

EIS 401

AA054576

Environmental impact statement [for an] extractive industry :

Portion 63, Parish of Frederick, County of Cumberland



P. DANIEL

ENVIRONMENTAL IMPACT STATEMENT

EXTRACTIVE INDUSTRY

Portion 63

Parish of Frederick

County of Cumberland

Prepared by

Collin C. Donges & Associates Pty. Ltd.

L87/0076

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(i)

PREAMBLE

This Environmental Impact Statement has been prepared to accompany a development application, to be lodged with Hornsby Shire Council, and in which consent will be sought for the carrying-out of an extractive industrial operation within Portion 63, Parish of Frederick, County of Cumberland.

Subject Portion, as indicated in the following Regional Location Map, is situated to the east of Old Northern Road and to the north of Wisemans Ferry Road, at Maroota. The shape and dimension of the 16 ha. parcel are shown on a sketch plan, Figure 2, in Part 1 of this document.

Attachment 1 at the end of this Statement is a copy of the Director's Clause 35(2) response to the Clause 35 (1) consultation as previously sought.

This Clause 35 (2) letter, having given notification that the Director has requested careful consideration to be given to soil erosion controls, visual aspects and any possible effects on Marra Marra National Park. In Paragraph 5 it is suggested that Hornsby Council should be approached for any comments which it may have in relation to the proposal. Council was duly consulted by telephone and confirmatory letter. A copy of Council's response is at Attachment 2.

The format followed by this E.I.S. is based on the content of Clause 34 of the Environmental Planning and Assessment Regulation 1980.

COLLIN C. DONGES & ASSOCIATES PTY. LIMITED

A handwritten signature in cursive script, reading "Collin C. Donges", written over a horizontal line.

Per: Collin C. Donges.

(ii)

CERTIFICATE
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (SECTION 77(3)(d)).
ENVIRONMENTAL IMPACT STATEMENT

(i) This Statement has been prepared on behalf of Mr. P. Daniel being the applicant making the development application referred to below.

(ii) The Statement accompanies the development application made in respect of the development described as follows:-

Dam construction and transport of sand from the site.

(iii) The development application relates to the land described as follows:

Street Old Northern Road

Locality/Suburb Maroota

Real Property description Portion 63 Parish of
Frederick, County of Cumberland

(iv) The contents of this statement, as required by clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

(v) Name, Qualifications and Address of person who prepared Environmental Impact Statement:-

Collin C. Donges, MIS Aust., Dip. TCP., MRTPI, FRICS, MRAPI, Dip.
Env. Stud., LGTCP, Dip. Leis. St., Reg'd Land
Agent

of 939 Old Northern Road, Dural, N.S.W. 2158.

