

Quarry, lot 344 South Western Highway, Mundijong

Ransberg Pty Ltd

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

**Environmental Protection Authority
Perth, Western Australia
Bulletin 662
December, 1992**

THE PURPOSE OF THIS REPORT

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

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

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

APEALS

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

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

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6000

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 18th December 1992

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Summary and recommendations

Ransberg Pty Ltd (the proponent) proposes to open up a hard rock quarry located about 4km east of Mundijong in the Darling Ranges. For the initial development period of 10-15 years, the quarry and infrastructure would be located on the area of mainly cleared land in the northwestern part of the site. Subsequently, the main granite quarry would be developed on the southern side of Manjedal Brook which will involve the construction of an access track and a crossing.

The proponent prepared a Consultative Environmental Review and released the document for public and government agency comments which closed on 30th September 1992. The main environmental issues which were identified were:

- impacts on existing residences and land uses;
- visual amenity;
- access road off South Western Highway;
- Manjedal Brook water management;
- noise and dust; and
- conservation values.

Impacts on existing residences and land uses

The existing residences have the potential to be affected to some extent by noise, dust, safety and visual amenity impacts from the quarry if these issues are not adequately managed. However, all of the residences are shielded by significant topographic and vegetative barriers and **the Environmental Protection Authority has concluded that the residences are far enough away and well enough shielded for the proponent to be able to meet noise, blasting and dust limits which will be set and safety and visual amenity criteria.** Apart from a potential impact on scout activities at the intermittent camp near the boundary of the proposed quarry, there does not appear to be the potential for an environmentally significant impact on land uses on surrounding properties.

Visual amenity

The proponent did a visual assessment of the viewsheds of the quarry from the Swan Coastal Plain and concluded that only the quarry area on the southern side of the site has the potential to be seen from the coastal plain and only in the later stages of the development. The Environmental Protection Authority evaluated the visual assessment and found it to be reasonable such that there should be no loss of visual amenity from the Swan Coastal Plain. However, the Authority recommended that, before the quarry on the southern side of Manjedal Brook is extended in the later stages, the proponent obtain the approval of the Minister for the Environment that the rehabilitation of the initial stages of the quarry is satisfactory.

Access road off South Western Highway

Potential impacts from the access road off South Western Highway relating to the loss of visual amenity, noise, dust, drainage and safety are specifically addressed in the Consultative Environmental Review, the response to issues and the proponent's commitments, and are also addressed in the planning approval conditions. **The Environmental Protection Authority has concluded that the environmental issues relating to the design and construction of the access road off South Western Highway have been addressed by the planning approval conditions and the proponent's environmental management commitments.**

Manjedal Brook water management

Manjedal Brook is one of the major streams of the area and, along with supporting the conservation values of the riverine environment, includes the highly scenic feature of Whitby Falls, which flows all year round. The water in the stream is also used for stock purposes and, hence, it is important that the quality and quantity of water in Manjedal Brook be maintained. In addition to the planning approval conditions which specifically address the water management issue, the proponent has made numerous environmental management commitments designed to protect both the water quality and quantity of Manjedal Brook. **The Environmental Protection Authority has concluded that the implementation of the conditions and commitments would ensure the protection of the water quality and quantity in Manjedal Brook.**

Noise and dust

Quarry operations are inherently noisy and dusty which is one reason why a buffer zone of 2km is nominated under the basic raw materials policy. The proponent recognised this and has designed the project and made numerous environmental management commitments to address the potential noise and dust problems and to meet the noise and dust limits which will be imposed by the various responsible government agencies.

The nearest noise and dust sensitive premises are the residences at the Whitby Falls Hostel complex and the Manjedal Scout Camp. These are 1.3km away and separated from the quarry by vegetated ridges of granite. Other residences surrounding the proposed quarry are nearly or more than 2km from the centre of the quarry site and are further shielded by other vegetated ridges. The Environmental Protection Authority considers that, under these circumstances, the proponent should be able to manage the quarry operation to meet the noise, blasting and dust limits which will be set. **The Environmental Protection Authority has concluded that appropriate noise, blasting and dust limits will be set under the works approval provisions of the Environmental Protection Act such that the noise, blasting and dust impacts at residences surrounding the proposed quarry are environmentally acceptable.**

Conservation values

The Environmental Protection Authority received advice about the proposal from the Department of Conservation and Land Management, which has primary responsibility for the conservation of flora and fauna. No specific requirements for conservation were identified which have not been addressed in the planning approval conditions or the proponent's environmental management commitments. Therefore, **the Environmental Protection Authority has concluded that neither further investigations nor further specific protection measures for the conservation values of the area are warranted.**

Other issues

The Environmental Protection Authority notes that the Department of Planning and Urban Development proposes to release for public comment a Planning Review for the Darling Range area which includes a proposed rural landscape and conservation zone covering the quarry site which adjoins a proposed Darling Range Regional Park covering the State Forest to the east. Many public submissions pointed out the incompatibility of the proposed quarry with the planning review's proposals.

The Authority has usually left matters relating to environmental choice in the metropolitan area to the established planning processes except where there are potential pollution impacts or impacts on System 6 conservation areas, lakes, estuaries or rare or endangered species. In the absence of such issues for this proposal, the Environmental Protection Authority has reported on the outstanding environmental issues only, and defers decisions relating to environmental choice to the established planning processes.

Conclusions and recommendations

The Environmental Protection Authority considers that the environmental issues related to the proposal are manageable and has concluded that the proposal is environmentally acceptable.

The Environmental Protection Authority notes that the planning approval issued for the proposal includes a comprehensive suite of conditions, some of which relate to the environment and are to the requirements of the Authority. The Authority also notes that the proponent requires an extractive industry licence from the local government authority which can include both operational and environmental conditions and a bond on the rehabilitation performance by the proponent.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to establish a quarry operation on Lot 344 South Western Highway is environmentally acceptable, subject to the proponent's environmental management commitments and the recommendations in this report. In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as:

- **impacts on existing residences and land uses;**
- **visual amenity;**
- **access road off South Western Highway;**
- **Manjedal Brook water management;**
- **noise and dust; and**
- **conservation values.**

The Environmental Protection Authority considers that these and other minor environmental issues can be adequately managed. If the proposal proceeds, the Environmental Protection Authority recommends that the proponent's environmental management commitments listed in Appendix 1 and the recommendations in this report be applied.

Recommendation 2

The Environmental Protection Authority recommends that, before the quarry on the southern side of Manjedal Brook is expanded such that it would become visible from the Swan Coastal Plain, the proponent obtain approval from the Minister for the Environment that the rehabilitation of the initial stages of the quarry is satisfactory such that the expansion would not cause a loss of visual amenity from the Swan Coastal Plain.

1. Introduction

Ransberg Pty Ltd (the proponent) proposes to open up a hard rock quarry located about 4km east of Mundijong in the Darling Ranges. The quarry would be on Lot 344 and access off South Western Highway to the site would be via Lots 249, 426 and 278, which are owned by the proponent (Figure 1). The Environmental Protection Authority is formally assessing this proposal following an extended history of quarry proposals for this site. The Minister for the Environment, in determining an appeal on a works approval application, directed the Authority to assess the quarry proposal at a level of Consultative Environmental Review.

The proponent prepared a Consultative Environmental Review and released the document for public and government agency comments which closed on 30th September 1992. Nineteen submissions were received (Appendix 3) and the issues and questions raised were summarised and submitted to the proponent for a response. The proponent subsequently provided a response to issues (Appendix 2) and a consolidated list of environmental management commitments (Appendix 1).

1.1 Assessment history

The extended history of quarry proposals for this site is as follows:

- In April 1989, the Authority provided informal advice to the State Planning Commission on a quarry proposal by Hanscon Holdings Pty Ltd. That advice indicated that the proposal was considered environmentally acceptable at that time subject to the Authority's advice on rehabilitation aspects and the proponent's commitments. However, the State Planning Commission and the Shire of Serpentine-Jarrahdale both recommended against planning approval being issued on planning grounds.
- Planning approval was granted, on appeal, by the Minister for Planning on 22nd December 1989 and the conditions were set on 3rd May 1990 (Appendix 4), giving approval for ten years. The shire issued an extractive industry licence to the then owner of Lot 344, Dr Horner, on 6th August 1990, but subsequently refused to renew it upon its renewal date on 30th June 1991.
- The Environmental Protection Authority issued a works approval on 29 June, 1990, to Hanscon Holdings Pty Ltd for a grinding and milling plant as part of the quarry operation.
- After a transfer of ownership of the property to Ransberg Pty Ltd (jointly owned by Hanscon and WA Limestone Co.), the works approval lapsed and, when Ransberg, as the new proponent, applied for a new works approval, the Minister for the Environment, on appeal, directed the Environmental Protection Authority to formally assess the proposal at a level of Consultative Environmental Review.
- An application by Ransberg Pty Ltd to the Shire of Serpentine-Jarrahdale for an extractive industry licence has been refused. The proponent appealed the shire's decision and the issue of a licence is pending a decision by the Minister for Local Government.

