DRAFT GUIDELINES

APPLYING CONSERVATION COMMISSION BRM POLICY FOR ACCESS AND MANAGEMENT OF GRAVEL PITS WITHIN THE CONSERVATION ESTATE

FOR MANAGERS AND PROPONENTS.

TABLE OF CONTENTS

APPENDICES

1. BACKGROUND

1.1 History and Impact of Gravel Extraction

In the past, a common practice of securing gravel from Vacant Crown Land or Crown Reserves saw many gravel pits opened in areas of significant remnant vegetation with little or no subsequent rehabilitation effort. With increasing community awareness of the importance of the State's remnant vegetation, particularly in the wheatbelt where extensive clearing has occurred, many of these remnants have now been incorporated into the conservation estate as nature reserves or national parks.

While these former gravel pits generally occupied small areas, they nonetheless had serious impacts on specific vegetation types. Indeed, in many instances it was the vegetation type which served as an indicator of the presence of gravel.

Some measure of the impact of gravel extraction on areas now within nature reserves was provided by a 1992 the Department survey which indicated that 30% of nature reserves in the wheatbelt had barren gravel pits within them. Many more reserves were impacted by pits which had since regenerated a partial cover of vegetation. The Kwongan vegetation has suffered particularly, with at least 2000 hectares of this vegetation type mined in wheatbelt nature reserves.

1.2 Purpose and Structure of This Document

National parks and nature reserves are vested in the Conservation Commission and are managed by the Department. The present document has been prepared under their direction with the objective of:

- providing an appreciation of the conservation estate and of the importance of its protection;

- acquainting those wishing to secure gravel from the conservation estate with the planning and operational requirements for accessing it and the associated costs;

- providing a set of guidelines on the planning, operational and rehabilitation requirements for gravel pits in the conservation estate.

The document is presented in the following sections:

- a discussion of the conservation estate and of policy applying to access to that estate;

- guidelines on the four phases of securing gravel from the conservation estate: initial planning, operational management, subsequent rehabilitation and post-rehabilitation monitoring;

- access, extraction and rehabilitation checklists which summarize guidelines for securing approval for a gravel pit in the conservation estate and for the operation and rehabilitation of that pit.

ACCESS TO THE CONSERVATION ESTATE

2.1 The Conservation Estate

The conservation estate has been established to protect representative areas of the State's biological resources. The purpose, tenure and vesting of reserves is designed to secure this objective.

2.1.1 Purpose

A reserves system is recognized as the appropriate method for ensuring that examples of the State's biogeographical regions, vegetation communities, and flora and fauna species are preserved.

While reserves and national parks to achieve this purpose are found throughout the State, the greatest need for protection of remnant vegetation in reserves is in the agricultural region. Here extensive clearing has occurred, with less than 10% of the original vegetation remaining in some shires, and with much of this still not secured in reserves.

Size, maintenance of floral diversity, and control of disturbance are important in maintaining the ecological integrity of reserves and in ensuring that their conservation values are maintained.

2.1.2 Classification

Under the CLM Act, reserves are classified in terms of purpose, tenure/class, and vesting as follows:

- Purpose: The conservation estate is secured in national parks and conservation parks which are designated for both conservation and recreation purposes, and in nature reserves which are for conservation only.

- Tenure: National parks, conservation parks and nature reserves may be classified "A" Class or "other" (B or C). "A" Class reserves require a parliamentary vote to change purpose or boundaries, whereas "other" reserves can be altered on Ministerial discretion.

- Vesting: National parks, conservation parks and nature reserves are vested in the Conservation Commission. This is a body representing broad community interests, with responsibilities to protect and promote conservation values and to provide advice on conservation matters direct to the Minister.

2.2 Policy on Access

Gravel extraction from the conservation estate for use on land outside that estate is a conflicting land use under the CLM Act and requires Ministerial consent or Parliamentary approval. To secure this consent, any extraction proposal must first meet criteria laid down in the Conservation Commission's Basic Raw Materials (BRM) Policy.

The policy - which is available from any Departmental office - incorporates the following requirements:

- that the gravel be used on a road which is within and/or which serves in the management of the particular reserve or park;

- that a more environmentally acceptable alternative source is not available;

- that the extraction operation will not compromise the biophysical values of the park or reserve through clearing vegetation which is poorly represented, or through risking the introduction or spread of dieback disease;

- that best practice rehabilitation will be adopted following the extraction operation, with establishment of a reserve fund to guarantee such rehabilitation;

- that for local authorities the above requirements are embraced in rolling 3 to 5-year plans which include evaluation of alternative sources, resource surveys, biological surveys and works programs;

- that all planning and operational costs to achieve the above objectives are borne by the proponent accessing the gravel, unless otherwise agreed.

The Department also commonly seeks an area of such land for addition to the conservation estate to offset any which is excised or mined for gravel extraction where the proposed use is beyond the boundaries of the particular reserve.

With respect to the first of the above requirements, three circumstances are recognized related to the intended use of the gravel:

- Gravel which is to be used on a road which is part of the conservation estate and which serves the management needs of that estate can be accessed under the CLM Act, subject to Departmental approval.

- Gravel which is to be used on a road reserve which passes through but is not a part of the conservation estate may be accessed under consent to enter and conditions approved by the Conservation Commission pursuant to powers under the Local Government Act .

- Gravel which is to be used beyond the boundaries of the conservation estate may require consent pursuant to powers under the Local Government Act 1995 or excision to afford access to the affected area, with that access subject to Ministerial and if an "A" Class excision, Parliamentary approval.

The BRM policy places a high cost on securing gravel from the conservation estate beyond the costs normally associated with securing gravel outside that estate. These relate to biological and dieback assessment at the planning stage, pit planning costs, and the expense of best practice rehabilitation to approximate the pre-existing native vegetation. In some cases, there may also be a cost associated with securing land to add to the conservation estate as an offset for any area alienated by gravel extraction.

A 1993 estimate of these additional costs for a hypothetical pit in a nature reserve in the northern wheatbelt put them at more than $6000/ha.

The costs are borne by the proponent, unless the gravel is to be used on a road which contributes significantly to management requirements of the conservation estate. In this event, the Department may bear some of the costs.

3. PLANNING FOR ACCESS TO THE CONSERVATION ESTATE

An extended series of planning steps are required if access is to be gained to gravel in the conservation estate. These steps include:

- evaluation of gravel resources beyond the estate;
- application for approval to explore within the estate;
- detailed site and locality appraisal to establish that access will not have an unacceptable impact on the conservation estate, be this directly (e.g. clearing of vegetation) or indirectly (e.g. introduction of dieback or increasing disease risk through drainage alteration);
- preparation of operations and rehabilitation plans to demonstrate that gravel extraction will be managed and that subsequent rehabilitation will be carried out in a manner that minimizes adverse impacts and that restores as nearly as possible the pre-existing vegetation;
- application to Conservation Commission for approval to mine;
- seeking suitable alternative land for addition to the conservation estate;
- formal agreement to mine.