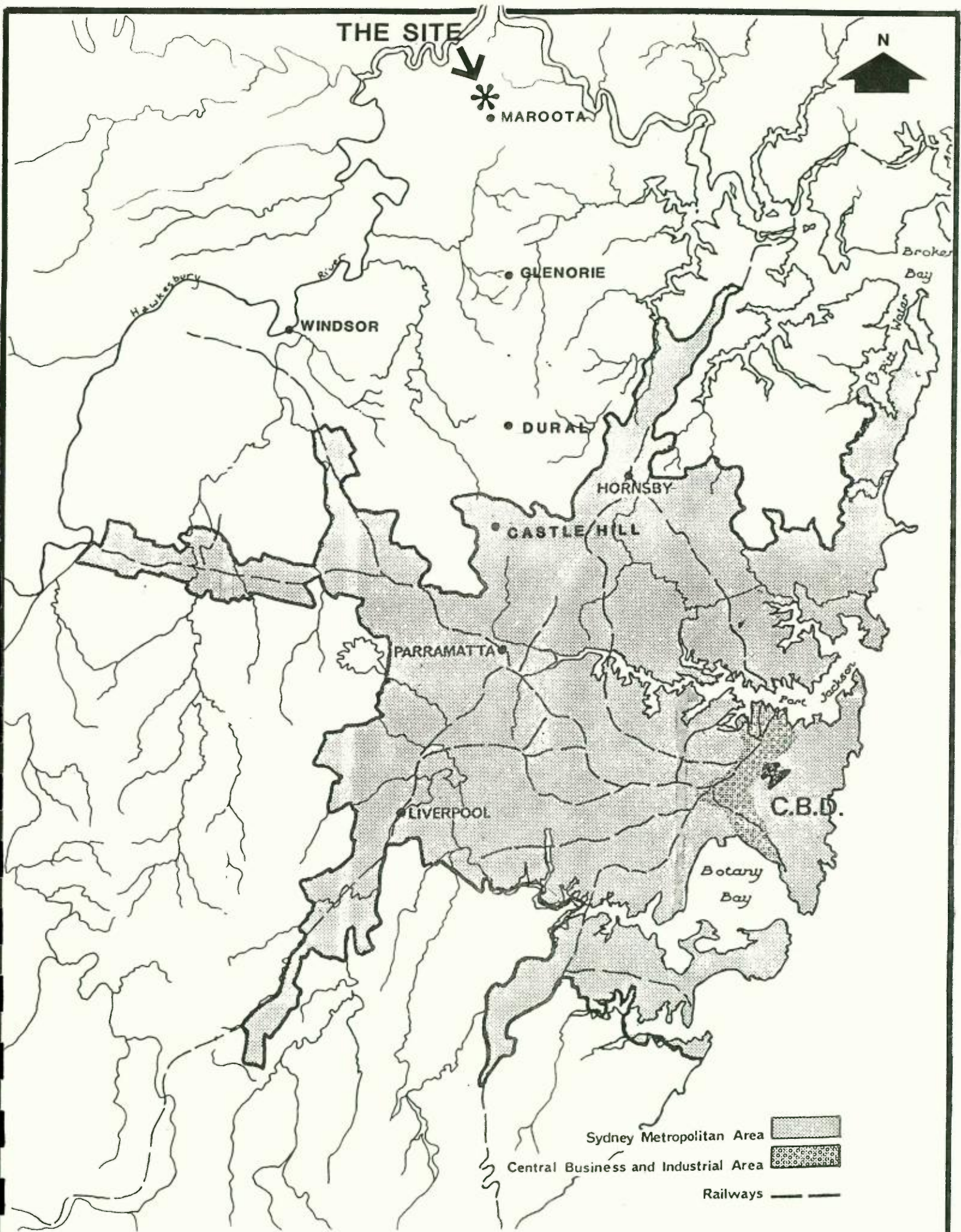
(vi) Certificate

I, Collin C. Donges of Collin C. Donges & Associates Pty. Limited, hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.



Signature

11.11.86



Regional Location

EXECUTIVE SUMMARY

Following is a condensation of the summaries of each part of this Statement. Each such summary is preceded by its part number and title.

1 - SITE INFORMATION

The Hawkesbury Sandstone-based hills of the Maroota District support both rival land uses and significant deposits of marketable fine aggregate sand. Portion 63 is representative of many small land holdings in this area and supports several market garden plots, a small orchard and sufficient sand to justify its sale during property improvement works. (Page 3)

Sand extraction operations commonly generate intense controversy. With its publication of Sydney Regional Environmental Plan "Extractive Industry" the Department of Environment and Planning has formulated an environmentally acceptable rational approach to the satisfaction of community demand for building materials. This plan identifies the Maroota ^{sand deposit} District as being a significant source of sand for the Sydney market and this extraction should be encouraged if it is carried out in an environmentally acceptable manner. (Page 4)

2 - PROPOSAL OBJECTIVES

The extraction operation achieves objectives for both the landholder, Mr. Trovarto, and the applicant, Mr. Daniel. Mr. Trovarto wishes to improve the agricultural potential of his property and Mr. Daniel aims to secure employment for about five years. With regard to the latter, the extraction operation will remain a small, one man operation. (Page 7)

The rehabilitation of the land is an integral part of the project with improvements in agricultural quality and the prevention of erosion being the primary objectives. (Page 7)

3 - PROPOSAL DESCRIPTION

There is within the property a pronounced knoll lying sufficiently far from Old Northern Road as to preclude its ready visibility from that road. It is from within this knoll that the sand extraction operation will occur. In order to add to the sight and sound attenuation already afforded by distance from the road and other properties, sand removal will take place from the eastern side of the knoll and will progress steadily towards the barrier afforded by the retained western face. The sand is soft and friable and needs little preparation prior to its transport to Sydney markets via trucking contractors. Rehabilitation of the site will be undertaken by recontouring the land, deep ripping and spreading of topsoil, planting of grasses and the cultivation of crops. (Page 11)

4 - THE PHYSICAL AND BIOLOGICAL ENVIRONMENT AND IMPACT POTENTIAL.