2. The proposal

The objective of the proposal is to provide hard rock products for the expanding urban area for which the proponents are already a significant soft rock supplier. The proposal is to carry out hard rock quarrying and processing activities on Lot 344 and transport the products, via a dedicated access road on land owned by the proponent, to markets in the Perth region. The principle site components are a quarry area, internal access/haul roads, a crushing and screening plant, stockpile areas, water management facilities, office facilities, fuel storage and workshop facilities (Figure 2).

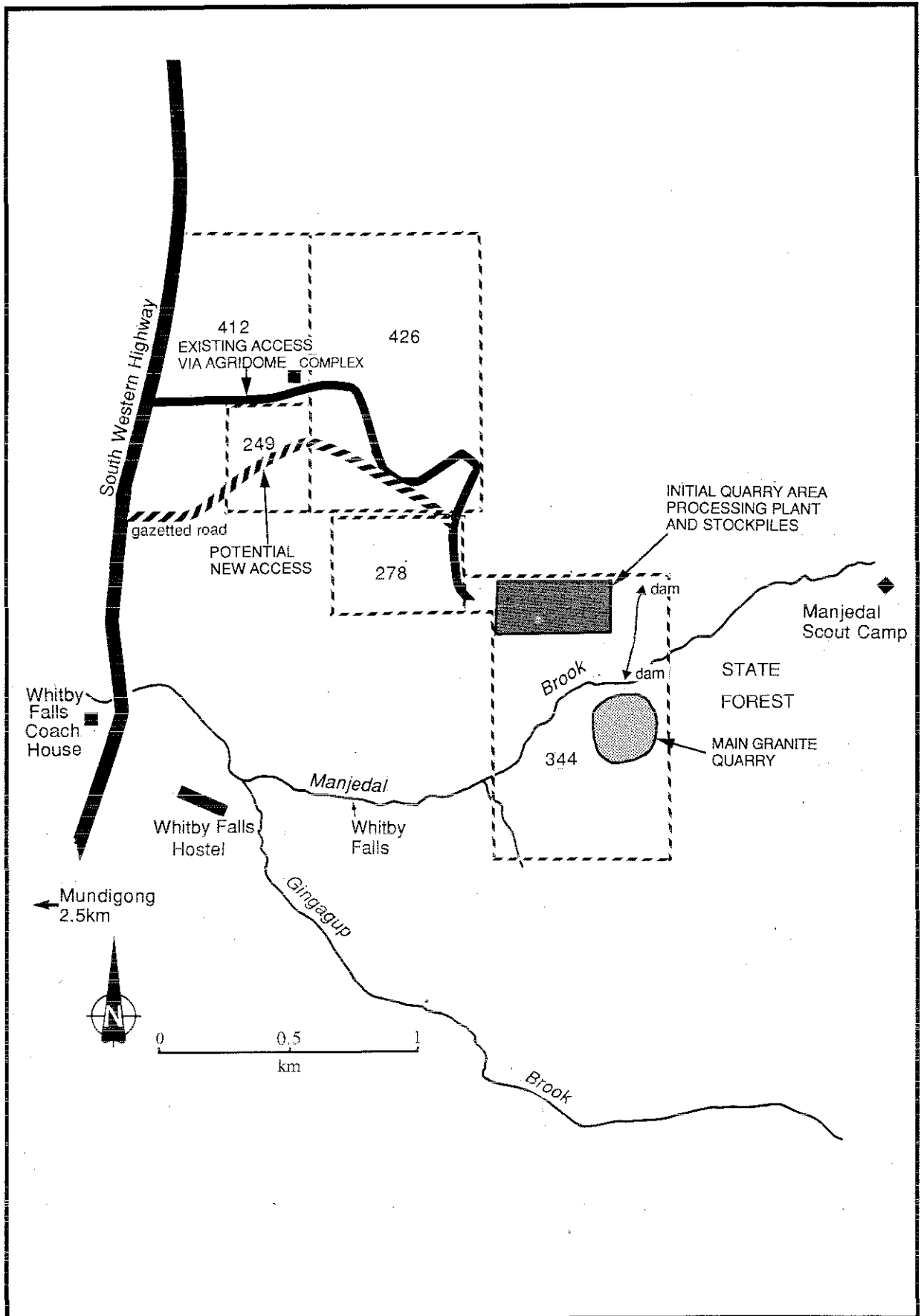


Figure 1: Regional location

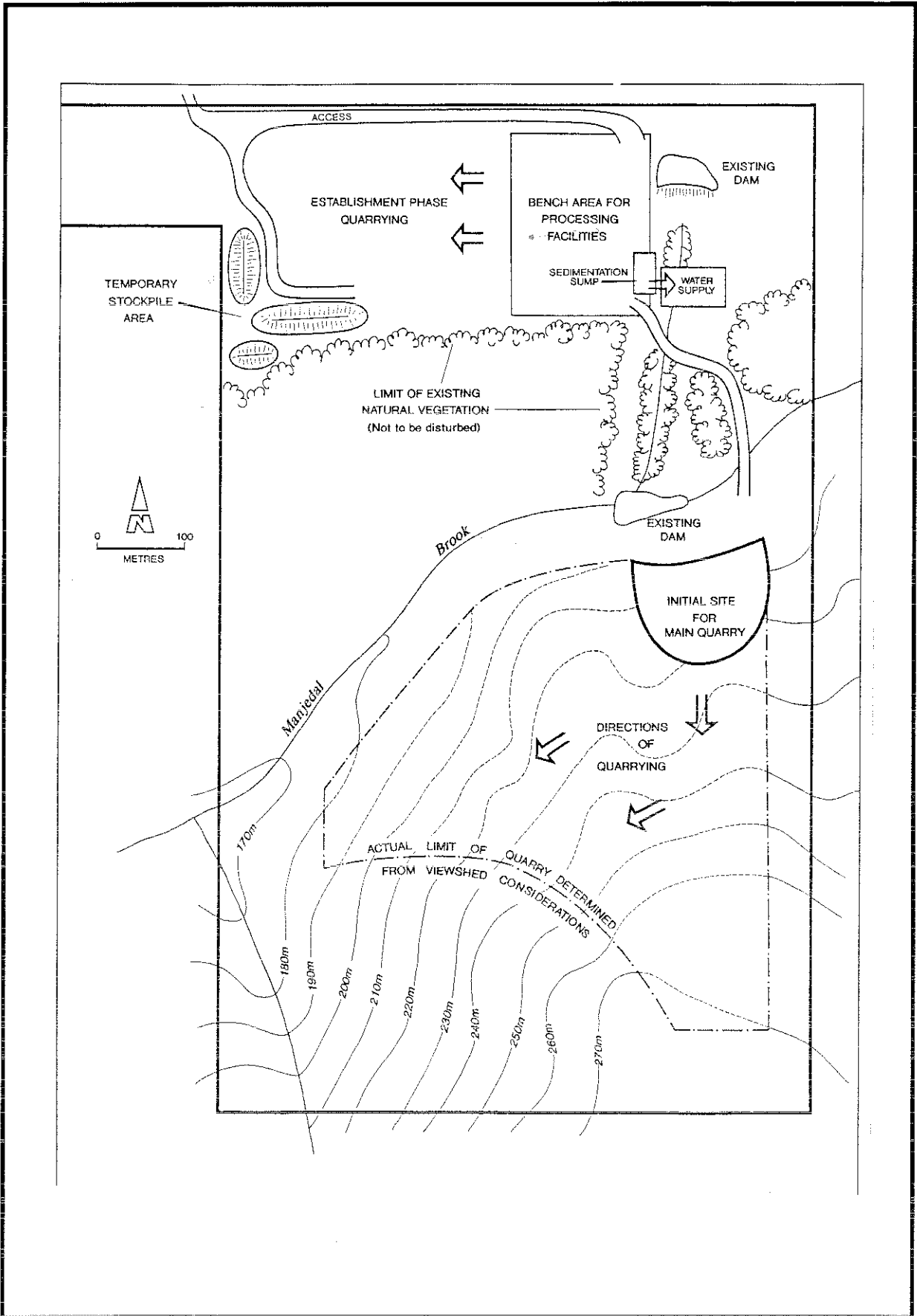


Figure 2: Schematic layout of quarry operation

For the initial development period of 10-15 years, the quarry and infrastructure would be located on the area of mainly cleared land in the northwestern part of Lot 344. Subsequently, the main granite quarry would be developed on the southern side of Manjedal Brook which will involve the construction of an access track and a crossing.