It is possible that proposals affecting particularly significant areas may be referred to the EPA for assessment. This could see a requirement for a more lengthy and more costly approval process.

3.1 Evaluation of Gravel Resources outside the Conservation Estate

As the first step in justifying access to the conservation estate, the proponent seeking that access must identify and evaluate alternative gravel resources and any other road building materials in the general area. The possibility of using amendments to permit recycling of existing road surfaces or to allow use of inferior quality gravel from outside the conservation estate should also be considered.

If the proponent is a local authority, the above evaluation must be integrated with a 3 to 5-year plan for meeting gravel requirements.

Gravel resources on freehold and leasehold land, and on any accessible Crown Land, must be assessed. In pursuing this assessment, the proponent should secure through the Department of Agriculture, the Geological Survey and the Department the best available geological, soils and vegetation information as a first indicator of the likely location of gravel resources. This might be complemented with local information from farmers, shire foremen, or others with experience of gravel extraction in the locality, and by remote sensing and airphoto interpretation, to identify prospective sites.
This desk-top appraisal is followed by field testing of the best prospects (e.g. with a backhoe), to confirm whether or not they are useful source areas and to establish the dimensions and quality of the resource available.

3.2 Evaluation of Gravel Resources within the Conservation Estate

If the outcome of this first phase assessment does not indicate sufficient resource outside the conservation estate to satisfy the proponent's needs, assessment of potential sites within the conservation estate might be considered. This must be pursued in consultation with the Department and the Conservation Commission, whose approval and cooperation is required for the assessment to be undertaken.

Once again, the first step is a desk-top appraisal of available geological, soils and vegetation information, complemented by airphoto interpretation and/or remote sensing, if appropriate, to secure an indication of the likely presence and location of gravel resources within the estate.

If a prospective source or sources are identified by this desk-top appraisal, ground assessment might then proceed to precisely locate a preferred source, define its boundaries, and determine the extent and quality of gravel within it. Preferred locations will be old pits which require clean-up and rehabilitation, and powerline or other service easements.

The ground assessment will require the approval of the Conservation Commission, be under the direction of the Department and will be subject to strict hygiene procedures, to ensure neither dieback nor weeds are introduced or spread through the area by prospecting activities. This will likely entail clean-down between each test site of the machine used to check designated source areas, and access in dry soil conditions only.

3.3 Assessment of Impact on the Conservation Estate

Once a source has been proven, planning moves into a third phase: determining whether access to the gravel resource will meet certain criteria which would allow the Conservation Commission to consider permitting that access, and associated tenure and management requirements.

A checklist (Append A) detailing these criteria is attached. As well as requiring evidence of the inadequacy of gravel and other road building resources outside the conservation estate, it seeks information on the following:

- the likely impact of gravel extraction on the flora and fauna (particularly threatened ecological communities, declared rare flora and priority listed species) of the conservation estate;

- the prospects of containing potential dieback, weed and erosion problems;

- social, political, cultural and economic factors which might influence the proposal.

- the feasibility of rehabilitating the extraction site to meet a pre-defined objective.

To meet the first of the above criteria, two integrated surveys are required - one of dieback distribution, and the other of local flora and fauna. These are funded by the proponent and are designed in consultation with the Department.

3.3.1 Dieback Survey

Any activity in the conservation estate involving the use of earthmoving machinery can introduce or spread soil-borne pathogens. Notable amongst these is the Phytophthora or dieback fungus within the Phytophthora occurrence zone and the Armillaria or root rot fungus in the wheatbelt. These pathogens can seriously damage the biological resources of that estate.

Where an operation is within the Phytophthora occurrence zone, a dieback survey must be undertaken embracing the intended extraction site, the proposed access route to same, and land downslope of the intended pit and its access corridor. The survey will include soil and tissue sampling, as well as visual appraisal, sufficient to determine the likely presence or otherwise of the Phytophthora fungus. At least one month's lead time will be required to permit processing of any samples which are collected.

If the source area is believed to be dieback-free and dieback-free gravel is required from it, a minimum 3 years' no-burn and no-disturbance lead time may be necessary prior to the survey, to permit expression of dieback symptoms and thus allow reliable assessment of dieback status. Dieback maps need to include relevant time limitations statements.

Dieback "hazard", or the susceptibility of vegetation in the area if dieback were introduced, must also be determined. This will be assisted by use of vegetation maps where they are available. Information on the probable impact on the reserves values will be required.

The outcome of the dieback survey will provide the basis for a hygiene strategy to be applied to the gravel extraction operation. This strategy will be developed by the proponent for approval by the Department.

The dieback status of the extraction site will influence the preferred use of the gravel it yields. Dieback-free gravel should be not be used in areas of known dieback infection, in unprotectable areas or in areas which are immediately downslope of infected areas. Dieback-free gravel should preferentially be used in high value, dieback-free and protectable locations. Access to dieback-free gravel usually requires the mining of undisturbed dieback-free vegetation with the attendant risk of a new disease introduction. The risk and cost of mining such high value sites needs to be weighed against the possible benefits.

3.3.2 Flora and Fauna Survey

The conservation estate is, in many cases, the principal area for ensuring the long term security of vulnerable and endangered species. Many species of flora are not declared as "rare" under the Wildlife Conservation Act simply because they are in secure reserves. Gravel extraction in these areas can put these species at risk and thereby change their status.

A biological survey supported by a search of existing flora and fauna databases is therefore a pre-requisite to accessing gravel from areas of the conservation estate. The database search must include the Department's rare flora and fauna information and may extend to other sources, such as the WA Herbarium and the Museum.

The field survey is preferably undertaken in spring and must check any proposed pit sites and areas at risk from potential dieback infection for declared rare flora and priority listed species. A follow-up survey may be required to coincide with the flowering times of rare species not flowering at the time of the original survey and which might be expected to occur in the area.

The survey must be of sufficient detail to determine the following:

- whether vegetation associations and species which will be affected by the extraction operation are well represented elsewhere in the reserve or the surrounding locality;

- whether there are any rare, endangered or priority list flora or fauna likely to be affected;

- whether any plants which are unusual phenotypic or genotypic variants, or plants at the edge of their natural range, will be affected;

It should include transects for determining plant density and diversity which will serve as a basis for assessing the success of subsequent rehabilitation, should an extraction operation be approved.

The cost of the biological survey, like the dieback survey, must be borne by the proponent, with the Department having a primary role in its scoping.

3.3.3 Assessment of Impact on Other Site Values

The site should also be evaluated to determine whether it is a significant palaeontological or geological site, contains an important soil type, or is a significant landscape feature. Determination of impact on surface and sub-surface water values will require consultation with the Water and Rivers Commission.

3.4 Identifying Land for Addition to the Conservation Estate

A proponent's case will be strengthened if suitable land can be identified for addition to the conservation estate to offset losses associated with excision or mining of the proposed extraction site. A cooperative investigation with the Department of areas of remnant vegetation in the locality might indicate the existence and availability of such land and the

extent to which its addition to the conservation estate might offset the loss from that estate of the proposed extraction site. Use of Landsat imagery can be helpful to this process.