Hawkesbury Sandstone is the dominant lithology in the Maroota District. When weathered, the resultant sand is highly desirable in the building industry. The impact of the proposal on the geology of the District will be negligible. (Page 27) ?!

The topography is controlled by the geology. Where the sandstone is heavily weathered, gently undulating hills are formed in contrast to the steep cliffs and valleys defined in the unweathered sandstone. The extraction area is located in the headwaters of Coopers Creek which drains into the Hawkesbury River after passing through Marra Marra National Park. (Page 27)

The major land system represented on Portion 63 is agricultural with minor areas devoted to extraction and dams. As such, Portion 63 is typical of many surrounding properties. (Page 27)

The combination of three settling ponds and progressive rehabilitation of extracted areas will ensure that the transport of fines into the National Park will be minimised. (Page 27)

Soils developed on Hawkesbury sandstone are generally poor and those at Maroota are no exception. However, with fertilizer application their fertility can be improved and thus will be the major impact of the extraction/rehabilitation project. (Page 27)

A small segment of highly disturbed native vegetation on the site represents the regrowth following clearing about five years ago. Its size and disturbed nature precludes the presence of any significant fauna and the biological value of the area as a whole is extremely low. (Page 27)

The Maroota Aquifer does not exist in the vicinity of Portion 63 and hence the impact of land disturbance on subsurface drainage will be comparable to that within other cultivated areas on the property. (Page 27)

Sound Pressure Levels recorded on the site demonstrated an expected decrease away from the extraction area. This decrease was enhanced by the location of machinery behind the knoll which screens residential dwellings from significant increases in noise levels. (Page 28)

Dust has detrimental effects on agricultural production. The two main dust source areas are the extraction/stockpile site and the access road. The construction materials within the road, coarse sand and road base, result in low probability of dust generation. If dust becomes a problem during prolonged dry periods, water trucks will be used to dampen dust sources. (Page 28)

The site was surveyed by an archaeologist, Dr. Laila Haglund, who reported that the site was so heavily disturbed that there was little probability of any archaeological relics being present in the area. (Page 28)

5 - LAND USE, SOCIAL AND ECONOMIC IMPLICATIONS

The Maroota District is primarily a rural area with several small extraction projects currently operating. The N.S.W. State Government has identified this general area as being an important source of construction sand for the Sydney region. The future of such extraction projects seems assured. (Page 41)

The small scale of the Portion 63 operation and the attention being given to both minimising negative environmental impacts and promoting rehabilitation, suggests that the benefits of improved agricultural land, water supply and increased financial return outweigh the minor environmental costs. (Page 41)

Careful consideration of the traffic related aspects of the proposal has concluded that the number of extra vehicle movements generated will not be significant. The safety of motorists using Old Northern Road in the vicinity of Portion 63 will not be compromised by trucks entering or leaving the access road. (Page 41)

The increasing scarcity of suitable and accessible fine aggregate sand for the Sydney Metropolitan Area has emphasised the importance of deposits at Maroota and related, accessible areas. The production/non-production of sand from the Maroota District (including Portion 63) has regional as well as local ramifications. (Page 41)

A consideration of alternatives to the proposal suggests that there are no viable counter proposals in which the objectives of the landowner and the applicant are achieved. (Page 41)

PART 1 SITE INFORMATION

SECTION 1 SITE LOCATION

Portion 63, the whole of the land in Certificate of Title Volume 4242 Folio 67, is located in western Hornsby Shire, about 3 km. north of Maroota and approximately 8 km. south of Wisemans Ferry (Figure 1).

The Maroota area is primarily a rural district with farming allotments being confined to the crests of the Maroota Ridge along which Old Northern Road passes in a north-south direction. Portion 63 lies at the head of Cooper's Creek which drains the eastern flank of the ridge and then joins the Hawkesbury River.

East of Portion 63 lies Marra Marra National Park and the dissected Hornsby plateau which supports extensive stands of native forest. The developed land is generally poor and capable of supporting little agriculture without intensive modification.

SECTION 2 SITE DIMENSIONS AND EXISTING DEVELOPMENT

2.1 Dimensions

Portion 63 covers an area of 16 ha. in the shape depicted in Figure 2. The southern boundary measures about 920 m. and the northern boundary 740 m.