An access road linking the quarry with the South Western Highway would be constructed on land adjacent to the Agridome. A description of the proposal is contained in the Consultative Environmental Review though the detailed layout of the quarry has not yet been determined.

2.1 Existing environment

A full description of the existing environment is contained in the Consultative Environmental Review and a brief summary of the more pertinent aspects is presented below. Lot 344 is in a valley which straddles Manjedal Brook behind the frontal hills of the Darling Scarp. A tributary creek of Manjedal Brook occurs near the eastern boundary of the property and runs into a dam on the Brook (Figure 2).

About half of the northern side of the property has been cleared for pasture, a dam has been constructed on the tributary creek and some small gravel pits developed on the northern boundary. The southern side of the property is a jarrah-marri-yarri open forest in relatively good condition though apparently it has been logged and some grazing has occurred.

The Department of Conservation and Land Management have indicated to the proponent that no declared rare flora are known from the proposed quarry area and that, of the six Priority species generally known from the region, none have previously been recorded from the area. The vegetation systems of the area were mapped by the proponent's consultants using regional mapping vegetation complexes of Heddlé *et al*, 1980. The main system of interest is the Myara Sub-Complex which occurs along the river valleys such as Manjedal Brook where it consists of a marri-yarri overstorey with a dense understorey of swamp peppermints and sedges.

The proponent's consultants carried out a faunal survey and identified the most significant habitat as being the riparian zone alongside Manjedal Brook and its tributaries. A description of the range of faunal species and their preferred habitats is given in the Consultative Environmental Review.

Indications of the presence of the quenda (Southern Brown Bandicoot) were found, which is a Schedule 1 species under the Wildlife Conservation Act, 1950, and its preferred habitat is the riparian zone. The chuditch (Western Quoll), which is also a Schedule 1 species, may occur in the area based on its known distribution, though no evidence was found.

The proponent's consultants report concluded that it is unlikely that any rare or endangered faunal species would be affected by the proposal if the recommended impact reduction strategies were implemented (Dell and Turpin, 1992). These strategies are:

- no riverine vegetation be removed;
- the access road across the brook to the southern quarry area be constructed in the cleared area leading to the existing dam; and
- runoff to be controlled to prevent erosion.

3. Environmental issues and management

Public submissions on the proposal raised numerous environmental issues to which the proponent responded (Appendix 2). Some of the issues raised are dealt with under other legislation and these are discussed below in section 3.7. The proposed quarry requires both planning and environmental issues to be addressed. The Environmental Protection Authority has usually left matters relating to environmental choice in the metropolitan area to the established planning processes except where there are potential pollution impacts or impacts on System 6 conservation areas, lakes, estuaries or rare or endangered species. In the absence of

such issues for this proposal, the Authority has reported on the outstanding environmental issues only, and defers decisions relating to environmental choice to the established planning processes.

The main environmental issues which were identified were:

- impacts on existing residences and land uses;
- visual amenity;
- access road off South Western Highway;
- Manjedal Brook water management;
- noise and dust; and
- conservation values.

3.1 Impacts on existing residences and land uses

The potential impacts of the proposed quarry on the existing residences and land uses on properties surrounding the site were a major consideration in evaluating the environmental acceptability of the proposal. For land use or environmental planning decisions involving quarries, the Environmental Protection Authority uses the Department of Planning and Urban Development's basic raw materials policy criteria (DPUD, 1992), one of which designates a nominal zone of 2km surrounding a quarry within which there would be environmental or land use constraints.

The proponent identified all the existing residences within the nominal buffer zone of 2km from both the centre and the boundary of Lot 344. The nearest residences are at the Whitby Falls Hostel complex and the caretakers house at the Manjedal Scout Camp: These residences are about 1.3km from the centre of the proposed quarry. The Agridome and a residence to the southwest of the site are about 1.9km from the centre. A total of eighteen residences occur within 2km of the boundary of Lot 344 but all except four are more than 2km from the centre of the quarry site.

These residences have the potential to be affected to some extent by noise, dust, safety and visual amenity impacts from the quarry if these issues are not adequately managed. However, all of the residences are shielded by significant topographic and vegetative barriers and **the Environmental Protection Authority has concluded that the residences are far enough away and well enough shielded for the proponent to be able to meet noise, blasting and dust limits which will be set and safety and visual amenity criteria.**

Current land uses within the buffer zone consist of intermittent scout camps, recreational activities (mainly at Whitby Falls), timber production and grazing. Apart from a potential impact on scout activities at the intermittent camp near the boundary of Lot 344, there does not appear to be the potential for an environmentally significant impact on land uses on surrounding properties. The scout activities have been continuing in the presence of both the Byford quarry and Alcoa's bauxite mine and it would appear that potential impacts from the proposed quarry are manageable provided close liaison is maintained by the proponent with the neighbours.

The Environmental Protection Authority concludes that the potential impacts from the proposed quarry on existing surrounding residences and land uses are manageable such that they are not environmentally significant.

3.2 Visual amenity

The proponent recognised that the Darling Scarp is an important visual resource and, in particular, that the Shire of Serpentine-Jarrahdale has a landscape protection policy for the Scarp and surrounding environs. Hence, the proponent did a visual assessment of the viewsheds of the quarry from the Swan Coastal Plain. The assessment concluded that only the quarry area on the southern side of the site has the potential to be seen from the west (on the

coastal plain) and only in the later stages (about 30 years time) of the development. The Environmental Protection Authority evaluated the visual assessment and found it to be reasonable for the proposal as described in the Consultative Environmental Review.

The proponent proposes to rehabilitate the parts of the quarry which would become visible at that stage such that the visual impact is not environmentally significant. Condition 2 of the planning approval ensures that the rehabilitation would be to the requirements of the Environmental Protection Authority and the shire.

The Minister for the Environment, in directing the Environmental Protection Authority to formally assess the proposal, highlighted the policy that the visual amenity of the Darling Scarp should be given the highest protection. **Accordingly, the Authority has recommended that, before the quarry on the southern side of Manjedal Brook is extended such that it would become visible from viewsheds on the Swan Coastal Plain, the proponent obtain the approval of the Minister for the Environment that the rehabilitation of the initial stages of the quarry is satisfactory.**

The proposed quarry site is in a valley behind the frontal hills of the Darling Scarp but is visible from parts of the adjoining properties to the east, south and southwest. The State Forest to the east is used by the Scout Association for temporary camping activities, and there will be a loss of visual amenity from the nearest parts of the adjacent State Forest.

Only grazing activities currently occur on the parts of the adjoining properties to the south and southwest which have views of the proposed quarry. The loss of visual amenity for these activities is minor and intermittent and was not considered to be environmentally significant.

The Environmental Protection Authority has concluded that the quarry proposal would not have an environmentally significant impact on the visual amenity as viewed from surrounding properties, except for the temporary impact on the scouts. The Authority considers that the proponent should negotiate with the managers of the scouting activities in order to resolve not only the loss of visual amenity but other potential impacts from the quarry operation. The scout activities have been continuing in the presence of both the Byford quarry and Alcoa's bauxite mine and it would appear that, if appropriate, modifications to the scout activities would be feasible.

3.3 Access road off South Western Highway

The access road off South Western Highway would be constructed in a mainly cleared rural property which extends up the Darling Scarp over the frontal hills to the proposed quarry site. The property is included as part of the proposed rural landscape and conservation zone in the planning review. The proponent estimates that there would be about one hundred truck movements per day during peak production periods and compares this with the average of 5,500 vehicle movements per day on South Western Highway.

Potential impacts from the access road relating to the loss of visual amenity, noise, dust, drainage and safety are specifically addressed in the Consultative Environmental Review, the response to issues and the proponent's commitments, and are also addressed in the planning approval conditions.

The proponent would screen the road from viewsheds on the coastal plain with vegetative or rock barriers which, according to Condition 3 of the planning approval (Appendix 4), would be to the satisfaction of the Department of Planning and Urban Development, Department of Conservation and Land Management, Environmental Protection Authority and the Shire of Serpentine-Jarrahdale.