If suitable land is not available, financial compensation may be required by the Department to underwrite future land acquisition for the conservation estate.

3.5 Establishment of Pit Tenure

If the outcome of the preceding steps is a determination that the gravel within the conservation estate is the only satisfactory source available to the proponent and that its extraction will not have an unacceptable impact on the values the estate has been established to protect, the Proponent's application with the Department's recommendation will be put to the Conservation Commission. This may propose access under the Local Government Act or excision of the source area, depending on such considerations as its location in relation to estate boundaries, intended pit life, and proposed use of the material.

If it is excised, the area may be vested in a local authority as a quarry reserve or in the Conservation Commission, under the CLM Act, as a Section 5(h) (subject to Land Admin Act amendments) reserve for conservation and resource purposes. The latter vesting allows the Conservation Commission to retain overriding control.

Subject to Conservation Commission approval of an excision or access under the Local Government Act, the next stage of planning can then be entered: preparation of a pit management plan.

3.6 Preparation of a Pit Management Plan

The pit management plan has two components: extraction operations and subsequent rehabilitation.

3.6.1 Pit Operations

The extraction operations section of the pit management plan is to embrace the following components:

- location and design of the access track into the pit to ensure it does not cross particularly sensitive areas and is effectively drained;

- attention to site amenity, with the access track alignment not permitting direct views into the gravel pit from adjacent roads, and retention of a vegetation screen around the pit;

- details on site preparation, including vegetation clearing and stockpiling, and topsoil and overburden removal and stockpiling;

- intended sequence of extraction operations, with only sufficient area to be open at any one time to meet immediate needs, and the maximum area open not to exceed 2 hectares;

- Mechanisms to deal with any other values such as fauna habitat and special flora.
- avenues for maximizing the resource, such as crushing of laterite caprock in the floor of the pit;

- machinery to be used, demonstrating its adequacy to recover the full depth of the resource within the pit, unless there is a requirement to retain some gravel-bearing material to facilitate later revegetation;

- proposals for drainage management and sediment and erosion control, to ensure that in-pit erosion is minimized, escape of sediment is avoided, and that drainage both within the pit and along the access track are such as to minimize the risk of dieback infection downslope;

- dieback hygiene practices to be adopted in opening the pit, in subsequent extraction operations, and in ultimate rehabilitation;

- measures to prevent weed introduction and to remove any weeds which may invade during the operational life of the pit;

- safeguards to prevent unauthorized pit usage, including rubbish dumping and illegal removal of gravel.

3.6.2 Rehabilitation

Rehabilitation schedule is to be presented, adopting an incremental approach as extraction advances across a site, rather than waiting until a pit is exhausted. It should aim to restore as nearly as possible the original values of the disturbed ground, with natural regeneration of indigenous vegetation preferred. **In this respect, the use of fresh (less than 6 months old) topsoil is critical to ensure adequate regeneration, ideally topsoil should be directly transferred from one site to another**. "Diluting" fresh topsoil to cover a larger area is also an option. Also the timespan since the last fire is an important consideration: areas which have remained unburnt for an extended period have a large seed bank in the topsoil and offer greater potential for regeneration of native species than recently burnt areas.

A dieback hygiene strategy should be integral to the rehabilitation plan. This strategy should aim to maintain or improve upon the existing hazard status of the pit and should ensure that any pre-existing disease control measures are not compromised.

If for some reason natural regeneration is not possible (e.g. topsoil may be lost as a result of earlier gravel extraction on the particular site), rehabilitation should focus on making the maximum use of available topsoil by spreading it thinly, introducing local species by seeding and, in occasional circumstances, planting, sourcing material from locally harvested seed or cuttings. The aim is to restore as nearly as possible the original species composition, diversity, density and gene pool status.

If conditions have changed so much that local species cannot be reinstated, native species suited to the new site conditions should be seeded and/or planted, selecting preferentially those which occur closest to the site and will grow within it. Once again, seed for broadcasting or for nursery propagation should be sourced in the neighbourhood. If,

however, local seed material is in short supply, the Department should be contacted for advice on a suitable source area.

Rehabilitation plans prepared with the foregoing objectives in mind are to incorporate proposals for the different steps involved, including:

- pit shaping, ripping, and drainage and erosion control;
- return of topsoil, overburden and any harvested vegetation;
- any soil amelioration which may be necessary;
- any plant introduction deemed necessary, through spreading of seed-bearing brush, seeding or, in occasional circumstances, planting using nursery stock (secured from a dieback-accredited nursery);
- identify success criteria; and
- provision for follow-up monitoring and maintenance.

The rehabilitation plan is to indicate staging of rehabilitation such that it follows as closely as possible behind gravel extraction in successive cells of the gravel pit. It is also to include provision for rehabilitation of the access track once the gravel extraction operation is completed.

4. PIT OPERATION AND REHABILITATION

Once excision or a access under the Local Government Act over the source area has been secured and operational and rehabilitation plans have been approved, gravel extraction can commence, subject to a range of operational controls and rehabilitation requirements.

The Department may require annual reporting and/or joint inspection to review pit operations as a precursor to approval of a further year's activity. Depending on the maximum area to be open at any one time and the operational and rehabilitation record of the proponent, they may also require a bond against responsible operation of the pit and a satisfactory standard of rehabilitation. These will be incorporated in access conditions.

4.1 Pit Commissioning and Operation

There are a series of steps to be observed in pit opening and subsequent gravel extraction to ensure activities are carried out in an environmentally sound manner that minimizes impacts on surrounding areas and improves the prospects of successful rehabilitation.

4.1.1 Dieback and Weed Hygiene

A key initial step is to ensure that appropriate dieback and weed hygiene are implemented. Hygiene procedures will be guided by the the Department's Hygiene Manual. In the Phytophthora occurrence zone, they are likely to demand, as a minimum, clean-down of all

earthmoving equipment with air, or with high pressure water prior to accessing the site, and working of dieback-free pits only under dry soil conditions.

If a pit is dieback-free, clean-down occurs before vehicles enter the site and a split-phase operation is favoured. This may entail either temporal or spatial separation of different components of the operation.

In the former case, extraction might, for example, be carried out over a short time span in dry weather, with the material stockpiled for subsequent haulage over a period of several months. In the latter case, clean equipment might work within a pit to excavate gravel and stockpile it at the edge of the hygiene zone, adjacent to an access track. Trucks then haul from this point without a requirement for prior clean-down on each haul, provided the track is properly formed and drained, and the haul trucks do not leave it.

Outside the Phytophthora occurrence zone, washdown of vehicles and machinery at the commencement of an operation will usually be sufficient, with this washdown being designed primarily to remove any weeds or weed seeds.

4.1.2 Access

The pit access track should, where practical, follow the contour and avoid sensitive or difficult terrain, such as steep slopes, boggy ground or wetlands. It should also avoid significant stands of vegetation, and is to be aligned so that it does not permit views into the pit from the road it exits.

