PIONEER CONCRETE PTY LTD

NOTICE OF INTENT TO MINE LIME-SAND AT

CLEAVERVILLE ON MLS 511 - 513

Report Prepared by
Astron Environmental

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Astron Environmental

SUMMARY

Pioneer Concrete Pty Ltd proposes to re-open its lime-sands mining operations at Cleaverville on the eastern coast of Nickol Bay in the Pilbara Region. The tenements involves in the current proposal are ML 511, 512 and 513. These were granted under the 1904 Mining Act but are subject to some modern environmental conditions. The market for lime-sand is intermittent and mining will therefore be undertaken on a campaign basis, extracting 20 - 50 000 cubic metres each time.

The mining operation will continue from an existing quarry face and progress systematically through the tenements from the previously mined ML 513 to ML 511. Generally the operation will simply involve loading sand from face to truck but at times it may be necessary to screen out > 5 mm fraction using a mobile screening plant. The product will be carted via the gravel Cleaverville access track to Great Northern Highway.

This proposal makes the following environmental commitments:

1) The Cleaverville access track maintained by the Shire of Roebourne will not be used when in a damp condition.

2) During the mining operation the area of un-stabilised sand will be kept to a minimum. The area of newly cleared surface for each campaign will not exceed 0.1 Ha.

3) A foredune area will be maintained / constructed and stabilised during the mining operation.

4) An existing drainage line through ML 512 will not be disturbed and will be protected by a 20 m buffer.

5) All disturbed surfaces will be stabilised and revegetated with locally occurring indigenous plant species.

6) Mined out areas will be left in a state suitable for coastal recreational development.

7) Only one access track will be opened to the operational area and this will be blocked again at the conclusion of each campaign.

8) Measures will be taken to prevent public vehicular access to the operational and rehabilitation areas.

9) Any potential aboriginal sites discovered during excavation will be protected pending consultation with the Sites Department.

1. INTRODUCTION

Pioneer Concrete (WA) Pty Ltd proposes to resume the mining of lime sands at its Cleaverville tenements during 1994. The markets for this sand are diverse but the material will generally be used for pipe laying or making concrete for the local construction industry. In the longer term lime sands may be utilised for mineral processing (eg. sinter plants) in the region.

1.1 Location

The area in question is a strip of coastline on the eastern side of Nickol Bay in the Shire of Roebourne. The strip lies between the mouth of Cleaverville Creek and Point Cleaverville (just west of Dixon Island). The area is approximately 30 km east of Dampier and 12 km north-west of Wickham. A chain of ten mineral leases cover the coastal sand dunes along the Cleaverville coast.

1.2 Ownership & Status

The ten tenements ML 511 - 520 are held by Pioneer Concrete (WA) Pty Ltd (formerly Specified Services) as Mineral Leases applied for in 1974 under the Mining Act of 1904 (Figure 1). Grant was delayed for some years but was finally agreed in 1989 subject to some early environmental conditions. These are provided in Appendix 1.

The area falls within 2 kilometres of the coast and the project will be automatically referred to the Department of Environmental Protection as required under an inter-departmental memorandum of understanding.

This Notice of Intent pertains to proposals for operations on only the three eastern-most tenements ML 511 - 513.

1.3 History

Most of the sand in ML 513 was mined out in the 1970s to provide lime sand (flux) for the iron ore pelletising process at Cape Lambert. The mined out area was subsequently sheeted with gravel and is now intensively used as an unofficial caravan park area during the tourist season (May - September).

In the intervening period Specified Services and Pioneer Concrete have mined small tonnages, intermittently, mostly on ML 513. In 1992, after direction from the Department of Minerals and Energy, Pioneer produced a Rehabilitation Report. Subsequently access to the existing quarry face on ML 513 was controlled and rehabilitation work was undertaken on Pioneer's previous operational area. Pioneer now intend to continue sand extraction and rehabilitation in a systematic manner.

1.4 Existing Facilities

There is no permanent infrastructure at the mine site other than signage and barriers to control public access.

2. EXISTING ENVIRONMENT

The Cleaverville area is a straight stretch of coastline on the eastern side of Nickol Bay. It is bounded to the east by a range of rocky hills a kilometre or less inland.

2.1 Geology and Soils

This is a rocky, tidal coastline with numerous outcrops of archaean bedrock (Cleaverville Formation) within the intertidal zone or appearing as small headlands. A perched beach of coarse, shelly marine sands or of beach-rock pavement occurs above the intertidal. A dune of finer recent sands has developed above the perched shoreline, beginning at around 6 m above MSL. This dune is continuous along the Cleaverville coastline, but varies

considerably in height and depth. At the Dixon Island end the dune is pinched in against the inland range and the sand deposits may be 10 m in depth. Towards Cleaverville Creek the dune is lower and narrower bounded inland by a broad, sandy swale. The dune system provides the limesand resource for this project.

2.2 Hydrology

The sand deposits are elevated and there has been no mining groundwater / seawater interactions with previous operations. A small creek discharges to the sea through ML 512.

2.3 Climate

The coastal Pilbara between Whim Creek and Mardi is drier than most of the Pilbara and is genuinely arid (average rainfall < 250 mm). Rainfall is unpredictable with the months with the highest probabilities being February, March and May. Autumn rainfall is likely to produce better growing seasons, as it corresponds with declining air temperatures and evapo-transpiration rates. Dew is a particularly important source of moisture for plants and animals on the coastal Pilbara.

2.4 Flora and Fauna

2.4.1 Vegetation

The vegetation of the project area was examined by traversing the entire area and recording the occurrences of species. A list of plants observed within the area is provided in Appendix 2. Vegetation units were delineated on a colour 1 : 10 000 aerial photograph of the project area to produce a vegetation map (Figure 1).

Using the photographic signatures the vegetation of the project area can be broadly classified into four units.

Beach Spinifex Grassland

Beach Spinifex *Spinifex longifolius* dominates the beach above the strandline and the foredune area. Other plants in this zone include *Salsola kali*, *Ipomoca pes caprae*, *Canavalia rosea* and ephemeral *Ptilotus villosiflorus*.

Beach Spinifex Grassland with Emergent Shrubs

On the lower dune slopes Beach Spinifex occurs with scattered woody shrubs up to 1.75 m in height of *Acacia coriacea*, *A. bivenosa* and *Santalum lanceolatum* and low, *Scaevola crassifolia* and *Threlkeldia diffusa*. The introduced weed Buffel Grass *Cenchrus ciliaris* and Kapok *Aerva javanica* occur most frequently as lower level species.

Acacia Low Shrub

Acacia low shrub to a height of 2 m covers the top of the main dune, which varies from 20 to 30 m in width, and the upper lee slope. Three *Acacia* species make up the shrub stratum; these being *A. sclerosperma* var. *sclerosperma*, *A. bivenosa* and *A. coriaceae*. The former two species tend to co-dominate on ML 512 and 513 with *A. coriaceae* being more common on ML 511. Other widespread shrub species in the *Acacia* Low Shrub include *Rhagodia eremaea*, *Santalum lanceolatum*, *Adriana tomentosa* and *Senna artemisioides* subsp. *oligophylla*. One specimen of woody shrub *Clerodendrum tomentosum* was also recorded in unit ML 512. Other common plants on the main dune were the herbs *Heliotropium tenuifolia* and *Euphorbia* spp, the vines *Tinospora smilacine*, *Mukia maderaspatana* and the dodda *Cassytha aurea*.

Triodia pungens Hummock Grassland

A patchy and degraded Hummock grassland of *Triodia pungens* occupies the lower lee slopes of the dune and the sandy interface with red loamy inland soils. Buffel grass has taken hold in this area and there is widespread

senescence of woody shrubs of *Acacia bivenosa*, *A. coriaceae*, *A. pyrifoloa* and *Senna artemisioides*. This may be due to drought conditions or the allelopathic affects of Buffel Grass.

The three vegetation units described are typical of the coastal Pilbara. No gazetted rare or protected plant species were recorded.

2.4.2 Fauna

The Nickol Bay Naturalists Club (NBNC) surveyed the small ground fauna of the Cleaverville area in 1991/92 with a program of pitfall trapping. Traplines were operated in two hummock grassland habitats : one within the rocky hills and the second on a loamy area above the tidal flats. The coastal sand dune area was not sampled using pitfall traps.

The results of the NBNC survey are presented in Appendix 3. The fauna of the loamy flat area is probably representative of the *Triodia pungens* Hummock Grasslands habitat in the Project area, at least where this has not been degraded by invading Buffel Grass. The ground fauna of *Acacia* scrub habitat does include, (from field observations), the dragons *Pogona minor*, *Gemmatophora gilberti* and *Tympanocryptis cephala*, the Sand Monitor *Varanus gouldii* and Black-headed Scaleyfoot *Pygopus nigriceps*.

Coastal dune areas overrun with Buffel have depauperate faunas which are often characteristically infested with introduced House Mice *Mus musculus*.

There is no evidence that any rare or specially protected fauna occurs on the Project Area.

3. PROJECT DESCRIPTION

Demand for lime-sand in the Roebourne Shire is presently intermittent and as a consequence the extraction of material will be done on a campaign basis. It is estimated that campaigns will involve the excavation of between 20 000 and 50 000 cubic metres of sand.

3.1 Mining Method

The existing sand quarry face on ML 513 (Figure 1) lies between 6 and 14 m above sea level and is approximately 35 m wide. Mining will resume at the existing face and move progressively along the dune in a north-easterly direction into ML 512 and ultimately ML 511.

The material will be extracted from the face using a front-end loader and where necessary the coarse 5 mm fraction will be screened out using mobile plant temporarily located on the adjacent flat mined out area. The product will either be trucked away directly or stockpiled on site for later utilisation.

3.2 Transportation

The material will be trucked to Great Northern Highway on the Cleaverville Road. This is a high standard gravel road maintained for public use by the Shire of Roebourne. Material will not be moved if the road is in a damp condition.

3.3 Accommodation & Housing

All operational personnel will be accommodated in Karratha. No dwellings, sheds or shelters will be constructed at the main site.

4. ENVIRONMENTAL IMPACT AND MANAGEMENT

Previous mining at the Cleaverville Area has inadvertently contributed to an increase in un-managed tourist use. As many as 70 caravans have been counted in the area during the June to August period, with most of these being parked in the flat mined out part of ML 513. The rehabilitation plan sought to restrict further expansion of the unofficial caravan park and to keep the public away from the quarry face.

The impact of uncontrolled public use of the Cleaverville coastal strip has been quite severe. Much of the woody vegetation has been removed for firewood, there are a multitude of tracks, areas of dune erosion and public

health problems due to the lack of ablution facilities.

4.1 Land Use

In 1991 the Department of Land Administration commenced the process of establishing the Cleaverville coast as a recreational reserve vested in the Shire of Roebourne. To this end the Shire produced a draft management plan for the area. Unfortunately this process has not yet been completed. It is however assumed that the land will ultimately be managed as a public reserve for coastal recreation and camping.

4.2 Environmental Management Objectives

The following objectives underpin the environmental management plan for the Cleaverville sand mining operations:

1) Protect the Cleaverville coast from erosion by rapidly stabilising dune areas affected by mining.

2) Retain, or construct, a foredune and retain any drainages through the operational area.

3) Keep exposed sand surfaces to a minimum during operations.

4) Restrict public access to operational and rehabilitation areas both during and between mining campaigns.

5) Leave landforms suitable for recreational use in the long term.

6) Protect any aboriginal sites discovered during mining operations.

4.3 Earthmoving

Prior to the resumption of sand excavation the standing vegetation and topsoil from the area above the quarry face will be swept off and stockpiled for later use. The area swept will not encroach seaward closer than the 9 m contour

on the dune, in order to leave a protective foredune (Figure 2.1). The area cleared will be sufficient to meet quantity requirements of the campaign and allow for a 3 : 1 batter to be pushed out at the conclusion of excavation. Normally the area of surface cleared of vegetation will not exceed 0.06 - 0.1 Ha.

Sand will be mined from the face using an excavator and normally loaded directly onto trucks. Parts of the deposit may require screening to remove coarse material > 5 mm using a mobile screening plant. Any coarse screenings produced will be re-spread over the floor of the mined-out area to stabilise the surface.

All plant and vehicle movements will be via a single existing access track which will be closed at the conclusion of each campaign.

The drainage line through the dune on ML 512 (Figure 1) will not be disturbed and will be given a 20 m buffer of un-mined dune. At some stage mining on the western side of the creek will be completed and a new pod with another access track will be opened up on ML 511.

4.4 Dust Generation

The lime-sand material being handled is coarse in nature and unlikely to generate significant airborne dust levels. No special dust control measures are currently envisaged.

4.5 Stabilisation and Revegetation

At the conclusion of each campaign the disturbed lee-ward side of the foredune will be battered down to a stable angle (Figure 2.2). This area will then be top-soiled and brushed with the material collected ahead of the advancing quarry face (Figure 2.1). If there is insufficient material it may be necessary to bring brush material in from another source (eg. Roebourne Shire).

At the end of each campaign the quarry face will be battered to a 3 : 1 slope. Should the face constitute a final face, it will also be top-spoiled and brushed.

The flat quarry floor behind the operational area will be sheeted with coarse screenings (where this material is available) and deep ripped to roughen the surface.

Direct seeding of recently stabilised areas will take place in the February / March period following each campaign. The following species are recommended:

Foredune and Completed Faces

Spinifex longifolius (as female flower-heads pinned under brush)
Canavalia rosea
Ipomoea pes-caprae
Swainsona formosa
Whiteochloa airoides

flat Mined-Out Areas

Acacia bivenosa
Acacia coriacaea
Acacia sclerosperma var sclerosperma
Caparis spinosa
Ptilotus exaltatus
Rhagodia eremaea
Senna artemisioides subsp. oligophylla
Triodia pungens

4.6 Completion Criteria

1) The foredune area should be considered complete when it is revegetated with local native species at local densities. Some sand movement is normal on foredunes. Similar criteria should be applied to completed faces.

2) The flat mined out areas should be revegetating with locally occurring plant species and have no significant evidence of sand drift.

5. SOCIAL IMPACTS

5.1 Aboriginal Sites

Mining to date has not exposed any artefactual material in the dune. The nearest shell midden and artefact scatter sites appear to be around Cleaverville Creek. However, it is always possible that cultural materials, or even burials, will be discovered during the excavation of sand. Should this happen, work in the affected area will cease and the Aboriginal Sites Department in Port Hedland will be consulted. Protection of sites or salvage programs would then be organised as required.

Indian Ocean

ML 511

ML 512

ML 513

Intertidal bedrock

Beach

Beach

Beach

Quarry site cut off here with signs

Old quarry site

Quarry face

Disturbed site

Drainage channel

LOCALITY MAP

Map area

Port Hedland

Karratha

WESTERN AUSTRALIA

PERTH

REFERENCE

- Rocky shore
- Beach Spinifex Grassland
- Beach Spinifex Grassland with emergent shrubs
- Acacia low scrub
- *Triodia pungens* Hummock Grassland
- Area of significant senescent scrub
- Track