The proponent is committed to sealing the road to minimise potential noise and dust problems and this will assist with potential traffic safety concerns. The control of drainage such that the road does not cause erosion problems in the creek nor create a stormwater management problem on the South Western Highway would be to the requirements of the Shire of Serpentine-Jarrahdale according to Conditions 6 and 17 of the planning approval and local government by-laws.

The Environmental Protection Authority has concluded that the environmental issues relating to the design and construction of the access road off South Western Highway have been addressed by the planning approval conditions and the proponent's environmental management commitments.

3.4 Manjedal Brook water management

Manjedal Brook is one of the major streams of the area and, along with supporting the conservation values of the riverine environment, includes the highly scenic feature of Whitby Falls, which flows all year round. The water in the stream is also used for stock purposes and, hence, it is important that the quality and quantity of water in Manjedal Brook be maintained.

In order to address this issue, four conditions of the planning approval specifically relate to the management of the water in Manjedal Brook:

- Condition 10 requires the proponent not to disturb the vegetation for fifty metres either side of Manjedal Brook, as well as fifty metres along the eastern boundary of the property adjoining the State Forest;
- Condition 11 requires the proponent to demonstrate to the Water Authority of WA that the summer flows in Manjedal Brook will not be disturbed;
- Condition 12 requires the proponent to satisfy all other requirements of the Water Authority with regard to dam construction, turbidity control and extraction of groundwater; and
- Condition 13 requires the access road across Manjedal Brook to be to the requirements of the local government authority and the Environmental Protection Authority.

In addition to the planning approval conditions, the proponent has made numerous environmental management commitments designed to protect both the water quality and quantity of Manjedal Brook. **The Environmental Protection Authority has concluded that the implementation of the conditions and commitments would ensure the protection of the water quality and quantity in Manjedal Brook.**

3.5 Noise and dust

Quarry operations are inherently noisy and dusty which is one reason why a buffer zone of 2km is nominated under the basic raw materials policy. The proponent recognised this and has designed the project and made numerous environmental management commitments to address the potential noise and dust problems and to meet the noise and dust limits which will be imposed by the various responsible government agencies.

In considering whether the proposed quarry could meet the environmental noise limits which will be set, the Environmental Protection Authority evaluated a number of factors which influence noise propagation. The main factors are the proximity of the noise sensitive premises and the presence of barriers to noise propagation, as well as the loudness of the noise.

With regard to the loudness of the noise, the proponent is bound by the Occupational Health, Safety and Welfare regulations (1988) for site workers which sets a limit of 90 dB(A) in the workplace. The proponent is committed to implementing noise suppression measures to achieve this limit.

With regard to noise propagation, the nearest noise sensitive premises are the residences at the Whitby Falls Hostel complex and the Manjedal Scout Camp. These are 1.3km away and separated from the quarry by vegetated ridges of granite. The Agridome complex is uninhabited and the residence 1.9km to the southwest is shielded by vegetated ridges of granite. Other residences surrounding the proposed quarry are more than 2km from the centre of the quarry site and are further shielded by other vegetated ridges. **The Environmental Protection Authority considers that, under these circumstances, the proponent should be able to manage the quarry operation to meet the noise limits which will be set.** This conclusion is supported by the Department of Minerals and Energy's

regular monitoring and assessment of the impact of noise from the Byford quarry, which is in a similar setting.

The noise and airblast overpressure limits which will be set under the works approval and licencing provisions of the Environmental Protection Act will be according to the imminent new noise regulations. These regulations are being finalised and are likely to be enacted in December 1992. They are as follows:

Table 1 : Noise and airblast overpressure limits

Day	Time	Noise limits
Monday - Saturday	0700 - 1900 hrs	50 dB(A)
Monday - Saturday	1900 - 2200 hrs	45 dB(A)
Sundays and Public holidays	0700 - 2200 hrs	45 dB(A)
Always	2200 - 0700 hrs	40 dB(A)
		Overpressure limits
Monday - Saturday	0700 - 1800 hrs	125 dB (peak linear)
Sunday	0700 - 1800 hrs	120 dB (peak linear)

The above noise and airblast overpressure limits address two components of noise from blasting, the other component involves blasting vibration. In setting a works approval for the quarry, the Environmental Protection Authority will evaluate the site specific circumstances related to blasting at the proposed quarry and determine if a blasting vibration limit needs to be set. The proponent has made several commitments (Appendix 1) to minimise the impact from the quarry's blasting activity including a commitment to monitor for both vibration and airblast overpressure at the nearest residence and a commitment to survey potentially affected residences. The health inspector for the Shire of Serpentine-Jarrahdale has reported to the Environmental Protection Authority that there have been no complaints about blasting in the last two years from residents near the Byford quarry.

The limits and technical specifications of monitoring for blasting vibration will be set under the works approval and based on site specific factors and the proponent's on-going performance. **The Environmental Protection Authority has concluded that the impacts from blasting can be managed by the proponent to be within the limits which will be set under the works approval.**

Quarry operations are inherently dusty and therefore, the proponent has made numerous commitments to address the potential problem. The Environmental Protection Authority will be setting an environmental dust limit which should not be exceeded at the nearest residences. The limit will be set under a works approval and would be the same as that for the Byford quarry. Because of the distance to the nearest residences, the Environmental Protection Authority concludes that the proponent should be able to manage the quarry operations such that the dust limits are not exceeded at the nearest residences.

The Environmental Protection Authority has concluded that appropriate noise, blasting and dust limits will be set under the works approval provisions of the Environmental Protection Act such that the noise, blasting and dust impacts at residences surrounding the proposed quarry are environmentally acceptable.

3.6 Conservation values

Parts of the quarry area, particularly the northern half, have been cleared, logged or grazed by the previous owner and hence, little of the vegetation is in pristine condition. The conservation values of the area were investigated by the proponent's consultants (Dell and Turpin, 1992) and

it was concluded that there were no rare flora species and no other conservation values that would be significantly impacted by the quarry's operations.

A protected fauna species, the Southern Brown Bandicoot, probably occurs in the most sensitive vegetation complex on the site, the Myara subcomplex. A significant proportion of the Myara vegetation complex on the quarry site is to be protected by the 50m buffer zone either side of Manjedal Brook. The Myara complex is also represented in the State Forest to the east of the quarry site.

The Environmental Protection Authority received advice about the proposal from the Department of Conservation and Land Management, which has primary responsibility for conservation of flora and fauna. No specific requirements for conservation were identified which have not been addressed in the planning approval conditions or the proponent's environmental management commitments. Therefore, **the Environmental Protection Authority has concluded that neither further investigations nor further specific protection measures for the conservation values of the area are warranted.**

The Department of Conservation and Land Management advised, firstly, that a dieback disease survey would verify the dieback status of the area and assist in determining the most suitable native species for rehabilitation and, secondly, that fire control precautions should be determined in consultation with the Bush Fires Board. The proponent has been provided with this advice.

3.7 Other issues

Many public submissions pointed out the incompatibility of the quarry proposal with the planning for a regional park in the area. The Department of Planning and Urban Development proposes to release for public comment a Planning Review for the Darling Range area which includes a proposed rural landscape and conservation zone covering the quarry site which adjoins a proposed Darling Range Regional Park covering the State Forest to the east. Following the public comments, the planning review's recommendations would be reviewed and final recommendations made to the Minister for Planning for possible implementation late in 1993.

The Authority has usually left matters relating to environmental choice in the metropolitan area to the established planning processes except where there are potential pollution impacts or impacts on System 6 conservation areas, lakes, estuaries or rare or endangered species. In the absence of such issues for this proposal, the Environmental Protection Authority has reported on the outstanding environmental issues only, and defers decisions relating to environmental choice to the established planning processes.

The rural landscape and conservation zone is a planning concept which would identify criteria for multiple uses within the zone. One of the criteria would relate to visual amenity as viewed from the Swan Coastal Plain. Apart from the access road, the quarry operations would not be visible from the plain.

State Planning Commission (DPUD) conditions issued as part of planning approval on 3rd May 1990 (Appendix 4) precede the Planning Review's identification of areas for possible regional parks or landscape protection. In addition, the area was identified in the basic raw materials Strategy as a resource area for hard rock materials. These aspects are planning matters which have been resolved, or are more appropriately resolved, under planning legislation.

Some public submissions questioned the need for the quarry and its viability. In the Consultative Environmental Review, the proponent has justified the need for the quarry on commercial considerations with regard to consistency, continuity and pricing of hard rock products from existing hard rock suppliers, which are competitors in the market place. These commercial considerations will affect the viability of the quarry and this is an on-going economic decision by the proponent.

The environmental implication relating to the viability of the quarry is whether the rehabilitation of the quarry would be maintained to a suitable standard. The Environmental Protection

Authority notes that condition 2 of the planning approval requires the proponent to rehabilitate the site to the specifications and satisfaction of the Authority and the shire. In addition, an extractive industry licence, which would need to be issued by the local government authority, has provisions for a bond to be guaranteed by the proponent to the shire in case of unsatisfactory performance in rehabilitating the site. The Environmental Protection Authority has concluded that the issue of viability of the proposal, in regards to the rehabilitation of the quarry, is satisfactorily addressed.

Possible future land uses surrounding the proposed quarry are tourism or conferences at the Agridome complex, development of recreational activities (particularly at Whitby Falls), intensification of farming activities and hobby farms or residential subdivision. If these land uses fell within the buffer zone (nominally 2km) surrounding the proposed quarry, they could be constrained by impacts from noise, dust and blasting. Proponents of such future activities would have to be made aware of the constraints and the Environmental Protection Authority concludes that appropriate zoning and control of the uses of the surrounding land requires the attention of the planning process.

The Environmental Protection Authority considers that other, minor environmental issues which were raised in submissions were satisfactorily addressed in the proponent's response to issues (Appendix 2).

3.8 References

- Dell, J and Turpin, M (1992). Vertebrate Fauna of the proposed Granite Quarry at Cardup. Unpublished report to Bowman Bishaw Gorham Environmental Consultants.
- DPUD (1992). Basic Raw Materials and Policy Statement for the Perth Metropolitan Region. Department of Planning and Urban Development, Western Australia.
- Heddle, E M, Loneragan, D W and Havel, J J (1980). Vegetation Complexes of the Darling System, Western Australia. in: Atlas of Natural Resources, Darling System, Western Australia. Department of Conservation and Environment, Western Australia.

4. Conclusions and recommendations

The Environmental Protection Authority considers that the environmental issues related to the proposal are manageable and has concluded that the proposal, as described in the Consultative Environmental Review, is environmentally acceptable.

The Environmental Protection Authority notes that the planning approval issued for the proposal includes a comprehensive suite of conditions, some of which relate to the environment and are to the requirements of the Authority. The Authority also notes that the proponent requires an extractive industry licence from the local government authority which can include both operational and environmental conditions and a bond on the rehabilitation performance by the proponent.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to establish a quarry operation on Lot 344 South Western Highway is environmentally acceptable, subject to the proponent's environmental management commitments and the recommendations in this report. In reaching this conclusion, the Environmental Protection Authority identified the main environmental issues as:

- **impacts on existing residences and land uses;**
- **visual amenity;**
- **access road off South Western Highway;**

- **Manjedal Brook water management;**
- **noise and dust; and**
- **conservation values.**

The Environmental Protection Authority considers that these and other minor environmental issues can be adequately managed. If the proposal proceeds, the Environmental Protection Authority recommends that the proponent's environmental management commitments listed in Appendix 1 and the recommendations in this report be applied.

Recommendation 2

The Environmental Protection Authority recommends that, before the quarry on the southern side of Manjedal Brook is expanded such that it would become visible from the Swan Coastal Plain, the proponent obtain approval from the Minister for the Environment that the rehabilitation of the initial stages of the quarry is satisfactory such that the expansion would not cause a loss of visual amenity from the Swan Coastal Plain.

With regard to noise, blasting and dust impacts, the Environmental Protection Authority has concluded that appropriate noise, blasting and dust limits will be set under the works approval provisions of the Environmental Protection Act such that the noise, blasting and dust impacts at residences surrounding the proposed quarry are environmentally acceptable.

The Environmental Protection Authority's experience is that it is common for details of a proposal to alter through the detailed design and construction phase. In many cases the alterations are not environmentally significant or have positive effects on the environmental performance of the project. The Authority considers that such non-substantial changes should be provided for in the environmental conditions issued by the Minister for the Environment.

The Authority also considers that any approval for the proposal based on this assessment should be limited to five years. Therefore, if the proposal has not been substantially commenced within five years of the date when the environmental conditions are issued, then such approval should lapse. After that time, further consideration of the proposal should only occur following a new referral to the Authority.

Appendix 1

Ransberg Pty Ltd environmental management commitments

SUMMARY OF COMMITMENTS

The following commitments are made by Ransberg Pty Ltd regarding the establishment, operation, and decommissioning of the proposed hard rock quarry on Lot 344 South Western Highway, Mundijong.

Aesthetics

1. Additional trees will be planted during the first 2-3 years of operations, adjacent to the stockpile and processing area, to supplement the screening function of existing trees (some of which are outside the property boundaries).
2. Quarry operations in the southern sector of the site will commence low in the profile and at the eastern side of the property. Quarrying will proceed in southerly then westerly directions, to enable the eastern benches to be rehabilitated before they become visible from distant view points.
3. Depending upon final end use, all buildings and equipment will be removed at the completion of the project, and all roads will be deep ripped and revegetated.
4. All buildings likely to be visible from outside the area owned by Ransberg Pty Ltd will be constructed and coloured to blend with the existing landscape to the greatest practicable extent.

Noise and Vibration

5. All blasts will be fitted with millisecond delays to produce sequential firing.
6. Monitoring of both ground vibration and air blast overpressure will be conducted at the most sensitive adjacent residence (most likely Whitby Falls Hostel).
7. Blasting will only be conducted during the afternoon on weekdays. Liaison will be maintained with Pioneer Concrete to avoid the unlikely event of simultaneous blasting.

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8. Efficient noise suppression devices will be maintained on all equipment and plant used at the site.
 9. Selected residences, notably Whitby Falls Hostel, will be provided with a schedule of blasting to inform residents of likely future blasting times. If required by the operators of the Manjedal Scout Camp, the proponent will notify the camp prior to each blasting event.
 10. The proponent undertakes, upon request of any landowner within the nominal 2km buffer zone of influence, to independently survey and document the condition of any residence or building before the commencement of quarrying activity at the site. The proponent will also maintain appropriate insurance to ensure that in the unlikely event of damage to a residence or other building being directly attributable to the quarrying activity on Lot 344, the building or residence will be restored to the condition as surveyed before the commencement of quarrying at the site.

Dust Levels

11. The main access road from South Western Highway to Lot 344 will be sealed.
12. All reasonable and practicable measures will be taken to minimise dust emissions from the plant and associated equipment.
13. When possible, blasting will be conducted on days when westerly winds are prevalent to minimise the potential for dust nuisance on dwellings west of the site.
14. Dust generated from the crushing and screening plants will be suppressed using water sprays. Equipment will be enclosed where practicable.
15. Stockpiles and unsealed roads will be sprayed with water when necessary to suppress dust.
16. Where possible, the stripping of overburden and topsoil will be conducted when soil moisture content is relatively high to reduce dust generation.

Water Quality

17. The existing water quality of Manjedal Brook will not be detrimentally affected due to the operation of the proposed quarry. Summer flows of the Brook will not be altered.
18. All water generated on the site will pass through a sediment settling dam or basin. Site run-off water will be stored in the settlement dams for use in dust suppression as far as is practicable. Water surplus to on-site requirements will be discharged to Manjedal Brook.
19. Silt traps will be cleaned at regular intervals to ensure effective operation. Fines will be utilised within the rehabilitation program where possible.
20. Small contour channels will be formed on re-constructed banks to reduce erosion potential and to increase water infiltration potential.
21. A septic tank and leach drain will be installed and maintained on-site with at least 100m horizontal separation to any open water body.
22. Oil and fuel handling areas will have impervious bunds with capacity to contain the volume of fuel stored, plus anticipated rainfall, plus a safety factor.
23. No chemicals or potential liquid contaminants will be disposed of on-site.

Waste Disposal

24. Materials suitable for recycling will be recycled.
25. All other wastes will be taken to an approved waste disposal site on a regular basis.

Flora

26. Clearing will be limited to the minimum necessary for safe and economic operation of the mine.

27. No riparian vegetation will be disturbed within 50 metres of either side of Manjedal Brook.
28. Indigenous plant species will be used during rehabilitation.
29. Where practicable and available, topsoil will be respread as soon as possible to maximise the possibility of native seed germination and growth.
30. Rehabilitation will be carried out progressively during the life of the quarry, subject to operational requirements.
31. Weed species within rehabilitation areas will be controlled.

Fauna

32. The clearing of vegetation will be carried out sequentially to allow mobile fauna to relocate.

Rehabilitation

33. The eastern sector of the resource area south of Manjedal Creek will be mined and rehabilitated or screened before subsequent mining exposes this area to viewsheds from the west.
34. The methodology outlined in Section 6.9 of the CER will be implemented to the satisfaction of the relevant authorities.
35. Rehabilitation will be monitored for success and modified when and if necessary.

Fire Control

36. Firebreaks will be maintained in accordance with the requirements of the Bush Fires Board and CALM.
37. The dust suppression water tanker will have a dual purpose by providing a portable fire-fighting water source.

Fuel Management

38. All hydrocarbon storage facilities will be bunded with an impervious material, having a capacity to accommodate the volume of fuel stored plus an allowance for rainfall and an additional safety allowance.
39. All drains which collect surface run-off from disturbed areas will be diverted to constructed settling basins or dams.
40. Vehicle washdown areas will be equipped with fuel and oil traps to ensure contaminated waters are not discharged to the environment.

Safety

41. All relevant Acts and Regulations covering occupational health and safety, and the safety of the general public, will be complied with.
42. The quarry area and access entrance will be fenced and the gates locked when the quarry is unattended.

Public Comment

43. All formal public comments to the proponent will be recorded. Where a complaint is valid, the proponent will take all practical measures to remedy the source of the complaint.

Appendix 2

Ransberg Pty Ltd response to issues

**PROPOSED HARD ROCK QUARRY
LOT 344 SOUTH WESTERN HIGHWAY, MUNDIJONG**

**Proponents Response to Issues and Questions
Raised During the CER Public Review Period**

1. INTRODUCTION

This document forms the proponent's (Ransberg Pty Ltd) principal responses to submissions regarding the Consultative Environmental Review (CER) for the proposed Hard Rock Quarry on Lot 344 South Western Highway, Mundijong. Specifically, this document responds to Environmental Protection Authority (EPA) correspondence to the Company dated 19 October, 1992.

In some instances the proponent refers to compliance with a Works Approval which will be issued for the project by the EPA. It should be noted that a Works Approval has previously been issued for a grinding and milling plant on the site, which has subsequently lapsed, therefore the proponent is familiar with the conditions likely to be imposed in respect of a Works Approval.

2. SPECIFIC RESPONSES

Issues raised in public and government agency submissions:

1. Long term impacts on land use development/conservation values.

1.1 Does the quarry fit in with the land use strategy under the Planning Scheme for the region?

Response:

The CER was formulated by the proponent in accordance with the requirements of the Environmental Protection Act, 1986 to identify the potential impacts of the hard rock quarry on the environment, and to propose environmental strategies to manage these

impacts in an acceptable manner. It was not the purpose of the CER to address matters in a planning context for the region.

The suitability of the proposal in a planning context is the responsibility of the planning authorities, namely the Department of Planning and Urban Development (State Planning Commission) and the Shire of Serpentine-Jarrahdale. Planning approval for the project, and associated conditions of approval, have previously been issued by the State Planning Commission (Ref. SPC 29/261-4). The proponent undertakes to comply with the conditions imposed by the State Planning Commission for the duration of the project.

1.2 The proposed quarry operation is considered incompatible with the rural landscape and conservation zone proposed in the Darling Range Regional Park review by the Community Consultative Committee; on what basis does the proponent consider the proposal is or could be compatible?

Response:

The potential impact of the proposal upon the visual amenity of the area is highly subjective. Nonetheless, the position adopted for the assessment of this project is that the quarrying operation should not be visually intrusive in the Darling Scarp landscape, and on this basis the proposal is considered to be compatible with the landscape protection philosophy for the scarp.

In recognition of the need to maintain the visual integrity of the site and its surrounds, the proponent has formulated stringent landscape protection and rehabilitation management criteria to mitigate any potentially adverse impacts of the proposal. These criteria include a staged mining plan to ensure that only areas below the visual horizon are quarried, and therefore screened from view, until exhausted areas of the site are rehabilitated to the satisfaction of the regulatory authorities. The objective of these criteria is to ensure that the quarry will not be visually intrusive when this section of the scarp is viewed from the coastal plain.

The management strategies proposed by the proponent in relation to the maintenance of the visual integrity of the site and its surrounds are detailed in Chapter 6 of the CER.

2. Impacts on existing residences/recreational activities.

2.1 What impacts would the quarry have on the residences which have not been identified in the CER (about 20 known residences) and which are within the nominal 2km zone of influence?

Response:

The EPA has acknowledged that the wording of this comment is incorrect, and that the CER has identified most, if not all, of the residences within the nominal 2 km zone of influence of the proposed quarry.

The potential impacts of the quarrying operation on these residences, including the Whitby Falls Hostel and the Manjedal Scout Camp, have been addressed in the CER and appropriate management strategies proposed.

The nearest potentially affected residence will be monitored for both airblast noise and vibration, in accordance with monitoring protocols determined in consultation with the EPA via conditions of the Works Approval.

Given these strategies and the associated monitoring program, the proponent anticipates that the operation of the hard rock quarry will have little, if any, impact on the local population.

2.2 What impact would the quarry have on current recreational activities such as the Miller's railway line heritage trail and scout camps, which are currently within 50m of the boundary of Lot 344; what mitigation measures are possible?

Response:

Miller's railway line heritage trail is located approximately 1.5 kilometres southwest from the boundary of Lot 344 at its closest point. Given this distance and the topographical and vegetative screening present between the site and the trail, the recreational values of Miller's railway are not expected to change from those experienced at present by itinerant users.

Whilst the Manjedal Scout Camp lease area is within 50 metres of the site, and in fact abuts the eastern boundary of Lot 344, the buildings associated with the lease are located approximately 1.3 km north east of the proposed quarry. The camp is separated from the site by significant topographical and vegetative barriers, and additionally is characterised by predominantly transient occupation.

The camp has operated successfully in the vicinity of both the Pioneer hard rock quarry and Alcoa's bauxite removal area for many years. However if required by the operators of the Manjedal Scout Camp, the proponent will notify the camp prior to each blasting event. It should also be noted that blasting will be infrequent, most likely only twice per fortnight or less, on weekdays only, at approximately the same time on each occasion (afternoon), and will not be undertaken on public holidays.

2.3 Are safety measures proposed such as fencing the quarry to keep animals and recreationalists off the site?

Response:

The proponent reiterates Commitment 40 of the CER, that:

"The quarry area and access entrance will be fenced and the gates locked when the quarry is unattended."

The proponent will comply with all relevant Acts and regulations concerning the safety of workers and the general public, and those contained in all conditions of approval for the project.

3. Noise.

3.1 Are the proposed noise mitigation measures comprehensive enough to ensure that the quarry, including trucks on the access track, can meet noise limits which would be set?

Response:

The proponent **must** comply with the noise criteria established in the EPA Works Approval and subsequent Licence which will be issued for the project. Therefore the proposed noise mitigation measures will be comprehensive enough to ensure the operation is within these criteria.

With specific regard to trucks on the access track, the proponent will construct a sealed access road to the site, thereby negating potential noise (and dust) generation from trucks travelling on an unsealed surface and through potholes. Additionally, all vehicles will be fitted with efficient noise suppression devices.

To place the predicted number of truck movements associated with the site into a local context, it is expected that when the quarry is operating at its' target production, the site will produce a total of approximately 100 truck movements per day. This corresponds to less than 2% of the total vehicular movements on the South Western Highway past the site per day at present.

The proponent also reiterates the management strategies which will be utilised to prevent or minimise noise generation from the proposed quarry operation:

- The location of the quarry within a valley landscape will tend to reduce the lateral propagation of blasting and operational noise other than along the valley.
- All blasts conducted at the quarry will have millisecond delays between individual charges to produce sequential firing.
- Blasting will only be conducted during weekday afternoons.
- Monitoring of both airblast noise and ground vibration will be conducted, in accordance with the monitoring protocols to be determined in consultation with the EPA (via the Works Approval and Licensing avenues).
- Liaison will be maintained with Pioneer Concrete with respect to blasting plans, to avoid the unlikely event of simultaneous blasting.

- Whitby Falls Hostel will be provided with a schedule of blasting prior to commencement of quarrying, if required, and liaison maintained regarding the effects of blasting.
- Noise suppression devices will be maintained in good condition on all operational machinery.
- Workers will be issued with noise protection equipment and instructed as to noise reduction techniques in the workplace.
- Any complaints received regarding noise disturbance will be recorded and follow-up action instigated to minimise the cause of future, similar disturbance, to the greatest practicable extent.