The track is to be properly formed and freely draining, with drainage directed away from the pit. Topsoil and vegetation are to be stripped from the alignment ahead of track formation, and these are then to be stockpiled in a location where they will not obstruct drainage or pit operations. This may be beside the track or near the pit entry.

A barrier is to be placed at the entry point to the access track, to block unauthorized entry.

4.1.3 Clearing

Boundaries of clearing cells are to be established by the proponent and checked in the field by the Department.

Once it has been cleaned, machinery can move onto the site to clear the first extraction cell.

If there is useful forest produce, this is salvaged ahead of general site clearing, provided its removal will not compromise later rehabilitation. Seed harvest for use in rehabilitation should also be undertaken at this time, if vegetation in the pit is bearing seed.

The remaining vegetation and any logs or other debris are then cleared into heaps or windrows which should be located at least 5 metres from the nearest living vegetation. Rakes or forks are best for the purpose, to minimize mixing of soil with the harvested vegetation. Generally debris are to be retained for subsequent fauna habitat and not burnt.

The cleared material should be retained for later respreading over the rehabilitated pit, burning only those logs that are not marketable and that are too large to stockpile and place back on the rehabilitated pit. Ash from such burnt material is good fertilizer and should be spread over rehabilitated ground.

4.1.4 Topsoil and Overburden Removal

After removal of vegetation, topsoil is stripped to a depth of 100mm and is either stockpiled or respread directly onto an adjacent cell which is being rehabilitated. Sequential operation of the pit allows the latter practice, with topsoil stripped from each new cell immediately transferred to the preceding cell as it is rehabilitated. This ensures maximum viability of seed and vegetative material within the topsoil and thus improved natural regeneration.

If topsoil must be stockpiled, stockpile depth should be limited to 1.0 metre for clays, 1.8 metres for clay loams, and 2.4 metres for light sands, to reduce microbial and seed deterioration. It should be stored for no longer than 12 months and should be handled only when dry.

If following removal of the topsoil, there is additional overburden to be stripped ahead of gravel extraction, this should be stockpiled separately for return prior to topsoil.

4.1.5 Drainage and Erosion Control

Pit layout and access are to be designed to minimize the potential for water accumulation and erosion. As a general principle, upslope runoff should be diverted around the pit, while the pit itself is to be well drained, with contour channels installed, if necessary, to minimize both surface erosion and localised ponding.

To the extent that it is practical, internal runoff is to be contained within the pit, unless this increases dieback risk. Where discharge is planned, this is to be via a sediment basin to permit sediment removal before overflows discharge onto well vegetated ground downslope.

4.1.6 Control of Pollutants and Rubbish

Pollutants must be controlled, ensuring no oil changes occur in the pit, no fuel or oil are stored on-site, no equipment is used which has serious oil leaks, and no soil, vegetation or rubbish are dumped within the site. Any soil within the pit which is contaminated by fuel or oil spills is to be removed, as is any rubbish which may, despite best efforts, be dumped there.

4.1.7 Gravel Extraction

Gravel is to be removed progressively, starting at the pit entry and moving towards its rear, with a maximum area (<2ha) open at any one time. Ideally this should see extraction advance from the lowest to the highest point of the site.

The above approach may be modified if variable gravel quality requires mixing of material from several sites within the same pit.

Pit life is to be maximized, as far as practical, by:

- ensuring that all areas of suitable gravel are removed, with no islands left in the pit;
- using equipment of adequate horsepower to secure material down to the basement clay;
- mixing basement clay with surface gravel, if quality is not unacceptably compromised and providing material remains in the pit floor which is suitable for subsequent revegetation;
- crushing caprock in the pit floor.

4.2 Pit Rehabilitation

Rehabilitation is to be based on a properly formulated plan, as outlined at 2.6.2 above.

4.2.1 Shaping

The pit sides are shaped to blend with the surrounding terrain, with batter slopes to be no steeper than 1 in 4 (14^0). Secondary filling of batters may occur to assist this objective, using overburden removed in the pit establishment process.

The pit floor should have an overall fall of not less than 1 in 100, to preclude localised ponding and consequent increased dieback risk.

Large laterite boulders may be broken up, removed, or buried in the pit shaping process, or some may be retained to provide faunal habitat and to assist in seed trapping.

4.2.2 Ripping

Ripping is preferably carried out under dry soil conditions, to maximize shattering of the underlying clay. Use of a winged tyne will also increase the zone of subsoil shattering.

The pit floor and batters are ripped on the contour at 1-metre intervals to a depth of 0.5-1.0 metres prior to return of overburden and topsoil. Cross-ripping is carried out on the pit floor only, to the same depth and at the same intervals, following topsoil and overburden return.

In certain situations where deep ripping may bring inferior subsoil to the surface which inhibits revegetation, shallow ripping is preferred. This is likely to apply, in particular, to pits in arid environments.

If presence of caprock prevents ripping to depth, blasting is required.

4.2.3 Topsoil and Overburden Return

Any overburden is spread evenly over the pit floor and batters, followed by even spreading of topsoil. The latter preferably comes directly from the next cell of the gravel pit as this is opened, but otherwise it will be stockpiled material which is returned.

Topsoil return should aim to leave a rough surface for improved drainage, erosion control and germination microclimate.

4.2.4 Soil Amendment

Approval by the Department will be required to advise on any soil amendment which may be required in pit rehabilitation.

On certain soils, gypsum addition for structural improvement or liming for pH correction may be warranted. Chemical fertilizers are also commonly beneficial to correct nutrient deficiencies, with application rates generally between 250 and 400 kg/ha. Proteaceous species are, however, adversely affected by some fertilizers. If these species predominate, fertilizer type and application rate will require careful selection to suit.

If seedlings are introduced they may benefit from addition to the soil of a slow release fertilizer tablet.

4.2.5 Drainage and Erosion Control

If the rehabilitated pit presents long or steep slopes, erosion control banks or drains may be warranted to check overland flow and consequent erosion hazard until vegetation has established.

4.2.6 Litter Return

Stockpiled vegetation, logs and other organic debris removed at the start of operations should be respread over the surface following topsoil return and ripping. This provides a protective surface cover which reduces raindrop impact, and thus surface erosion, as well as reducing evaporation in the summer months. It can also trap seed blowing into the area and offers niches for seedling survival and fauna habitat. Returned branches may also provide a seed source for site regeneration, if they are bearing seed at the time they are harvested.

4.2.7 Plant Establishment

There are several avenues for fostering plant re-establishment on the pit:

- The preferred approach in the conservation estate is to permit natural regeneration from topsoil especially fresh topsoil. This can be encouraged, where practical, by placement of seed-bearing branches harvested from the site or its surrounds. For best results, fruit or pods should be left on these branches rather than being removed from them, and the branches should be laid promptly after they are harvested.

- Seed may be introduced directly, preferably harvesting same within the immediate locality of the pit, but otherwise securing it within the reserve as a whole or from its neighbourhood. Indigenous native species only are to be used, with application rates

of at least 1.5kg/ha of mixed native seed, the mix reflecting the species which existed on the site before gravel extraction.

If local seed material is in short supply, the Department should be contacted for advice on a suitable source area.

- If it is believed that regeneration from the topsoil and/or from complementary seeding may prove insufficient, plant introduction may be considered as a back-up in those areas where rainfall is sufficient to permit survival of introduced seedlings. In this event, plants grown from locally harvested seed or vegetative material should be used, adopting a selection of both understorey and overstorey species and determining planting density in consultation with the local Department office. They must be grown under dieback-free conditions and should come only from Departmentally approved nurseries.

4.2.8 Weed and Vermin Control

Weed invasion will require monitoring for at least three growing seasons, with any weeds to be controlled using a Departmentally approved herbicide and/or by hand weeding. Control may be required beyond three seasons, if there is a continuing problem of weed invasion.

Rabbit control may be necessary to prevent grazing regenerating seedlings and spread of weeds. The chosen control method will require approval by the Department. Kangaroo foraging should also be monitored. If kangaroos are destroying young seedlings, fencing of the site with ringlock will usually be sufficient to discourage their access until vegetation is well established.

4.2.9 Access Track Closure

When the gravel resource has been exhausted, the access track, unless still required by the Department for management of the reserve, is closed, shaped to original profile, and ripped to 0.5-1.0 metre depth.

Topsoil is spread over the surface and, if it is still available, the vegetation cleared from the track alignment is returned as brush.

A ditch, earth bund, log or other approved barrier is then placed at the entry, to block further access. Signs may also be required, in which event they are to comply to the Department's specifications.

4.2.10 Rehabilitation of Old Gravel Pits

If the pit which has been sourced is an old one which has been reactivated, there may be no stockpiled topsoil or vegetation to return in its rehabilitation.

Depending on comparative benefits and drawbacks, such topsoil and vegetation might be secured in consultation with the Department by stripping undisturbed ground around the pit perimeter for a distance at least four times the pit's depth. If this is unacceptable, the pit is

simply rehabilitated by shaping and ripping as previously described, but without return of topsoil.

In the latter case, ancillary measures discussed above, such as soil amendment, fertilizing, seeding and planting, are likely to prove necessary to secure satisfactory regeneration, albeit this is still likely to be of poorer standard than in pits where fresh topsoil is available.

5. MONITORING AND MAINTENANCE

In a conservation area where reinstatement of original vegetation is sought, the time scale to achieve this will generally be long term - measured in decades rather than years. This long term result is the prime consideration, rather than any short term outcomes. Pit monitoring and maintenance must be sensitive to this and should not seek dramatic outcomes in a short time span.

The area should be monitored by the proponent for at least the first three seasons following completion of rehabilitation, to check for plant regeneration, weed infestation, and any evidence of dieback infection. Transects will usually be required as an integral component of this monitoring, to assess plant diversity and density.

The Department will consult with the operator on appropriate maintenance measures in response to the findings of this monitoring. This could include such initiatives as weed control, drainage improvement if dieback hazard is evident, or follow-up seeding or planting to assist species return, if particular species deficiencies are evident.

Once the Department is satisfied that the rehabilitation has been successful and that a natural ecosystem is evolving, the proponent will relinquish responsibility for further maintenance of the area. It can then be re-incorporated into the conservation estate.

APPENDIX A

CHECKLIST
PROPOSAL FOR ACCESS OR EXCISION FOR BASIC RAW MATERIALS FROM LAND MANAGED BY THE DEPARTMENT

RESERVE NO.: .....AREA: .....

PURPOSE : .....

VESTING :.....

1. DETAILS OF THE REQUEST

1.1 Proponent(s) of Excision.....

.....

1.2 a) Area requested ..... ha

b) Total area of reserve which has already been mined..... ha

c) Likely life of pit (before resource is exhausted)

.....years/months

1.3 Is it likely that further requests will be made for excision? Yes/No

1.4 Demonstrated evidence of the proponents ability to complete adequate pit rehabilitation following mining?

a) On Departmentally Managed Estate

b) On other reserves/road verges

Comments .....

.....

.....

1.5 For what purpose will the gravel be used?.....

.....

.....

.....

1.6 Any special rehabilitation problems (e.g. proposed pit would be excavated to duricrust)? .....

.....

.....

1.7 Has the gravel been assessed to ensure it meets engineering requirements? Yes/No

2. ALTERNATIVE GRAVEL SOURCES

2.1 Have the proponent(s) looked for any alternative gravel/road building material source? ..... Yes/No

If yes:

has private land been searched? Yes/No

Comments: .....

.....

.....

b) at what distance is the nearest, alternative sources.....km

c) the owner/s of the nearest alternative source is: .....

.....

3. BIOLOGICAL IMPACTS OF PROPOSED GRAVEL PIT

(If data is not available it is the proponents responsibility to carry out the surveys)

3.1 Are the vegetation associations at risk well represented elsewhere on the nature reserve? Yes/No

Comments (give estimate of each association area within pit and elsewhere within the reserve): .....

.....

.....

.....

3.2 Are the vegetation associations at risk well represented elsewhere in the Shire? Yes/No

Comments: .....

.....

.....

3.3 a) How many plants have been recorded within the proposed pit area? .....

b) What percentage of the proposed pit flora do you estimate has been recorded? .....%

c) How many species in the proposed pit are exotic? List them:

.....

.....

.....

3.4 Are all local species well represented:

a) elsewhere within the reserve? Yes/No

Except: .....

.....

.....

.....

b) elsewhere within the Shire? Yes/No

Except: .....

.....

.....

.....

3.5 Is there a national park, nature reserve or State forest within:

15+ km	Yes/No
10.1 - 15 km	Yes/No
5.1 - 10 km	Yes/No
0 - 5 km	Yes/No

3.6 In comparison with the nearest national park, nature reserve or State forest (whichever is closest), does the vegetation of the proposed gravel pit:

a) provide habitat not already conserved? Yes/No

b) constitute a significantly (i.e. 10% or more) proportion of habitat already conserved? Yes/No

c) neither of the above? Yes/No

3.7 Does the proposed pit area contain:

a) populations of plant or animals species declared as rare or endangered? Yes/No

b) populations of plants either on the flora "priority list" or under review as potential declared rare flora? Yes/No

c) Threatened Ecological Communities..... Yes/No

d) populations of plants or animals that are unusual phenotypic or genotypic variants, but not listed under (a), (b) or (c)? Yes/No

e) populations of plants or animals at the edge of their natural range, but not listed under (a), (b), (c) or (d)? Yes/No

f) none of the above? Yes/No

3.8 Is the proposed gravel pit known to be:

a) the type locality of a plant or animal species? Yes/No

b) the site of an important biological survey? Yes/No

c) a significant palaeontological site? Yes/No

d) providing a valuable opportunity for research not included under (a), (b) or (c) above? Yes/No

Comments:

.....

.....

3.9 Does the proposed gravel pit contain part or all of:

a) a unique or outstanding landscape feature (e.g. scenic breakaway or spring)? Yes/No

b) a site of geological importance, but not listed under (a)? Yes/No

c) an aboriginal heritage site? ..... Yes/No

d) an usual soil type poorly represented on nature reserves, national parks or State forest? Yes/No

e) none of the above? Yes/No

Comments:

.....

.....

3.10 Describe what impact the proposed pit, if excavated, would have on fauna.

.....

.....

.....

.....

.....

.....

3.11 Are any compensating land additions to the conservation estate

Proposed? ..... Yes/No

Comments:

.....

.....

.....

5.1 Is the proposed pit area likely to contribute to degradation of the reserve through introduction and spread of disease (e.g. phytophthora) spread? Yes/No
Comments: .....

.....

.....

.....

4. CULTURAL FACTORS

4.1 What social factors affect the proposal?

.....

.....

.....

.....

.....

.....

4.2 What political factors affect the proposal?

.....

.....

.....

.....

.....

.....

4.3 What economic factors affect the proposal?

.....

.....

.....

.....

.....

.....

5. OTHER MANAGEMENT ISSUES

5.1 Is the proposed pit area likely to contribute to degradation of the reserve, for example through facilitating rubbish dumping? Yes/No

Comments: .....

.....

.....

.....

5.2 Will quarrying pose a significant erosion problem? Yes/No

Comments: .....

.....

.....

.....

5.2 Is the pit over 100 metres from a watercourse in harnessed catchment and 50 metres from any other course? Yes/No

Does the Water and rivers Commission need to be consulted?

Yes/No

Comments: .....

.....

.....

.....

RECOMMENDATION (To what extent does the proposal conform to Conservation Commission policy. Attach relevant maps, survey reports etc)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

SIGNED: .....

NAME: .....

POSITION: .....

DATE: .....

APPENDIX B

PRE-CLEARING CHECKLIST

Planning **(Include Management Plan & Site Diagrams to cover the following)**	**Initial to confirm check is completed**	**Comments**
DRF & PRIORITY FLORA CHECKED		
FAUNA SURVEY (IF REQUIRED)		
CLEAR OF ABORIGINAL HERITAGE SITES		
ACCESS AND ACCESS CONTROL/BARRIERS [1]		
SCREENING/SITE AMENITY [1]		
DIEBACK HYGIENE PLAN		
DRAINAGE, EROSION AND SEDIMENT MANAGEMENT [1]		
CLEARING Demarcation Prior seed harvest Timber recovery Vegetation and litter clearing		
TOPSOIL MANAGEMENT [1] **DIRECT RETURN** OR Stockpiling		
OVERBURDEN MANAGEMENT [1]		
SEQUENTIAL EXTRACTION PLAN [1] (maximum 2ha open at any one time)		
WEED CONTROL PROPOSALS		
POLLUTANT AND RUBBISH CONTROL		

[1] Site plan approved
(Access, drainage, topsoil stockpiling, sequential mining proposals)

* Assumes any formal assessments and approval process for creation of the pit has been completed and all approvals (Ministerial etc) are in place as required by statute and Conservation Commission BRM Policy.

APPENDIX C

REHABILITATION PREPARATION CHECKLIST

Planning	Initial to confirm check is completed	Comments
PIT SHAPING Sides 1:4 or less Floor 1:100 or more		
CAPROCK BLASTING		
RIPPING Sides and floor ripped @ 1m to 0.5-1m depth Floor cross-ripped after topsoil return.		
OVERBURDEN RETURN None Direct transfer Return from stockpile		
TOPSOIL RETURN None available Direct transfer Return from stockpile		
SOIL AMENDMENT Gypsum/lime Fertiliser Other		
DRAINAGE AND EROSION CONTROL		
LITTER RETURN		
PLANT ESTABLISHMENT Topsoil only Seed-bearing branches Seed mix and source Planting prescription and source		
WEEDS AND VERMIN Weed control Rabbit control Kangaroo control		
RUBBISH AND POLLUTANT REMOVAL AND DISPOSAL		
ACCESS TRACK CLOSURE Shaping and ripping Topsoiling Brushing Seeding/Planting Barrier Sign(s)		
MONITORING ARRANGEMENTS		

APPENDIX D

ABBREVIATED OPERATOR GUIDELINES GRAVEL EXTRACTION IN THE CONSERVATION ESTATE.

BACKGROUND

This document has been prepared as an appendix to provide a simplified guideline for pit operators. Detailed planning and operating requirements and information on the requirements for obtaining access to gravel within that estate is available from the principal document. This appendix incorporates

- an overview on the approach to securing access to gravel in the conservation estate;
- extraction and rehabilitation once access is approved; and
- access, extraction and rehabilitation checklists.

POLICY ON ACCESS TO THE CONSERVATION ESTATE

The conservation estate includes national parks, conservation parks and nature reserves. These are graded "A", or "Other" (B or C) Class and are vested in The Conservation Commission. Gravel extraction from the conservation estate requires Conservation Commission approval and can require Ministerial or Parliamentary approval depending on the intended use of the material.

To secure approval for access to gravel from these areas, an extraction proposal must meet the following criteria laid down in a Basic Raw Materials (BRM) Policy developed by the Conservation Commission:

- that the gravel preferably be used on a road which is within and which serves in the management of the affected park or reserve;
- that a more environmentaly acceptable source is not available;
- that the operation will not compromise the values of the park or reserve;
- that best practice rehabilitation will be adopted, with establishment of a reserve fund to guarantee such rehabilitation;
- that planning and operational costs will be borne by the proponent.

For local authorities the above requirements must be embraced in rolling 3 to 5-year gravel resource plans.

The Department may also seek an area of suitable alternative land - or funding to purchase same - as an offsetting addition to the conservation estate.

PLANNING FOR ACCESS

Steps in seeking approval for access include:

- evaluation of gravel resources beyond the estate;
- application for approval to explore within the estate;
- Site appraisal to determine whether access will have an unacceptable impact;
- application to Conservation Commission for approval to mine;
- Seeking alternative land for addition to the conservation estate;
- Preparation of extraction and rehabilitation plans;
- formal agreement to mine.

1a. Are there alternative road building resources outside the conservation estate?

- Assess gravel and other road building resources outside the conservation estate using geological, soils and vegetation information, local knowledge, remote sensing and airphoto interpretation, followed by field testing.
- Consider use of amendments to permit recycling of existing road surfaces or use of inferior gravel.

* *If no suitable resource is found outside the conservation estate .....*

1b. Is there suitable gravel within the conservation estate?

- Assess sites within the conservation estate in consultation with the Department.
- Focus on preferred areas such as old pits and service easements.
- Assessment is subject to strict dieback hygiene.

* *If gravel is found within the conservation estate .....*

2. What is the likely impact of extraction?

3.

(a) □ <u>Dieback</u>

Within the dieback occurrence zone, carry out a dieback survey

- visual appraisal supported by soil and tissue sampling for presence or otherwise of the Phytophthora fungus;
- appraisal of dieback "hazard" (susceptibility of vegetation if dieback were introduced);

-if the area is believed to be dieback-free, a minimum 3 years' no-burn/no-disturbance lead time is required prior to survey, to permit expression of dieback symptoms;

- findings from the dieback survey give a basis for a hygiene strategy to be developed in consultation with the department.

(b) □ Flora and Fauna

The Department to advise on what is required
Ensure security of vulnerable and endangered species by

- field survey, preferably in spring, to check for declared rare flora and priority listed species;

- follow-up survey, if required, for rare species not flowering at the time of the original survey;

- search of existing data bases to support field findings.

Survey to be of sufficient detail to determine

- whether vegetation associations and species affected are well represented elsewhere in the locality;

- whether rare, endangered or priority list flora or fauna will be affected;

- whether unusual phenotypic or genotypic variants, or plants at the edge of their natural range, will be affected;

- plant density and diversity as a basis for assessing the success of subsequent rehabilitation.

(c) □ Other Site Characteristics

Determine whether the site

- is a significant palaeontological or geological location;

- contains an important soil type;

- contains an aboriginal heritage site;

- is a significant landscape feature;

-will impact on surface and sub-surface water values (consultation with the Water and Rivers Commission).

3. Is suitable land available for addition to the conservation estate

Assessment may be required to identify suitable land for addition to the conservation estate to offset the area affected by gravel extraction, or compensation may be sought to underwrite future land acquisition for the conservation estate.

* *If the outcome of the above steps is determination that gravel in the conservation estate is the only satisfactory source and its extraction will not have an unacceptable impact, the proponent to put a proposal with the Department's recommendation to the Conservation Commission proposing access under the Local Government Act or excision of the source area. Extraction and rehabilitation plans are then prepared.*

4a. Extraction Plan

The extraction plan embraces

- location and design of access track;
- protection of site amenity;
- details on site clearing;
- topsoil and overburden management;
- intended sequence of extraction operations;
- avenues for maximizing the resource, including machinery to be used;
- drainage management and sediment and erosion control;
- dieback hygiene practices;
- measures to control weeds;
- safeguards against unauthorized pit usage.

4b. Rehabilitation Plan

The rehabilitation plan must allow for

- rehabilitation occurring as early as possible, based on an incremental approach;
- reinstating as nearly as possible original values of the site by natural regeneration from topsoil as a first preference, introduction of local species by seeding and/or planting as a second preference, or introduction of non-local native species by seeding and/or planting as a third preference;
- incorporation of a dieback hygiene strategy.

Rehabilitation plans prepared with these objectives cover

- shaping and ripping;

- return of topsoil, overburden and harvested vegetation;
- soil amendment;
- drainage and erosion control;
- seeding and/or planting, where required;
- follow-up monitoring and maintenance.
- criteria for "success".

PIT COMMISSIONING AND OPERATION

Pit opening and subsequent gravel extraction must be carried out in an environmentally sound manner that minimizes impacts on surrounding areas and improves the prospects of successful rehabilitation.

1. Dieback and Weed Hygiene

Dieback hygiene procedures are required for all operational and rehabilitation activities. They are guided by the Departments Hygiene Manual.

In the Phytophthora occurrence zone,

- clean-down of earthmoving equipment is a minimum;
- in dieback-free pits, work under dry soil conditions only, all vehicles are to be cleaned-down before entry, and a split-phase operation is favoured.

Outside the Phytophthora occurrence zone,

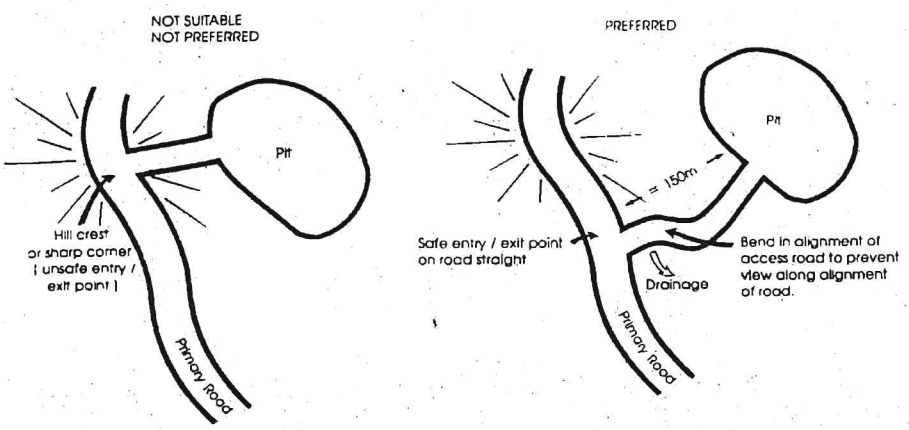
- washdown of vehicles and machinery at the start of operations.

2. Access

The pit access track should

- follow the contour;
- avoid sensitive or difficult terrain and significant stands of vegetation;
- not permit views into the pit from the road it exits;
- be properly formed and drained, with runoff directed away from the pit;
- ..... have a barrier to block unauthorized entry.

FIG. 1 LOCATION OF ACCESS TRACK



3. Clearing

Clearing and subsequent mining is to be incremental, advancing through successive cells, observing boundaries agreed by the Department and incorporating

- prior harvest of any useful seed;
- removal of useful forest produce, if this will not compromise rehabilitation;
- removal to a stockpile of remaining vegetation and any logs or other debris.

4. Topsoil and Overburden Removal

Topsoil is

- stripped to a depth of 100mm for
- **respreading direct** onto an adjacent cell which is being rehabilitated or
- storage in shallow stockpiles

Remaining overburden is stripped and stockpiled separately.

5. Drainage and Erosion Control

Drainage is designed to

- divert upslope runoff;
- ensure that the pit is well drained and is free of erosion and local ponding;
- contain internal runoff within the pit, unless this exacerbates dieback risk;

- channel overflows through a sediment basin onto vegetated ground.

6. Pollutants

Pollutants are to be controlled by

- no oil changes and no storage of fuel or oil on the site;
- no use of equipment with serious oil leaks;
- no soil, vegetation or rubbish dumping within the site;
- removal from the site of any contaminated soil or rubbish.

7. Gravel Extraction

Gravel extraction

- is progressive;
- ideally advances from the lowest to the highest point of the site;
- sees no more than 2 hectares open at any one time.

Pit life is maximized by

- removing all suitable material down to basement clay;
- mixing basement clay with surface gravel, if quality is not compromised;
- crushing caprock.