NORTH

0 200m

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Auth: VLL Date: 7/94

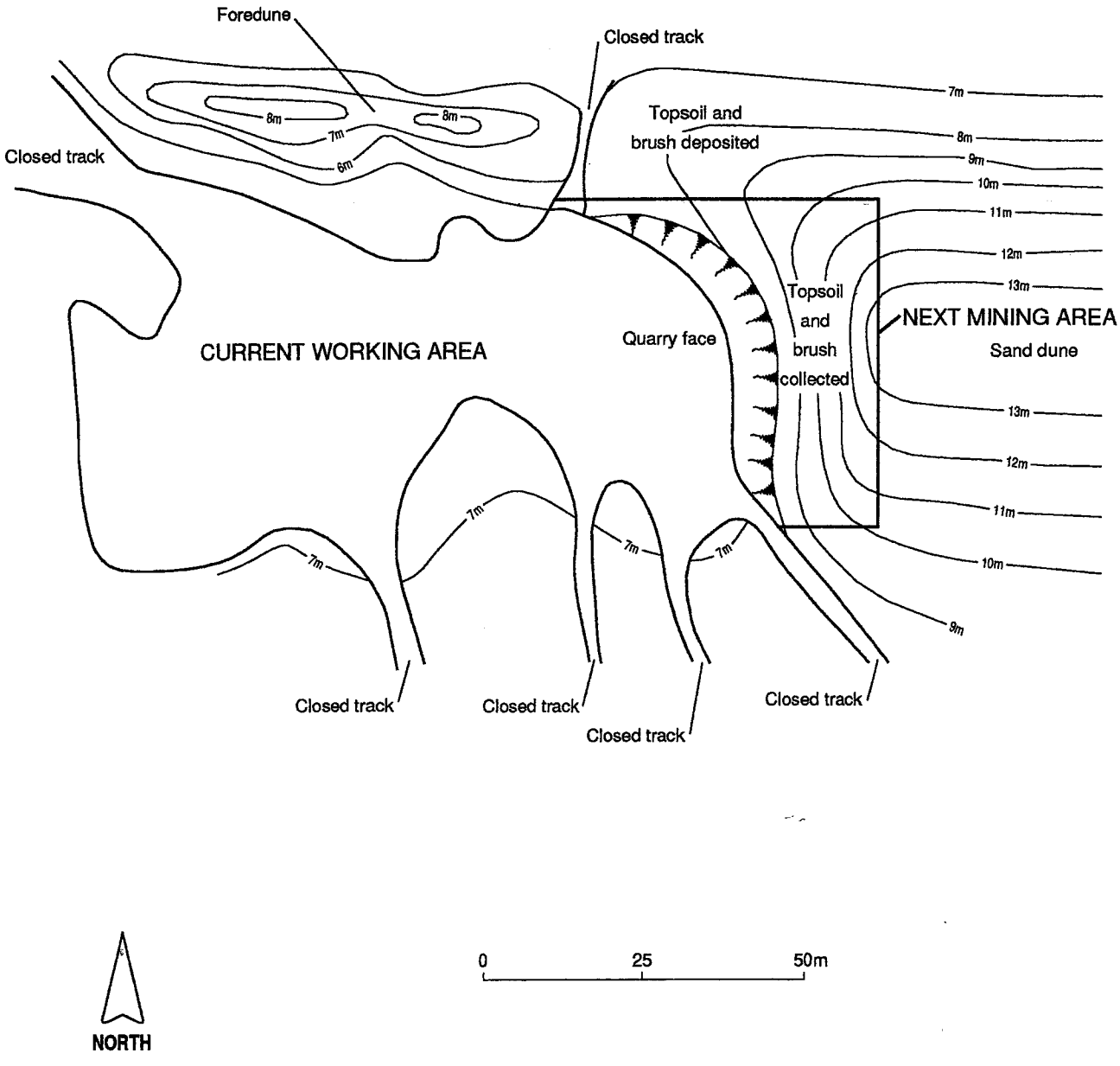
Pioneer Concrete WA Pty Ltd
SAND LEASES ML 511, 512, 513