3.2 What commitment to repairing any damage to residences/other buildings from blasting can the proponent make?

Response:

The proponent undertakes, upon request of any landowner within the nominal 2km zone of influence, to independently survey and document the condition of any residence or building before the commencement of quarrying activity at the site.

The proponent will maintain appropriate insurance to ensure that in the unlikely event of damage to a residence or other building being directly attributable to the quarrying activity on Lot 344, the building or residence will be restored to the condition as surveyed before the commencement of quarrying at the site.

3.3 What would be the cumulative noise impact from the Pioneer quarry and the proposed quarry on residences (if any) in the zone of overlap?

Response:

As stated in the CER, land within the nominal zone of overlap created by existing quarrying in the area and the proposed site is predominantly used for stock grazing or

State Forest purposes.

Given the following factors, the proponent considers that the potential for cumulative noise impact will be insignificant:

- Liaison will be maintained with Pioneer Concrete with respect to blasting, to avoid the unlikely event of simultaneous blasting occurring.
- Both the Pioneer quarry and the proposed quarry will have separate access roads, therefore truck movements will not be concentrated at one point. The access road to the site will be sealed and maintained in good repair.
- Noise suppression devices will be maintained in good condition on all operational machinery used in the quarrying operation.
- The proponent will conduct all quarrying operations within the conditions of approval, including the Works Approval issued by the EPA.

4. Dust.

4.1 Are the proposed dust mitigation measures comprehensive enough to ensure that the quarry operation can meet the dust limits which would be set?

Response:

The proponent **must** comply with the dust criteria which will be established in the EPA Works Approval which will be issued for the project. Therefore the proposed dust mitigation measures will be comprehensive enough to ensure the operation is within these criteria.

The proponent reiterates the management strategies which will be utilised to prevent or minimise dust generation from the proposed quarry operation:

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- All reasonable and practicable measures will be taken to minimise dust emissions from the plant and associated equipment.
 - Where possible, blasting will be conducted on days with westerly winds prevailing (winds from the westerly quadrant occur during 60% of the year) so that any dust produced will be carried to the most sparsely populated areas.
 - Dust suppression water sprays will be incorporated into the crushing and screening plant. Conveyors will be sprayed or enclosed as necessary.
 - In the event that wind-borne dust becomes a problem, non-working faces of stockpiles will be sprayed with water from portable sprinklers and/or provided with a protective coating (e.g. hydro-mulch).
 - All traffic areas will be sealed or treated and maintained in a manner which prevents or minimises generation of dust.
 - The concentration of air borne dust from the premises shall not exceed those criteria stipulated in the EPA Works Approval and Licence, which shall be gauged by appropriate air sampling at critical times.

5. Water quality.

5.1 Would any monitoring of the water quality of Manjedal Brook be proposed if the quarry went ahead?

Response:

The proponent reiterates Commitment 15 of the CER:

"The existing water quality of Manjedal Brook will not be detrimentally affected due to the operation of the proposed quarry. Summer flows of the Brook will not be altered".

The proponent will monitor selected aspects of the water quality of Manjedal Brook as required by the conditions of the Works Approval issued by the EPA, and the Planning

Approval issued by the SPC to the requirements of the Water Authority of Western Australia.

6. Visual amenity.

6.1 What would be the specific visual impact of the quarry on the visual amenity of Whitby Falls as viewed from the plain?

Response:

The quarry will not be visible when viewing Whitby Falls from the plain. The view from Whitby Falls to the proposed quarry site along the alignment of the Manjedal Brook valley is not a straight line. There are two significant "bends" in the valley, in addition to relatively dense stands of vegetation and varying topographically screening elevations and minor ridge spurs, and consequently an uninterrupted view of both the site and the Falls from the plain is not possible.

6.2 Can the quarry be designed such that it would have an insignificant visual impact on the viewsheds from the coastal plain?

Response:

The proponent has designed the quarry and formulated both a quarry plan and a preliminary rehabilitation strategy to ensure that the quarry operation will not be visible from the plain before the rehabilitation of any potentially exposed areas has been completed, to the satisfaction of the relevant authorities. Only at this time will quarrying activity potentially expose previously mined and rehabilitated areas.

Quarrying will commence on the eastern side of the site which is topographically lower, and therefore screened, by land immediately to the west. The western side of the site will not be quarried until the eastern slopes, which may become exposed, have been rehabilitated to provide a visually similar backdrop to the surrounding undisturbed environment. It should be noted that based on current projected extraction rates, it is not anticipated to quarry the western side of the site for approximately 45 years.

Additional management strategies proposed by the proponent to minimise visual intrusion include:

- Additional tree planting during the first 2-3 years of operations, adjacent to the stockpile and processing area, to supplement the screening function of existing trees (some of which are outside the property boundaries).
- Depending upon final end use, all buildings and equipment will be removed at the completion of the project, and all roads will be deep ripped and revegetated.
- All buildings likely to be visible from outside the area owned by Ransberg Pty Ltd will be constructed and coloured to blend with the existing landscape to the greatest practicable extent.

6.3 What screening and/or design measures are possible to minimise the visual impact of the access road?

Response:

The sealed access road will be designed to meander towards the site as shown in Figure 5.1 of the CER, rather than adopting a straight alignment which would be potentially more visually apparent.

Screening of the access road will be achieved by supplementary tree planting, and by taking maximum advantage of existing remnant stands of vegetation in the vicinity of the proposed alignment.

7. Water quality.

7.1 By what means would the “potentially contaminated water” be contained and subsequently disposed of?

Response:

As explained in the CER, the main source of potentially contaminated water will be in the form of water containing suspended solid particles, or silt. This water is termed turbid

water. During winter storm periods, turbid water enters the Brook naturally through run-off within the steeper sections of the catchment. The proponent is committed to maintaining the existing quality and quantity of water in Manjedal Brook, and has formulated management strategies to achieve this objective.

The main management strategy employed to ensure the protection of Manjedal Brook will be the use of settling ponds to provide sufficient retention times to allow the settling of suspended solids before discharge or recycling of water for dust suppression.

Retention basins will be designed by, and constructed under supervision from, a qualified engineer. Hydrological principles will be applied to calculate anticipated peak flows so that the structures will be sized to accommodate runoff volumes in accordance with Department of Mines (1991) guidelines.

The following management strategies will ensure that water pollution of Manjedal Brook is avoided:

- The summer throughflow in Manjedal Brook will not be altered by the proposed quarry operation (water for dust suppression etc. will be obtained from water storages constructed to trap winter runoff generated on site or within the minor tributaries to Manjedal Brook).
- The premises shall be drained such that all potentially contaminated water is retained on-site in retention basins.
- Water run-off from the crushing area and mine development shall be contained within the vicinity of the working areas for sufficient time to allow settlement of suspended matter.
- A continuing program of rehabilitation of worked out areas will be instigated to stabilise slopes and minimise turbid run-off (see Section 6.9 of the CER).
- The effectiveness of drainage structures (dams, drains) will be regularly checked and maintained.

- Silt removed from basins will be incorporated into the rehabilitation program as fill below topsoil.
- Where possible, all water used in the quarry will be recycled through the settling basins for re-use.
- Waste and fuel management will be handled in accordance with those described in Sections 6.5 and 6.11 of the CER.

8. Rehabilitation.

8.1 Considering the steepness of the site and the existing erosion, are the proponent's confident they can design and economically implement appropriate erosion control strategies?

Response:

The proponent will be legally bound by the conditions of approval and the Works Approval to operate the quarry in a manner which will satisfactorily control erosion and the possible effects of erosion. Therefore the question of economic implementation is irrelevant, as the proponent **must** control erosion at the site to the satisfaction of the authorities and conditions of approval.

The proponent has a long association with mining and the mining industry, and will continue to demonstrate a responsible attitude toward environmental management. The Company considers that its practical experience, combined with its commitment to the project and the commitments detailed in the CER, will enable the successful control of any potential erosion at the site.

The proponent also considers that erosion evident on the site at present to be relatively minor, and that this limited erosion will be remedied once the quarry is in operation..

8.2 The rehabilitation plan would need to be based on site specific information because the CER's description of the vegetation is generalised and some species, particularly some Eucalypts, are not present: at what stage would a rehabilitation plan be produced?

Response:

As a component of the assessment of the potential environmental impacts of the proposed quarry, the proponent commissioned a flora and vegetation survey of the site by a qualified botanical consultant. Given the level of assessment set by the EPA (CER), the proponent did not report the detailed results of the survey in the CER document.

Nonetheless, the results are available for use by the proponent in the formulation and execution of a rehabilitation plan, such as those included in Appendix E to the CER, "Indigenous Plant Species Suitable For Rehabilitation Use".

