shire of Northam;

2. That the Minister considers the report on the relevant environmental factors of:
    - direct impacts on flora and vegetation;
    - indirect impacts on flora and vegetation;
    - vertebrate fauna;
    - invertebrate fauna;
    - closure and rehabilitation;
    - dust;

- ground and surface water;
- noise from vegetation clearing and site preparation;
- operational noise; and
- vibration.

3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 3, and summarised in Section 4, including the proponent's commitments; and

4. That the Minister imposes the conditions and procedures recommended in Appendix 3 of this report.

Appendix 1

List of submitters

Organisations:
Department of Indigenous Affairs
Water and Rivers Commission (now part of the Department of Environment)
Licensing Branch, Department of Environment
Ecological Systems Branch, Department of Environment
Environmental Regulation Division, Department of Environment
Office of Soil and Land Conservation, Department of Agriculture
Department of Conservation and Land Management
Department of Industry and Resources
Shire of Mundaring

Avon Valley Environmental Society
Wooroloo Brook Land Care District Committee
Earth
Wildflower Society of Western Australia Inc.
Conservation Council of Western Australia
Birds Australia Western Australia Conservation and Research Committee
Chamber of Commerce and Industry
Lakes Action Group

Individuals:
Sixteen members of the public

Appendix 2

References

References

Benchmark (2004) *Dust and Silica Assessment for the Voyager Quarry, The Lakes.* Prepared for the Environmental Protection Authority, Western Australia BenchMark Toxicology Services, December 2004

BGC (2003a) *Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Volume 1: Executive Summary, January 2003

BGC (2003b) *Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Volume 2: Public Environmental Review, January 2003

BGC (2003c) *Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Volume 3: Appendices, January 2003

BGC (2003d) *Proposed Relocation of the Voyager Quarry Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Summary of Submission, September 2003

BGC (2003e) *Proposed Relocation of the Voyager Quarry Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Summary of Submission, September 2003

BGC (2003f) *Proposed Relocation of the Voyager Quarry Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Final Report, Response to Submissions Volume 1, December 2003

BGC (2003g) *Proposed Relocation of the Voyager Quarry Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413)* URS Australia Pty Ltd, Final Report, Response to Submissions Volume 2, Appendices, December 2003

Biota (2003) *Voyager Quarry Extension – Targeted Fauna Survey.* Biota Environmental Sciences Pty Ltd, January 2003

EPA (2000) *Environmental Protection of Native Vegetation in Western Australia, Position Statement Number 2.* Environmental Protection Authority, December 2000.

EPA (2004) *Guide to EIA Environmental Principles, Factors and Objectives*. (version 2) Environmental Protection Authority, November 2004.

LAG (2003) *Land Clearing and Quarry Expansion, Avon Loc 1881, Lot 14 Horton Road, The Lakes (EPA Assessment Number 1413) Public Response prepared by The Lakes Action Group* The Lakes Action Group, April 2003

SKM (2004) *BGC Voyager Quarry Site Investigation.* Sinclair Knight Merz Pty Ltd, March 2004

Appendix 3

Recommended Environmental Conditions and Proponent's Consolidated Commitments