CLEAVERVILLE BEACH
LOCALITY AND VEGETATION MAP

Figure 1

Environmental Drafting (089) 49 6105

505-RV-01



Pioneer Concrete WA Pty Ltd
SAND LEASES ML 511, 512 ,513

THE NEXT MINING CAMPAIGN PRIOR TO THE EXCAVATION OF MATERIAL

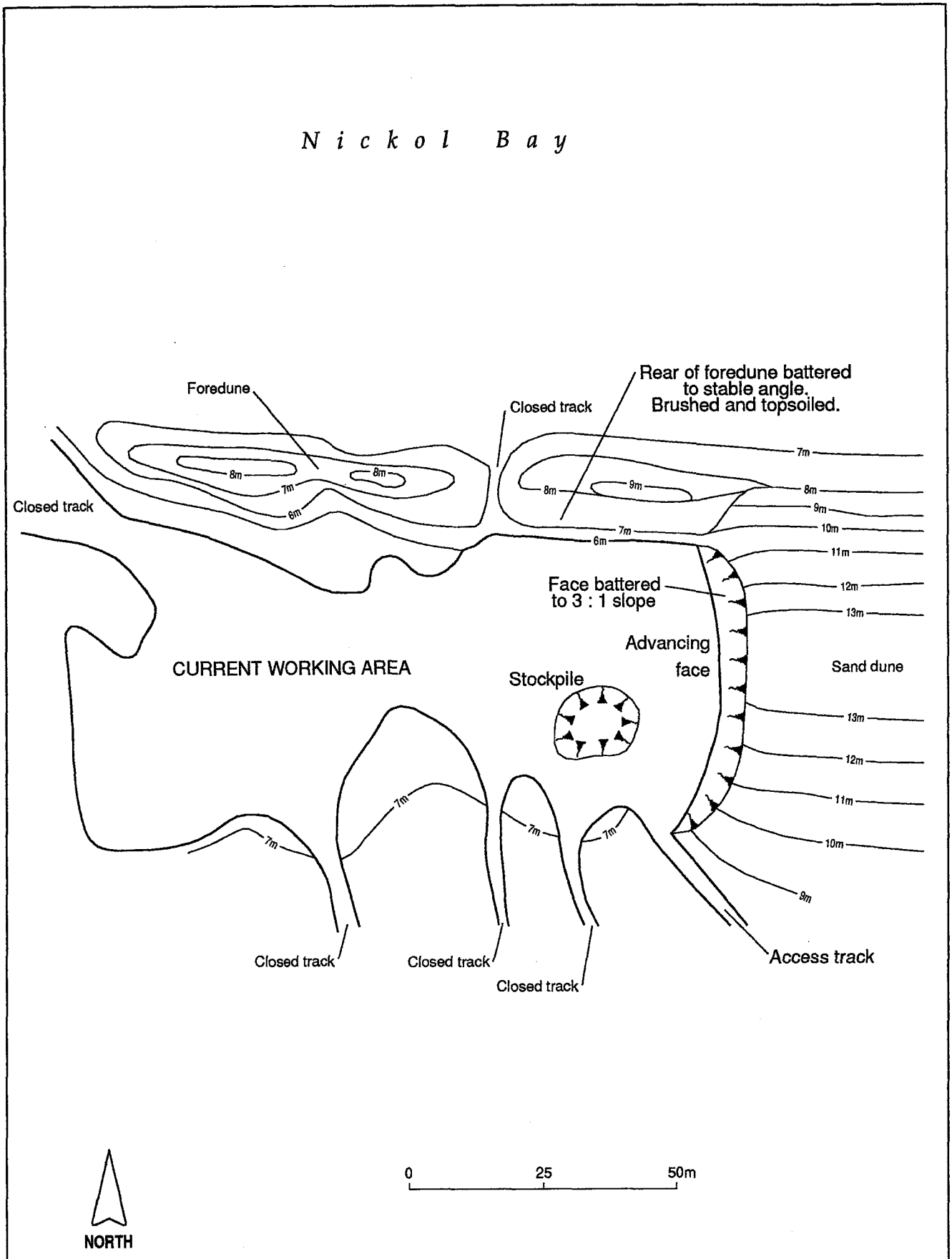
Figure **2.1**

Astron environmental

Auth: JND | Date: 7/94

Environmental Drafting (098) 40 8105

505-RV-01



Astron environmental Auth: JND Date: 7/94	Pioneer Concrete WA Pty Ltd SAND LEASES ML 511, 512 ,513 **THE NEXT MINING CAMPAIGN AFTER EXCAVATION OF MATERIAL**	Figure **2.2**

Environmental Drafting (098) 40 8105

505-RV-01

APPENDIX 1

LEASE CONDITIONS

9

COMPUTER ENTERED

ML 47/512

same condo as 47/511. Name of Lease

* i) Survey.

ii) The mined area to be rehabilitated and contoured to the satisfaction of the State Mining Engineer and the Commissioner of Soil Conservation.

iii) All topsoil to be both removed prior to mining and replaced over the mined out area after the completion of mining.

iv) All vegetative debris and other waste material to be returned and spread over the mined area prior to the replacement of topsoil.

v) The replacement of topsoil, and debris from the screening plant, to proceed continuously with the mining operations.

vi) The revegetation of the area to be carried out, to the satisfaction of the Commissioner of Soil Conservation, at the correct time with regard to climatic conditions and including the restriction of public access if found necessary to protect revegetation.

vii) Such further conditions as the Minister for Mines may from time to time consider necessary.

mmended

6.74

ed 17.6.74

EMPTIONS

Period

rom

26.3.75 (to 31.12.75)	$48.00
24.12.75 (to 31.12.76)	$48.00
23-12-76 (to 31.12.77)	$48-00
12.7.78	$48.00
(to 31.12.78) 3-1-79 to 31.12.79	$48.00
27.5.80 (to 31.12.80)	$48.00
24-4-81	$48-00
3-3-82	$48.00
16.3.82 (to 31.12.82)	$12.00
18.1.83	$60.00
12.1.84	$60-00
1-4-85	60 00
14-1-86	60-00
24-12-86	70 00
17.5.88	77 00
17-3-87	81 00
10.5.90	81 00
12-6-91 (to 31.12.92) EXEMPTION	87-00

ML47/511 to 513

(NOI condition to be imposed)

RENT CREDIT/DEBIT

RED IN TENDEX

EXPENDITURE						
red e nded	Amount Report Filed	$ Expended or Nil	Number	Relates to Year Ending	/12ths	Amount Exempted ($)
00	22.7.83	17.50	6.5.92		93.00	

UP-TO-DATE RENTAL EXPENDITURE AND EXEMPTION DETAILS ARE AVAILABLE FROM TENDEX

APPENDIX 2

VEGETATION LIST

APPENDIX 2

CLEAVERVILLE BEACH MINERAL SANDS LEASE ML47/511, 512, 513 VEGETATION LIST

31	POACEAE	*Cenchrus ciliaris L. Enneapogon caerulescens (Gaudich) N Burb Eragrostis eriopoda Benth. Spinifex longifolius R.Br. Triodia pungens R Br. Whiteochloa airoides (R.Br.) Lazarides
92	SANTALACEAE	Santalum lanceolatum R.Br.
105	CHENOPODIACEAE	Rhagodia eremaea Paul G.Wilson. Salsola kali L. Threlkeldia diffusa R.Br.
106	AMARANTHACEAE	*Aerva javanica (Burmf.) Juss ex. Schultes. Ptilotus exaltatus Nees. Ptilotus villosiflorus F.Muell
122	MENISPERMACEAE	Tinospora smilacina. Benth.
131	LAURACEAE	Cassytha aurea J.Z. Weber.
137A	CAPPARACEAE	Capparis spinosa L. Cleome viscosa L.
163	MIMOSACEAE	Acacia bivenosa DC. Acacia coriacea DC. Acacia pyrifolia DC. Acacia sclerosperma F.Muell. Subsp. sclerosperma.
164	CAESALPINACEAE	Senna artemisioides Subsp. oligophylla (DC) Randell.
165	PAPILIONACEAE	Canavalia rosea (SW)DC. Swainsona formosa (G Don) J Thompson Tephrosia rosea F.Muell ex Benth
173	ZYGOPHYLLACEAE	Tribulus occidentalis R.Br.
185	EUPHORBIACEAE	Adriana tomentosa Gaudich. Euphorbia australis Boiss. Euphorbia coghlanii Boiss. Euphorbia tannensis Sprengel

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APPENDIX 2 con't

301	OLEACEAE	Jasminium didymum G.Forster subsp. lineare (R.Br)Green.
307	CONVOLVULACEAE	Ipomoea pes-caprae (L.) R.Br.
310	BORAGINACEAE	Heliotropium tenuifolium R.Br. Trichodesma zeylanicum (Burm.f.) R.Br.
315	SOLANACEAE	Nicotiana occidentalis Wheeler
331	RUBIACEAE	Synaptantha tillaeacea (F.Muell) JD Hook
311	VERBENACEAE	Clerodendrum tomentosum (vent) R.BR. var. lanceolatum (F.Muell) Munir.
337	CUCURBITACEAE	Mukia maderaspatana (L) M.Roemer.
341	GOODENIACEAE	Scaevola crassifolia Labill.

APPENDIX 3

SMALL GROUND FAUNA OF CLEAVERVILLE AREA

APPENDIX 3 - SMALL GROUND FAUNA OF THE CLEAVERVILLE AREA
(Source : Nickol Bay Naturalists Club Inc.)

	Hummock Grassland	
	rocky hills	loamy flats
FROGS		
Leptodactylidae		
Cyclorana maini		+
REPTILES		
Gekkonidae		
Diplodactylus conspicillatus	+	+
Diplodactylus elderi	+	+
Gehyra variegata	+	
Heteronotia binoei	+	
Rhynchoedura ornata	+	
Pygopodidae		
Pygopus nigriceps	+	+
Agamidae		
Ctenophorus caudicinctus	+	+
Gemmatophora gilberti		+
Pogona minor		+
Scincidae		
Carlia foliorum	+	
Ctenotus duricola	+	+
Ctenotus grandis		+
Ctenotus pantherinus		+
Ctenotus saxatilis	+	+
Lerista muelleri	+	+
Menetia grevii	+	
Morethia ruficauda	+	
Tiliqua multifasciata		+
Varanidae		
Varanus acanthurus	+	+
Varanus brevicauda		+

	Hummock Grassland	
	rocky hills	loamy flats
Varanus giganteus	+	
Varanus gouldii		+
Varanus panoptes	+	+
SNAKES		
Typhlopidae		
Rhamphotyphlops diversus	+	
Elapidae		
Furina ornata	+	
MAMMALS		
Dasyuridae		
Dasykaluta rosamondae		+
Ningaui timealeyi	+	+
Planigale sp (Pilbara endemic)	+	
Sminthopsis macroura		+
Muridae		
Pseudomys hermannsburgensis		+

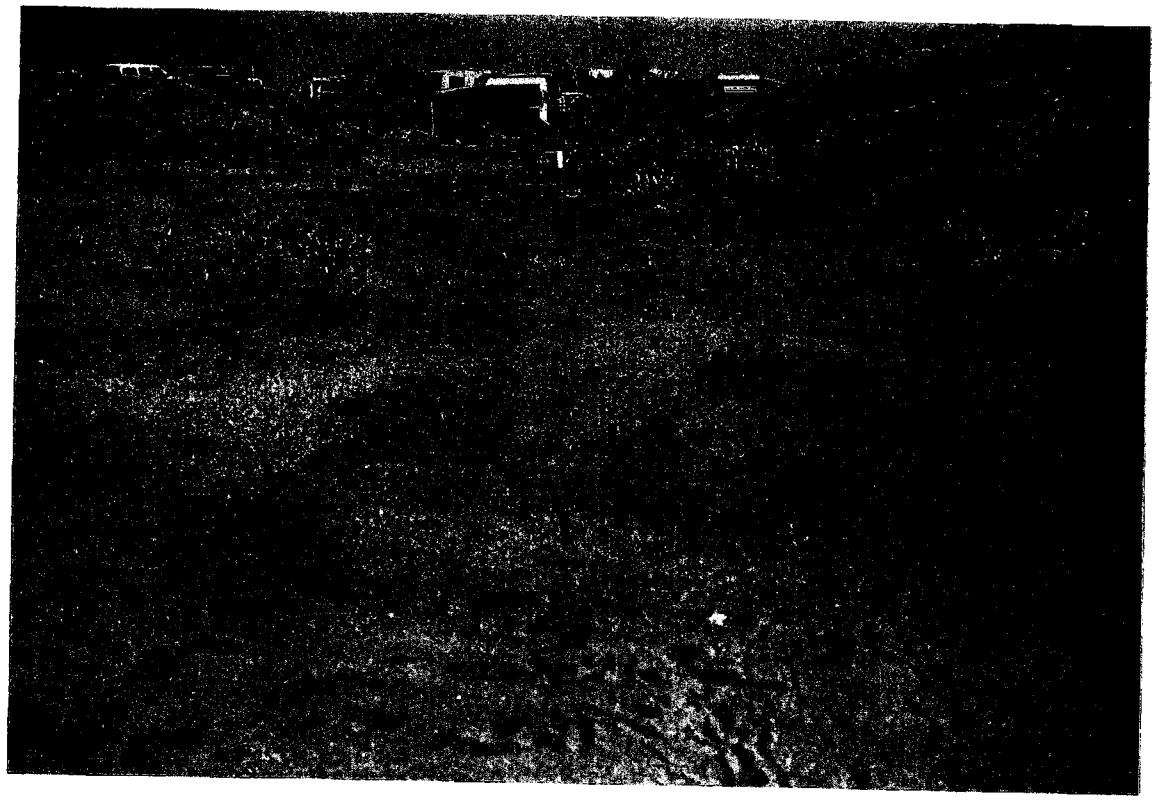

PLATE 1 Campers at the western end of the old quarry site.

PLATE 2 Low Acacia Shrub (*A. sclerosperma*, *A. bivenosa*, *A. coriacea*) on dune ridge.

PLATE 3 Beach Spinifex Community (*Spinifex longifolius* with low acacia *A. coriacea*)

PLATE 4 Degraded *Triodia pungens* Hummock Grassland with stands of senescent shrubs.