A rehabilitation plan will be produced in accordance with the conditions of approval for the project, including the time at which the plan should be formulated. It should be noted that the rate of extraction of hard rock will be relatively slow in the initial years of quarrying activity, and it will be several years before commencement of rehabilitation will be practicable.

9. Flora/vegetation.

9.1 What proportion of the Myara Sub-Complex vegetation type in the Manjedal Brook catchment would the quarry be affecting over its life?

Response:

The proportion of the Myara Sub-Complex in the Manjedal Brook catchment which may be affected over the life of the quarry proposal has been calculated at approximately 9%, based on the following:

- Figure 4.2 of the CER representing the extent of the Myara Sub-Complex in the Manjedal Brook catchment from a regional perspective (approximately 160 ha);

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- The probable staging plan for the project presented in CER Figures 5.2 and 5.3, representing approximately 14 ha of clearing of Myara Sub-Complex (as defined above) over the life of the mine;
 - The use of current (January 1992) aerial photography to determine areas within the site which have previously been cleared.

In conjunction with the information presented above, the following points should be noted:

- Much of the vegetation within the site has previously been altered by logging and stock grazing and is not therefore in an undisturbed condition;
- A buffer zone of 50 metres (and possibly more) of Myara Sub-Complex each side of Manjedal Brook will be left undisturbed;
- Approximately 55 ha of Myara Sub-Complex is protected in State Forest immediately east of the site, and;
- Other examples of the Myara Sub-Complex vegetation type are found in the vicinity of the proposed quarry outside of the Manjedal Brook catchment.

9.2 What width of riparian vegetation would be retained?

Response:

In accordance with the State Planning Commission's conditions of approval for the project to proceed (Condition 10), a buffer zone of a minimum width of 50 metres will be left undisturbed either side of Manjedal Brook. This area will be defined by fencing or other suitable means, to the satisfaction of the EPA.

3. REFERENCES

Department of Mines (1991). Environment Management of Quarries: Development, Operation and Rehabilitation Guidelines. Department of Mines, Western Australia.

Appendix 3

List of submitters

List of Submitters

1. Nanwall Investments Pty Ltd, 2 Wattle Ave, Dalkeith, WA 6009
2. Armadale Kelmscott Memorial Hospital (Whitby Falls Hostel), PO Box 460, Armadale, WA 6112
3. Conservation Council of WA Inc., 79 Stirling St, Perth, WA 6000
4. Ms Kath Laren, Lot 104 Keirnan Street, Mundijong, WA 6202
5. The Readymix Group, PO Box 138, Gosnells, WA 6110
6. Pioneer Concrete, PO Box 187, Victoria Park, WA 6100
7. The Scout Association of Australia, PO Box 467, West Perth, WA 6872
8. Shire of Serpentine-Jarrahdale, 6 Paterson St, Mundijong, WA 6202
9. Mr and Mrs Peirce, Lot 3 Manjedal Drive, Byford, WA 6201
10. Mr G Peirce, Lot 4 Manjedal Drive, Byford, WA 6201
11. Mr W G Webse, 106 Summerfield Road, Serpentine, WA 6205
12. Mr and Mrs Morris, 877 Manjedal Drive, Byford, WA 6201
13. Mr N J Coy, Lot 48 Turner Road, Byford, WA 6201
14. Mr and Mrs Ostle, PO Box 74, Byford, WA 6201
15. Mr Fred McKenzie, Darling Range Regional Park Community Consultative Committee, Parliamentary Office, Cnr Marion St and Railway Parade, Midland, WA 6056
16. Boral Resources, 136-138 Great Eastern Highway, South Guildford, WA 6055
17. Waterbird Conservation Group, Lot 139 Urch Road, Roleystone, WA 6111
18. B Mort, Lot 10 Keirnan Street, Mundijong, WA 6202
19. Department of Conservation and Land Management, Hackett Drive, Crawley.

Appendix 4

**Department of Planning and Urban Development
planning approval conditions**

STATE PLANNING COMMISSION

Conditions of Approval for a quarry operation on Cockburn Sound Locations 249, 278, 344, 412 and 426 South West Highway, Mundijong: SPC 29/261-4.

Conditions:

1. The quarrying activities shall be restricted to Lot 344.
2. Rehabilitation of the site shall be to the specifications and satisfaction of the Environmental Protection Authority and the Local Authority.
3. The quarry activities shall be screened from the coastal plain and adjoining State Forest to the satisfaction of the Department of Planning and Urban Development, Environmental Protection Authority, Local Authority and the Department of Conservation and Land Management. Specifically the proponent shall minimise clearing of existing vegetation and plant and subsequently maintain trees and shrubs indigenous to the area, to provide for effective screening.
4. Appropriate management practices shall be put in place to minimise dust and noise emanating from the site and these practices shall satisfy the specific requirements of the Environmental Protection Authority, Health Department and the Local Authority.
5. Compliance with the Mines Act Regulations, the Extractive Industries By-laws and the Rights in Water and Irrigation Act.
6. No stormwater is to be discharged onto the South Western Highway.
7. All vehicular access is to be via the existing road adjacent to Lot 412 and no access will be permitted directly onto the South Western Highway from Lot 412.
8. The adjoining State Forest shall not be used for access purposes and no overburden shall be placed within the State Forest.
9. The quarry site shall be fenced and marked with warning signs, to the specifications and satisfaction of the Local Authority and the Department of Conservation and Land Management.
10. A buffer zone, of a minimum 50 metres in width shall be left undisturbed either side of Manjedal Brook. This area shall be defined by fencing or other suitable means to the satisfaction of the

Environmental Protection Authority. Furthermore a similar buffer area shall be provided along the eastern (State Forest) boundary of the quarry site.

11. The proponent shall demonstrate to the satisfaction of the Water Authority that summer flows from Manjedal Brook will not be interfered with, prior to commencement of site works.
12. The proponent shall satisfy all other requirements of the Water Authority and in particular dam construction, turbidity control and extraction of groundwater.
13. Construction of access roads across the Manjedal Brook shall be to the specifications and satisfaction of the Local Authority and the Environmental Protection Authority.
14. Any fuel stored in tanks on the site shall be located on a fenced concrete pad within a perimeter earth bund capable of containing the total volume of fuel in the event of leakage. This structure shall be constructed to the satisfaction of the Local Authority and to comply with applicable by-laws and regulations.
15. A survey of native fauna population in the vicinity of the quarry site to determine the likely impact of mining on the fauna shall be conducted by the proponent, to the satisfaction and specifications of the Department of Conservation and Land Management, prior to site clearing and subsequently at 5 yearly intervals, throughout the life of the mining operation. Results of the survey including basic data shall be made available to the Department.
16. The proponent shall obtain all necessary licences and works approvals prior to commencement of site works.
17. Compliance with all other requirements of the Local Authority relating to the ongoing development, management and rehabilitation of the quarry site and surrounding environs.
18. This approval is issued for a period of ten (10) years only after which a fresh application is to be made by the proponent (landowner) to the appropriate authority(s) for approval.

FOOTNOTES

1. This decision is issued pursuant to the provisions of the Metropolitan Region Scheme.
2. The applicant is advised that portion of Lot 412 is affected by a future road widening requirement for South Western Highway which is reserved as an 'Other

Major Highway' in the Metropolitan Region Scheme. Further details can be obtained by contacting the Main Roads Department.

3. The Main Roads Department has advised that current long term plans do not allow for a median opening on South Western Highway opposite the existing road reserve that will be used for access purposes.
4. The Department of Conservation and Land Management should be consulted regarding the flora species to be planted as part of the screening and rehabilitation of the quarry site.
5. The Water Authority has advised that the site is situated within the Serpentine Groundwater Area and that a license is required before a bore or well is constructed. A license when issued will contain a number of conditions including the quantity of water which may be pumped each year.
6. The proponent should endeavour to utilise any marketable forest produce that may be felled.
7. The proponent should liaise with the Department of Occupational Health, Safety and Welfare relative to noise control of plant and machinery.
8. In respect of Condition 3, computer generated three-dimensional views shall be provided by the proponents to the Department of Planning and Urban Development, the Local Authority, Environmental Protection Authority and the Department of Conservation and Land Management prior to commencement of site works to enable determination of requirements regarding the screening of the quarry activities. The Department of Planning and Urban Development will subsequently advise the developer of the specific requirements to satisfy Condition 3 after seeking the advice of the Council, the abovementioned government agencies and having regard to the developers specific screening proposals (which should be nominated at the time of submission of visual impact models).