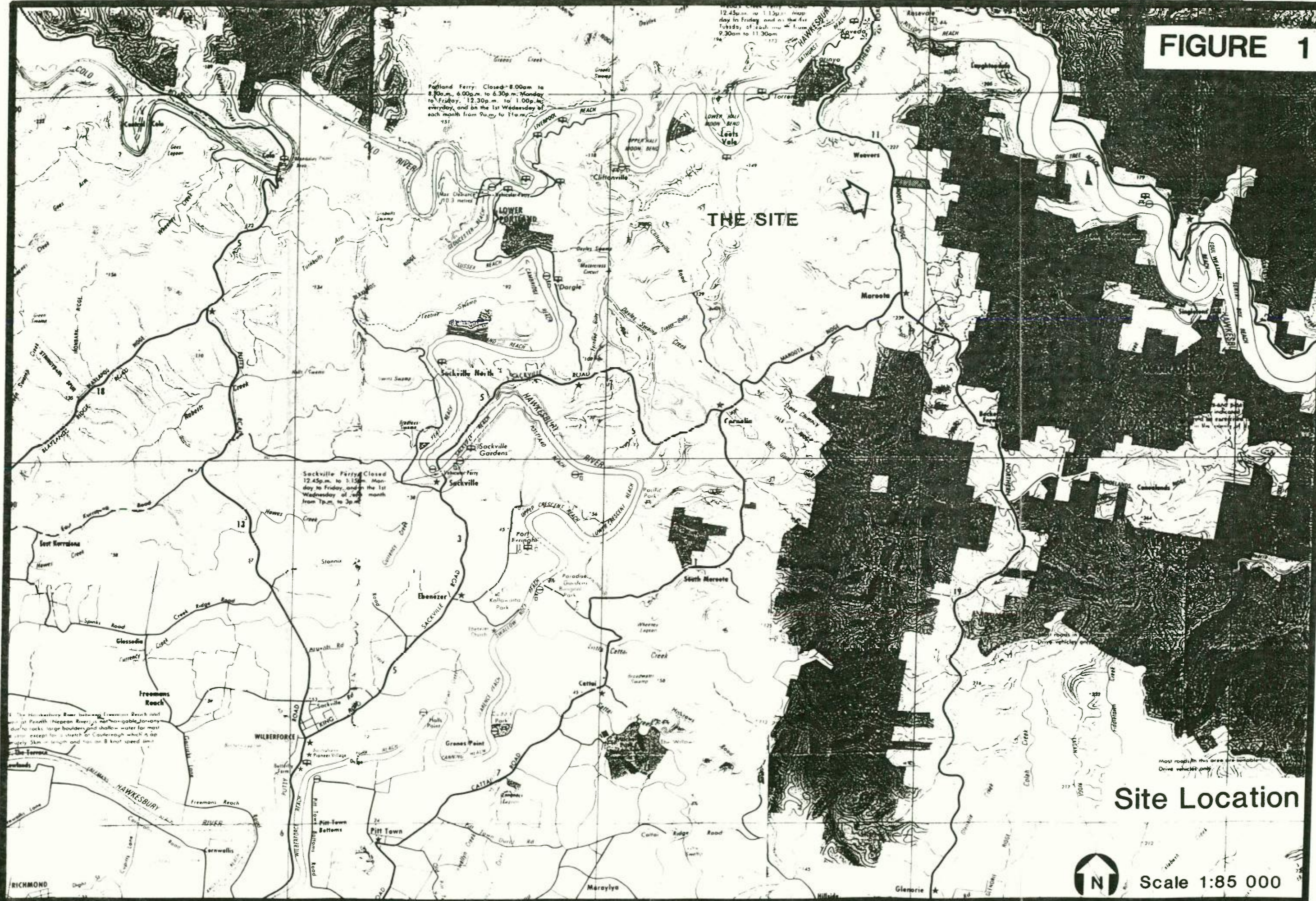
Properties surrounding Portion 63 to the north, south and west are rural holdings of between 16 and 50 ha.

2.2 Existing Development

The land, purchased in 1969 by Mr. & Mrs. J. Trovato, is still occupied by them as joint tenants. A house, garage and several small sheds are located near the access track on Old Northern Road. (Figure 3). The owners are currently tending 4 market garden plots and 1 orchard plot on their holding.

The western section of the property is, at present, devoted to irrigated vegetable cultivation, and some orcharding. (Photos 1 and 2) