Application for hard rock quarry operation, ML 47/306, 331, & 353

Messrs G & P Rocca

Report and recommendations of the Environmental Protection Authority

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Summary

This report is to provide the Environmental Protection Authority (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal to extend the Nickol Bay Quarry on the Burrup Peninsula, Dampier.

The proponent Messrs G & P Rocca propose to extend the pit of the Nickol Bay Quarry along the Pistol Range within an area covered by Mining Leases M47/306, M47/331, M47/309, and M47/353. The proposal does not alter the nature of quarry operations carried out at the Nickol Bay Quarry.

It is the EPA's opinion that the following are the environmental factors relevant to the proposal:

(a) Declared Rare and Priority flora;

(b) vegetation communities;

(c) Threatened and Priority fauna;

(d) visual amenity; and

(e) archaeological/ethnographic sites.

The conditions and procedures, in the EPA's opinion, to which the proposal should be subject if implemented are in summary:

(a) the proponent's commitments should be made enforceable;

(b) within five years of commencement of quarrying in the area covered by this proposal, the proponent should be required to prepare and implement a progressive rehabilitation programme; and

(c) the proponent should be required to implement an environmental management system.

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment note the relevant environmental factors and EPA objectives set for each factor (Section 3).

Recommendation 2

That subject to the satisfactory implementation of the EPA's recommended conditions and procedures (Section 4), including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

Recommendation 4

That the Minister for the Environment request the Minister for Resources Development to prepare a raw materials strategy for the Burrup Peninsula region which:

(a) addresses the possible development of quarries on the Burrup Peninsula;

(b) recognises the incompatibility between raw material quarrying and the conservation zone;

(c) **considers the effects of raw material quarrying on the visual amenity and landscape values of the Burrup Peninsula and in particular the Pistol Range; and**

(d) **considers the use of future industry sites as quarry sites.**

1. Introduction

1.1 The issues

During the summer of 1994-95, more complaints regarding dust impacts from land development sites were received by the DEP than for any previous summer. This resulted in a commitment from the Minister for the Environment to improve dust control measures.

During the winter months, the DEP and local government receive many complaints relating to smoke nuisance from the burning of cleared vegetation on development sites. Added to this is growing evidence that Perth's air quality is deteriorating in the form of increasing haziness. Smoke is a major contributor to this deterioration.

1.2 The 1990 guidelines

An earlier version of this document was published in 1990 following consultation between officers of the Department of Environmental Protection (DEP) — formerly the Environmental Protection Authority and representatives from the:

- Association of Consulting Engineers Australia (ACEA);
- Local Government Engineers Association (LGEA);
- Australian Earthmovers & Road Contractors Federation (AERCF); and
- Urban Development Institute of Australia (UDIA).

The document was in use for about five years. A review has been undertaken of the effectiveness and relevance of the guidelines, and to broaden the scope of the document from purely dust control to the management of both dust and smoke from land development sites.

1.3 The 1994 smoke control guidelines

Smoke control guidelines were released in 1994 in response to complaints of smoke resulting from the burning of cleared vegetation. In spite of the release of the smoke control guidelines, problems with smoke from land development sites have persisted, and as a result the effectiveness of those guidelines has also been reviewed.

1.4 Aims and structure of this document

This document contains several significant changes from the previous dust control guidelines, which were published in 1990, and replaces those guidelines.

The principal aims of this document are:

- to clearly define the roles and responsibilities of developers, engineers, contractors, local government and the DEP in the control of dust and smoke from land development sites;
- to provide a procedure whereby the potential of a development site to generate dust is assessed prior to site works commencing; and
- to put in place measures and contingency arrangements to manage the potential for dust leaving the site during and after development, and to ensure that the potential impacts of smoke from land development sites are recognised and mitigated.

The guidelines describe a course of action which may be taken by the developer, engineer for the developer, contractor, local government and the DEP when complaints related to development sites are received.

1.5 Review of the guidelines

These guidelines will be reviewed after they have been in operation for 12 months. This will enable many issues to be assessed, including the effectiveness of the measures used to prevent dust generation, the impact of the implementation of the guidelines upon the resources of local government and the response of developers towards the need for a more acceptable outcome on the issue of burning vegetation.

2. Guidelines for the prevention of dust and smoke pollution from land development sites

2.1 Definitions

For the purpose of these guidelines the following definitions are applicable:

(a) Land development sites — are premises (larger than 5000m^2) on which any work involving the clearing of vegetation and/or topsoil, recontouring (bulk earthworks), trenching and/or road construction is to be done to develop the land for any use.

(b) Land Uses — are items of value which would be adversely affected by exposure to excessive quantities of dust and wind-borne material and include houses, commercial buildings, commercial activities, market gardens, schools, factories, roads, parks and recreational areas.

2.2 Roles and responsibilities

In the scheme outlined in this document, there are five major stakeholders in the prevention of pollution from land development sites — developers, consulting engineers, contractors, local government and the DEP. All of these stakeholders have a role to play.

Developers, engineers and contractors are responsible for the development and implementation of air quality management programmes, and for ensuring that identified contingency measures are implemented as appropriate, to prevent adverse impacts from dust and smoke.

Local governments are responsible for the approval process for engineering works on land development sites and this provides a mechanism to manage the air quality impact of such developments. **Local governments are encouraged to use this approval process to require the preparation and implementation of acceptable air quality management programmes.**

The DEP is responsible for preventing pollution in Western Australia, and enforcing compliance with environmental standards. This responsibility is set out in Part V of the *Environmental Protection Act, 1986.*

In the context of land development sites, the DEP exercises this responsibility by setting environmental objectives and guidelines for land development, providing advice and technical assistance to local government and helping all parties in resolving situations where dust control measures prove inadequate. Where resolution is not achieved, the DEP may initiate enforcement measures.

The DEP believes that local governments are best placed to manage land development sites, due mainly to their extensive local knowledge and control of the approval process for engineering works on these sites. The DEP is committed to supporting local government, in their role in the management of land development sites, through training and other technical support. In accordance with this philosophy, and with current practice, complaints regarding land development sites will be referred to local governments to handle in the first instance.

The DEP's role in complaints will be determined on a case-by-case basis, in consultation with the relevant local government, although it is anticipated that the DEP is not likely to become involved until all possible alternatives for dispute resolution at the local government level have been exhausted.

While the DEP will retain overall responsibility for pollution prevention, provision will be made for local government, where they have the capacity and the desire, to accept delegation of some limited powers (for example, the ability to issue pollution abatement notices) under the *Environmental Protection Act, 1986.* This may assist local government in enforcing air quality management programmes. This delegation may take place where a request is made to the DEP by the relevant local government.

Where local government does not have either the capacity or the desire to accept such delegation, then responsibilities for activities such as issuing pollution abatement notices, for example, will remain with the DEP.

2.3 Timing of development

It is the developer's responsibility to schedule work on land development sites such that it is carried out at the time of the year, and in a way, which reduces the potential impacts of dust and smoke to a practical minimum.

The time of year when these activities are conducted is critical. Historical records of complaints received by the DEP show that very few dust problems occur during winter, but that smoke problems can occur at this time of the year.

Activities with high dust-causing potential, such as topsoil stripping, should not be carried out in sensitive areas during adverse wind conditions. When necessary, topsoil should be stripped in discrete sections, allowing buffer strips (windbreaks) between clearings.

2.4 Development staging

Dust generated by bulk earthworks being done during the summer months, particularly with housing in close proximity, can adversely impact upon people who live near development sites. These effects may be reduced if developments can be staged in a sequence whereby bulk earthworks are carried out in the winter months and the completed earthworks "front" is kept to about 100 metres in advance of newly-created lots.

In planning the staging of developments, it should be recognised that completed subdivisional stages are often quickly built upon and, hence, the completed stage should be considered to be an improved area when developing the next stage. This means that subsequent stages of any development can require more stringent dust control measures, as the completed subdivisional areas represent an increase in the potential for adverse impacts.

2.5 Treatment of vegetation on site

The burning of cleared vegetation on land development sites is a waste of a valuable resource, and a contributor to the deterioration of air quality, especially in urban areas.

The former point was considered in detail by the Select Committee on Recycling and Waste Management.

The Select Committee noted in its report (December 1995) that green waste from land development sites can be recycled as firewood or chipped or mulched for use in landscaping. The Select Committee consequently recommended that "Burning of green waste from urban land clearing be banned" (recommendation 20).

Burning of cleared vegetation is also a major source of public complaints to both the DEP and to local governments, as smoke can be disruptive and annoying to neighbours. Furthermore, the CSIRO, in conjunction with the DEP, has recently concluded a study into the composition and sources of brown haze experienced by Perth through the autumn-to-spring period. When released, this study is likely to add considerable weight, on both aesthetic and health grounds, to the need for better control of smoke from all sources affecting urban air in Perth.