PIT REHABILITATION

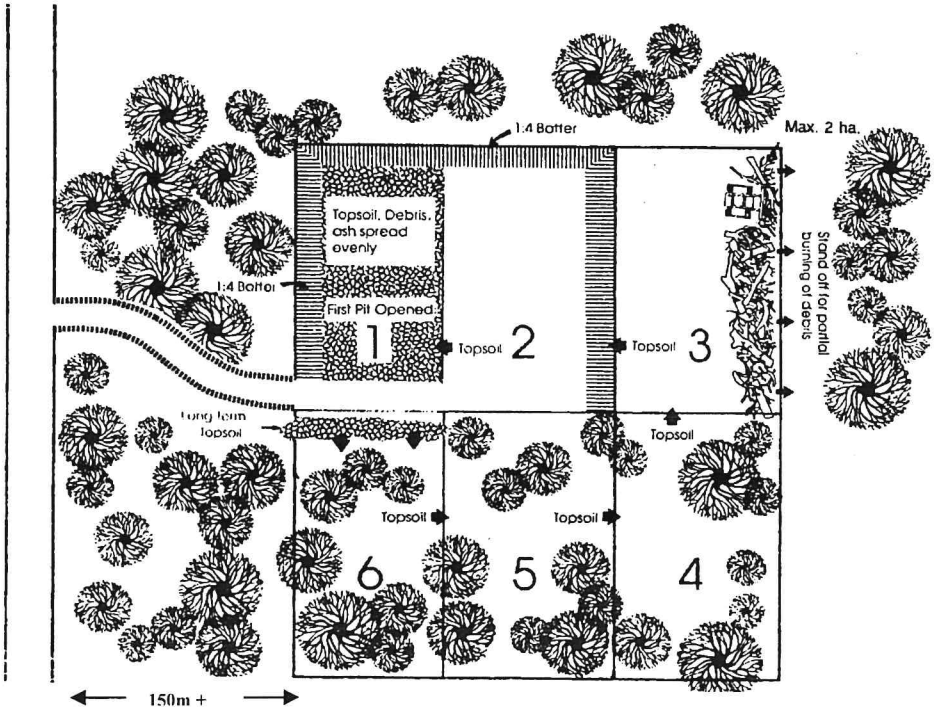
Rehabilitation follows promptly behind gravel extraction, adopting steps reflected in a rehabilitation plan.

1. Shaping

The pit sides and floor are shaped to blend with the surrounding terrain, with

- side slopes no steeper than 1 in 4;
- floor slope not less than 1 in 100;
- laterite boulders broken up, removed, buried, or retained.

FIG 2 IDEALISED MINE PLAN



2. Ripping

Ripping is preferably carried out with a winged tyne and under dry soil conditions

- the pit floor and batters are ripped on the contour at 1-metre intervals to 0.5-1.0 metre depth before overburden and topsoil return;
- the pit floor is cross-ripped to the same depth and at the same intervals after topsoil and overburden return;
- caprock which inhibits ripping is blasted;
- shallow ripping is preferred if deep ripping brings inferior subsoil to the surface.

3. Topsoil and Overburden Return

Spread overburden followed by topsoil

- preferably transferring direct from an adjacent cell which is being cleared;
- placing it evenly over the pit floor and batters;
- leaving the surface in a rough state by cross ripping or cultivating.

4. Soil Amendment

The Department approval is required for any soil amendment which may be required (e.g. gypsum for structural improvement, lime for pH correction, fertilizer to correct nutrient deficiency).

5. Drainage and Erosion Control

On long/steep slopes, erosion control banks or drains may be warranted to check overland flow and erosion hazard.

6. Litter Return

Stockpiled vegetation/logs/other organic debris are respread following topsoil return, ripping and soil amendment.

7. Plant Establishment

There are several options for revegetation, in decreasing preference they are:

- natural regeneration from fresh (less than 6 months) topsoil is preferred, possibly enhanced by placement of seed-bearing branches;
- broadcasting seed of local native species;
- broadcasting seed of non-local native species, if warranted by altered site conditions;
- plant nursery seedlings as a fall-back only.

8. Weed and Vermin Control

Weed control is to be by a Departmentally approved herbicide and/or by hand weeding for at least 3 growing seasons, and for longer if there is an ongoing problem.

Rabbit control is to be by a Departmentally approved method.

Kangaroo exclusion, where required, may be achieved by ringlock fencing.

9. Access Track Closure

On completion of extraction operations and rehabilitation

- close, shape and rip the access track;
- spread topsoil and brush over its surface;
- seed and/or plant, if warranted;
- place a barrier at the entry, and possibly a sign.

10. Rehabilitation of Old Gravel Pits

Old pits which are reactivated may have no stockpiled topsoil or vegetation for return. In such cases:

- procurement of topsoil and brush from undisturbed ground in the vicinity may be approved by the Department;

- if no topsoil is procured, soil amendment, seeding and planting may necessary.

MONITORING AND MAINTENANCE

The time scale to achieve satisfactory reinstatement of vegetation is usually long term. Monitoring and maintenance must be sensitive to this fact and should not seek dramatic short term results.

Monitor rehabilitation for at least three seasons for

- plant regeneration;

- weed infestation;

- dieback infection.

Maintenance measures are determined from the findings of the monitoring programme.

Once the Department is satisfied that the rehabilitation has been successful, the proponent relinquishes responsibility for the area

Appendix 1

PRE-CLEARING CHECKLIST

Planning **(Include Management Plan & Site Diagrams to cover the following)**	**Initial to confirm check is completed**	**Comments**
DRF & PRIORITY FLORA CHECKED		
FAUNA SURVEY (IF REQUIRED)		
CLEAR OF ABORIGINAL HERITAGE SITES		
ACCESS AND ACCESS CONTROL/BARRIERS [1]		
SCREENING/SITE AMENITY [1]		
DIEBACK HYGIENE PLAN		
DRAINAGE, EROSION AND SEDIMENT MANAGEMENT [1]		
CLEARING Demarcation Prior seed harvest Timber recovery Vegetation and litter clearing		
TOPSOIL MANAGEMENT [1] **DIRECT RETURN** OR Stockpiling		
OVERBURDEN MANAGEMENT [1]		
SEQUENTIAL EXTRACTION PLAN [1] (maximum 2ha open at any one time)		
WEED CONTROL PROPOSALS		
POLLUTANT AND RUBBISH CONTROL		

[1] Site plan approved
(Access, drainage, topsoil stockpiling, sequential mining proposals)

* Assumes any formal assessments and approval process for creation of the pit has been completed and all approvals (Ministerial etc) are in place as required by statute and Conservation Commission BRM Policy.

REHABILITATION PREPARATION CHECKLIST

Planning	Initial to confirm check is completed	Comments
PIT SHAPING · Sides 1:4 or less Floor 1:100 or more		
CAPROCK BLASTING		
RIPPING Sides and floor ripped @ 1m to 0.5-1m depth Floor cross-ripped after topsoil return.		
OVERBURDEN RETURN None Direct transfer Return from stockpile		
TOPSOIL RETURN None available Direct transfer Return from stockpile		
SOIL AMENDMENT Gypsum/lime Fertiliser Other		
DRAINAGE AND EROSION CONTROL		
LITTER RETURN		
PLANT ESTABLISHMENT Topsoil only Seed-bearing branches Seed mix and source Planting prescription and source		
WEEDS AND VERMIN Weed control Rabbit control Kangaroo control		
RUBBISH AND POLLUTANT REMOVAL AND DISPOSAL		
ACCESS TRACK CLOSURE Shaping and ripping Topsoiling Brushing Seeding/Planting Barrier Sign(s)		
MONITORING ARRANGEMENTS		