It should be noted that some local governments have already taken initiatives to curb burning. Landcorp also has implemented a protocol to minimise the requirement to burn cleared waste. The DEP strongly encourages and supports these measures.

In addressing the Select Committee's recommendation, the DEP is drafting a waste management strategy which will outline proposals to implement the ban recommended by the Select Committee. In this respect, the DEP has an objective to ban the burning of land clearance waste within one year (by the end of December 1997). **The proposal makes it clear that relevant stakeholders will be consulted in determining the nature, applicability and implementation of the ban.**

In the meantime, **the DEP recommends that all possible alternatives to burning of cleared vegetation be considered before the decision to burn is made.** Developers will be required to include in the air quality management program a section on how cleared vegetation will be treated. This should include a section on the assessment of the various strategies considered for the treatment of vegetation on-site.

If, after all the other options have been considered, it is decided that burning is still the preferred option, then the air quality management programme will also include details on:

- the **proximity** of nearby landuses;
- the **location** on the site where burning will take place;
- the **measures** that will be undertaken to minimise the amount of material burned;
- the **quantity** of cleared vegetation to be burned; and
- the **timing** of any proposed burning.

The following procedures indicate the order of preference for dealing with vegetation:

1. As much standing vegetation as practicable should be permanently retained. (Consideration should be given to leaving the majority of undisturbed vegetation on each building site, with the exception of fence lines and road verges, where applicable. The responsibility of removing vegetation for the construction of each building may result in increased cost to the eventual owner of the property. However, this also allows for a staggered reduction of vegetation and a greater choice by the new owner as to which vegetation should be removed).
2. Where appropriate, valuable species in areas to be cleared should be transplanted, for example, to areas planned to be retained for public open space.
3. Timber should be cut and stacked for firewood sale or collection.
4. Vegetation which is removed should be chipped and used for mulch for soil stabilisation.
5. Low scrub should be ploughed in to form part of the topsoil to be separately stripped, stockpiled and eventually respread.
6. Disposal of vegetation to landfill should be adopted only where absolutely necessary to avoid increasing the pressure on valuable landfill space.
7. Where cleared vegetation is to be burned, the following guidelines should be adopted:
    - a proposal for burning should be included in the air quality management programme;
    - local government approval for burning must be obtained;

- burning should take place as far away from residences as possible;
- burning should ideally be completed within normal business hours — all burning should be extinguished at the close of business on Fridays, or preceding a public holiday, and not reignited until after the weekend or public holiday;
- burning should proceed only in favourable weather and not on windless days or during an atmospheric inversion;
- spoil heaps should be as free of soil as possible and be allowed to dry for at least two weeks in drier months and at least four weeks in winter before igniting;
- under no circumstances should foreign material or accelerants of any kind be used to promote burning; and
- a contractor's representative must remain on-site for the length of the burn, especially where overnight burning is conducted.

If, during the next 12 months review period, burning on development sites causes pollution, then the DEP will proceed with a proposal to ban such burning. This could be achieved through a regulation made under the *Environmental Protection Act, 1986*. A mechanism for exemption from the blanket ban could be provided, but it is envisaged that exemptions would only be granted where a compelling case is presented.

In the meantime, if a complaint regarding smoke from a land development site is substantiated by the DEP, then the DEP will act to prevent further burning on-site.

Just as these guidelines are in no way related to Bush Fires legislation and do not constitute approval to burn, neither does an approval under the Bush Fires Act constitute environmental approval. There will be certain circumstances where no burning is either necessary or appropriate.

2.6 Stabilisation of cleared areas

The simplest and most effective method of dust control is the retention of vegetation. Patches and strips can be very effective and as much vegetation as possible should be retained. Even low or sparse scrub can be very effective at dissipating wind velocity at the ground surface, where dust lift-off occurs.

Where major works are undertaken, it is inevitable that the clearing of natural vegetation will occur and in some circumstances large tracts will be disturbed. In these situations, it is important to stabilise the soil that is exposed to ensure that it does not cause a dust nuisance. Several techniques for soil stabilisation are described below and all have proved to be effective, if used correctly and in appropriate circumstances. Often, a combination of the techniques described can result in the most effective dust management being applied to a development site.

When considering which soil stabilisation technique to use, it is important to consider the factors that affect both dust lift-off and the potential impact zones. Consideration of these factors will assist in choosing the most appropriate stabilisation technique.

Some common factors which affect **airborne dust lift-off** from land development sites (other than considerations of physical characteristics such as particle composition, density and size) are:

- wind velocity;
- amount of land area disturbed and exposed (includes adequacy of artificial covers such as hydromulching);
- soil dryness/compaction; and
- wind direction oscillation.

Some common factors which affect the **transport and adverse impacts of airborne dust** are:

- wind velocity;
- wind direction;
- type and number of preventive measures taken to control dust movement; and
- the proximity of nearby residents and land uses sensitive to dust impacts.

2.6.1 Wind fencing

The use of wind fencing as an aid in the control of dust has proved to be effective in most situations. Apart from the positive visual impact that fencing can provide, it allows a development site to be worked without undue constraint upon the contractor, while offering protection against the movement and impact of dust on nearby residents and landuses. The astute use of wind fencing may also reduce the amount of site watering and other, more direct forms of surface stabilisation required during the lifetime of the development site works.

Wind fences provide a sheltered region behind the fenceline where a reduction in wind velocity allows the settling of larger dust particles to take place. The effectiveness of any wind fence depends upon its location with respect to the wind direction and velocity, as well as the shape, width, height, and porosity of the fence. Wind fencing is most effective when it is perpendicular to the direction of the prevailing wind, but will have little or no effect when the wind direction is parallel to the fence.

Solid fences provide significant reductions in wind velocity for relatively short leeward distances, whereas porous barriers provide smaller reductions in velocity for more extended distances. The height of the barrier is also an important factor influencing the effectiveness of a fence. Reduced wind velocities can be experienced on the leeward side of a porous fence for a distance of up to 40 or 50 times the height. Studies carried out in the United States indicate that a porosity of around 50% appears to be optimum for most situations.

It is essential that the integrity of a wind fence is maintained. Wind-borne sand buildup along the fence should be removed on a regular basis to prevent damage to the structure and to ensure maximum efficiency. The use of shade cloth or hessian is suitable for a porous fence, providing the material is maintained on a regular basis and rips or breaks in the fence are repaired as required.

2.6.2 Water use

Water-carts are an integral part of land development sites since water is required during the compaction phase of road construction. Water can also be effective in reducing dust lift-off from unsealed roads and other trafficked areas on-site. However, its efficiency decreases as wind velocity and evaporation rate increase, and this can result in ever increasing applications of water being required in windy locations and on warm, sunny days.

It should be noted that site watering is more effective if it is undertaken prior to strong breezes developing. Its effectiveness is limited if the water is applied after the wind has set in.

The use of water is recommended for the management of dust in areas where bulk earthworks have been or are being conducted, however, application rates need to ensure that the water content of the top layer of soil is kept high enough to prevent dust generation.

The use of scheme water for dust suppression should be discouraged, on water conservation grounds, and alternative supplies should be used wherever possible. However, care must be taken to ensure that the quality of the water used does not have other adverse environmental impacts, such as saline water on vegetation.

While the use of water-carts remains the most effective and visual response mechanism available to a developer, it should be recognised that their efficiency in areas where bulk earthworks have been or are being carried out can be limited.

2.6.3 Hydromulch

Hydromulch is very effective at preventing dust lift-off from areas where bulk earthworks have been completed and little or no further vehicular or pedestrian traffic is likely. It is a versatile tool, as the constituents of spray mulch can be varied to suit the requirements of the contractor and the site location. For example, just mulch and water can be used effectively in the short-term or seed, fertiliser and stabiliser can be added if longer-term stabilisation is required.

It should be noted that for hydromulch to be effective, especially in the medium to long-term, vehicular and pedestrian access to the treated areas must be restricted. This is because the applied hydromulch layer may be compromised by trafficking and the matrix broken up. Once this happens, weathering processes (wind and water erosion) can lead to further deterioration of the hydromulch material and its soil binding properties rendered useless. Barrier fencing should be used in isolated locations, or where long-term effectiveness is required, to control access and achieve maximum benefit from the hydromulch application.

Hydromulch normally consists of recycled newspaper which is mashed to form a pulp with water and is then sprayed on the ground, where it forms a thin, fibrous layer. Grass seed (and fertiliser) can be included in the spray such that, after sufficient rain, the grass seeds germinate and the resultant vegetation becomes the long-term dust suppression strategy. Organic stabiliser can also be added to the mix to provide a more stable base for the germination of seed.

For short-term dust suppression, hydromulch without grass seed may be used with greater effect than water alone. Its effectiveness is much greater than that of just water as it is not affected by the evaporation rate. It will need to be re-applied, however, to areas which have been disturbed by vehicular or pedestrian traffic, for reasons given previously. Since the amount of dust which may be generated from a land development site depends on the size of the exposed area, this area of clearing should be minimised. It is possible to reduce the potential dust lift-off levels by keeping the maximum area of the site covered with original vegetation or material such as spray mulch.

An effective use of this material can be obtained by planning the bulk earthworks so that the minimal area is disturbed at any one time and the remainder of the site is continually covered with mulch. This may include the requirement for a light application of spray mulch over the worked area at the end of each working day and especially before weekends.

It should be noted that the effectiveness of hydromulch is dictated by the constituents of the mulch. The use of shredded paper and water may not be effective in high wind areas without the use of chemical stabilisers in the mix, as well as the use of other stabilisation methods e.g. wind fencing. Recommended application rates are available from suppliers and advice should be sought from suppliers prior to the use of hydromulch. In addition, when approving the use of hydromulch as a soil stabilisation technique, local government authorities should ensure that application rates and the constituents of the mulch are appropriate to the task at hand.

2.6.4 Chemical stabilisation

There are three main categories of chemical stabilisers used for dust suppression — bitumen based, inorganic salt based and adhesive based. Very little information exists regarding the successful use of chemical stabilisers for development sites in Western Australia and, before widespread usage, it may be necessary for the chemical ingredients to be evaluated with regard to their environmental effects. At this stage the DEP remains open to submissions on the potential applicability of these agents for dust suppression on development sites.

2.6.5 Chipped vegetation

Chipping cleared vegetation provides an effective mulch, which may be used as a ground cover to prevent dust lift-off by shielding exposed surfaces. Using material produced on-site for this purpose provides a convenient solution to both dust problems and to the disposal of cleared vegetation.

3. Air quality management programmes

3.1 Requirement for air quality management programmes

One of the main problems identified with the previous dust control guidelines was that they were not applied uniformly, that is, they were applied to some subdivisions and not to others. This weakness has been recognised, and it has been suggested by industry that a solution to this problem is for local governments to require an adequate air quality management programme to be submitted for approval with the engineering drawings for the subdivision. Responsibility for dust management is then the developer's, who can delegate that responsibility to the relevant engineers and contractors. This is one method that local governments can employ to ensure that dust management is always considered in the planning of a subdivision.

3.2 Air quality management programme

As a guide, the air quality management programme should include the following items:

(a) Site classification.

A "CLASSIFICATION ASSESSMENT CHART" for the site should be completed. This chart, together with some explanatory notes, is attached as Appendix 1 to the guidelines.

The chart and chart notes recognise that the major factors influencing the dust risk potential of a specific site are the time of the year when the works are to be conducted, the nature of the site, the extent of the proposed works and the proximity of the site to any other land uses.

Should an adjoining land development site have works occurring simultaneously or overlapping with the works on the subject site, then the site classification/s shall be assessed taking fully into account the adjacent site as an existing land use.

The "SCORE" obtained on the assessment chart, together with any special site conditions as described in the explanatory notes (Appendix 1, Sheet 3), shall then be used to determine the appropriate dust potential classification/s of the site.

It is envisaged that some sites may be divided into more than one site classification. Provisions and contingency arrangements applied to each part of the site are those relevant to the particular site classification.

The "SITE ASSESSMENT DETAILS" form refers to the starting and completion dates, and the duration of the development works. The air quality management programme may need to be revised/updated should the "Contract Dates" as shown on the form vary significantly.

(b) Site inspection, involving relevant engineer for the developer and Local Government Engineer and/or Environmental Health Officer to ascertain:

- soil type and sensitivity;
- exposure of site;
- proximity and sensitivity of land uses;
- extent of required wind fencing;
- existing vegetation and timing of removal; and
- other influencing factors, for example duration of development, effect of prevailing winds, etc.

(c) Sequence of site disturbance, including maximum size of exposed areas and details on the method used for the removal and replacement of topsoil, with respect to prevailing winds.

(d) Haul road location.

(e) Contractor's site location — proximity of houses.

(f) Schematic sketch of site, incorporating above items, where applicable.

(g) Notification of nearby residents by letter drop and information board on site (to include after hours number of engineer for the developer and/or contractor).

(h) Course of action to be taken in the event of a dust problem.

(i) Appropriate items in specifications to be included with engineering drawings, and approved by the local government.

(j) Details on interim mulching, or other stabilisation activity.

(k) Method of treatment of cleared vegetation (see Section 2.5).

3.3 Contractual arrangements

It is anticipated that the ACEA and UDIA will draft model clauses for use in contracts for subdivision works. As a guide, the contract clauses should include:

- reference to these Guidelines;
- a clear description of the demarcation of responsibility for costs included in the lump sum allowance and those covered by provisional quantity/sum items;
- a statement that the ultimate contractual responsibility for dust and smoke control remains with the contractor, being the occupier of the land, or the developer in relation to the adequacy of the contractual requirements to allow/compel the contractor to exercise his responsibility;
- wind fencing — detail of construction and maintenance, including removal of sand build-up;
- provisions and contingency items required by the dust control guidelines;
- a requirement for the cessation of work during adverse wind conditions;
- provisional quantities/sums detailed and listed in schedule;
- advisory notices;
- a course of action should problems arise; and
- classification of the site in relation to its status as contaminated land.

These model clauses will be appended to this document as soon as they are produced.

4. Procedures for the assessment and management of dust lift-off

Site classifications — Threshold scores

Based on the total score obtained from the "SITE CLASSIFICATION ASSESSMENT CHART" and notwithstanding any allowance for special site conditions during the dry period, (refer to Note 4, Appendix 1) the following Site Classification will apply:

Site Classification 1 — under 199;

Site Classification 2 — 200 to 399;

Site Classification 3 — 400 to 799, and

Site Classification 4 — over 800.

Note:
- Unique sites may need special assessment.
- It is essential that any contracts for construction work on site include the relevant contingency arrangements appropriate for the site classification.

4.1 Classification 1 (score under 199, considered negligible risk)

Provisions:

- None required.

Contingency arrangements:

- None required.

4.2 Classification 2 (score between 200 and 399, considered low risk)

Provisions:

- The developer shall supply a contingency plan to the local government, which shall detail the activities to be undertaken should dust impacts occur.

Contingency arrangements:

- Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust suppression.
- All areas of disturbed land should be stabilised to ensure that the disturbed area exposed at any time is kept to a practical minimum.

4.3 Classification 3 (score between 400 and 799, considered medium risk)

Provisions:

- Appropriate wind fencing of a length specified in the air quality management programme needs to be stored on site or available within one hour of being required by the engineer for the developer/local government/DEP.
- All areas of disturbed land should be stabilised to ensure that the disturbed area exposed at any time is kept to a practical minimum to prevent exceedence of the maximum acceptable dust level (see Section 6.).
- The engineer for the developer shall maintain close control of works with dust creating potential (for example, allowable length of open trenching).
- After all siteworks are completed, and before the contractor has vacated the site, the developer should ensure that the entire site is stable. The developer then retains responsibility for site stability until change of ownership/control takes place. After the change of ownership/control has taken place, the new owner or controlling party will inherit responsibility for site stabilisation.

Contingency arrangements:

- Suitable water-carts in good working condition and of not less than 10,000 litres capacity per 7.5 hectares of disturbed site, or other suitable alternatives, shall be available to commence watering on the site within 18 hours of being required to do so by the engineer for the developer/local government/DEP.

- Surface stabilisation equipment shall be available to commence operation on site within 48 hours of being required to do so by the engineer for the developer/local government/DEP and with sufficient capacity to cover the disturbed site area within a further 48 hours.
- Wind fencing shall be erected within 18 hours of the contractor being required to do so by the engineer for the developer/local government/DEP. Dust generating works on the site shall cease in the interim.
- If dust-related complaints are generated due to activities on the site, the developer may be required by the local government or an authorised DEP officer to distribute advisory notices to adjoining land occupiers within 48 hours. The notices shall include the name of the developer, engineer for the developer, contractor/s and the contract period. The notices shall also contain contact telephone numbers and procedures as detailed in Appendix 2.
- If dust-related complaints are generated due to material which has been excavated for trenching, the developer shall ensure this material is stabilised within 48 hours of being requested to do so by the engineer for the developer, local government or an authorised DEP officer.
- Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust and wind-borne material suppression.
- Include an allowance for surface stabilisation for the purposes of dust and wind-borne material suppression to be maintained after the construction period and until change of ownership/control takes place.

4.4 Classification 4 (score over 800, considered high risk)

Provisions:

- Advisory notices shall be issued to adjoining land occupiers, the local government and the DEP at least 48 hours before site works commence. The notices shall include the name of the developer, engineer for the developer, contractor/s and the contract period. The notices shall also contain contact telephone numbers and procedures as detailed in Appendix 2.
- Fencing to the extent and in locations agreed to by the developer and local government shall be erected before any part of the site surface is disturbed.

  Note: This provision does not necessarily mean that the total site boundary is to be fenced. The fence is to be installed to an extent which will protect adjacent land uses and in most cases should be erected on the edge of the area which will be disturbed rather than on the site boundary.
- An amount of wind fencing of a length specified in the air quality management programme needs to be stored on site or available within one hour of being required by the engineer for the developer/local government/DEP.
- The nominated wind fencing is to remain in position until the disturbed surface is stable.
- Surface stabilisation is to be applied to the disturbed area of each section of the site upon completion of the works in that section.
- The engineer for the developer shall maintain strict control of works with dust-creating potential. Material which has been excavated for trenching shall be stabilised if the trench is to be left exposed for longer than 72 hours.
- After all siteworks are completed, and before the contractor has vacated the site, the developer should ensure that the entire site is stable. The developer then retains responsibility for site stability until change of ownership/control takes place. After the change of ownership/control has taken place, the new owner or controlling party will inherit responsibility for site stabilisation.

Contingency arrangements:

- Suitable water-carts in good working condition and of not less than 10,000 litres capacity per 5 hectares of disturbed site, or an appropriate alternative, shall be available to commence immediate watering on the site.

- Surface stabilisation equipment shall be available to commence operation on site within 48 hours of being required to do so by the engineer for the developer/local government/DEP and with sufficient capacity to cover the disturbed site area within a further 48 hours.
- Additional wind fencing shall be erected within 18 hours of the contractor being required to do so by the engineer for the developer/local government/DEP. Dust generating works on the site shall cease in the interim.
- Include an allowance for water-cart operation, wind fencing and surface stabilisation during the construction period for the purposes of dust and wind-borne material suppression.
- Include an allowance for surface stabilisation for the purposes of dust and wind-borne material suppression to be maintained after the construction period and until change of ownership/control takes place.

5. Contractor's responsibility

The "Site Classification" rating for a particular site should be considered as an aid to deciding the appropriate measures which should be taken to contain dust and wind-borne material generated by a land development site to maximum acceptable limits.

Notwithstanding the allocated "Site Classification" given to a site, if, during the actual construction work, the suggested dust suppression measures are found to be insufficient, the responsibility for carrying out the necessary measures to achieve an appropriate level of dust suppression rests with the contractor. The DEP or relevant local government, however, reserves the right to take enforcement action for any unsatisfactory dust control against the engineer for the developer, the developer and/or the contractor.

6. Maximum acceptable dust level at site boundary

The existing DEP limit for the maximum allowed level of dust concentration in the atmosphere is 1000 micrograms per cubic metre of air, measured over 15 minutes. The level of dust being generated by a site should be determined by subtracting the upwind dust concentration from the downwind dust concentration. Both concentrations should be determined at the boundary of the development site.

NOTE: for the redevelopment of contaminated sites, more stringent standards and dust management protocols will be required, to be determined on a risk assessment basis.

A recommended rule-of-thumb for estimating dust levels is that visible dust crossing the property boundary indicates that the potential for adverse dust impacts exists and control measures should be implemented. The DEP has the technical capability to measure the concentration of dust in the air. Developers, engineers for the developers and contractors should not wait for dust measurements to be made before applying appropriate dust control measures in this instance, but should take immediate action to abate the dust lift-off.

Appendix 1

Figures

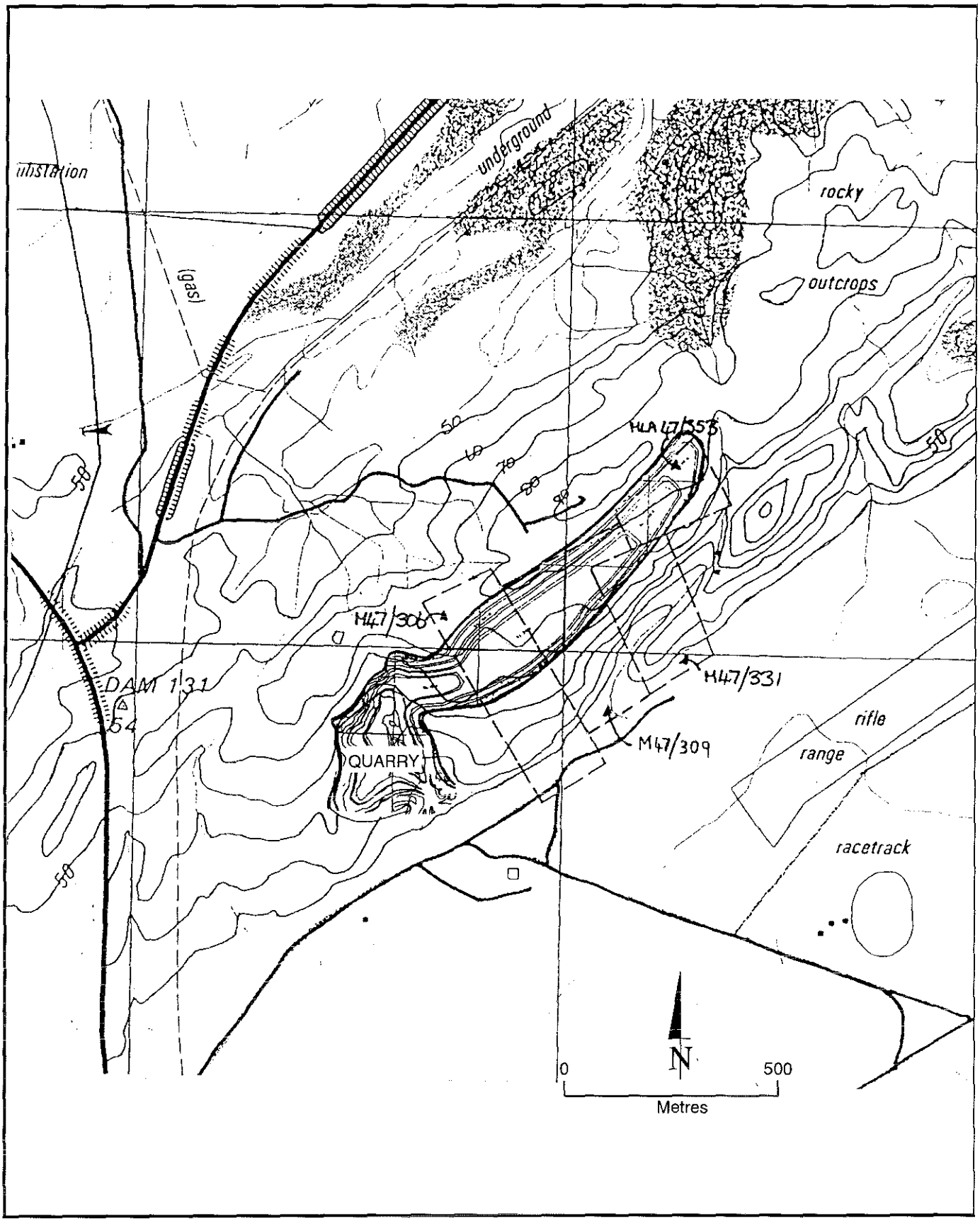

Figure 1. Location of project area and approximate final pit outline.

Appendix 2

List of people and organisations that made submissions

INITIAL REVIEW

State and local government agencies

Shire of Roebourne

Water Authority of Western Australia

Department of Conservation and land Management

Department of Planning and Urban Development

National Parks and Nature Conservation Authority

Aboriginal Affairs Department

Department of Minerals and Energy

Members of the public

Mr M Mercer

Ms S Starr

Nichol Bay Branch S.S.A.A.

Readymix

Chapple Research

Messrs A and L Parker

Friends of the Burrup Peninsula & Dampier Archipelago

Mr J Olsson

Ms C Olsson

Mr M Cooper

Mr W Hinchliffe

Ms C Hinchliffe

Mrs R Adshead

Mr R Adshead

Mr P Sanders

Ms K White

Ms M Russell

Conservation Council of Western Australia Inc.

Appendix 3

References

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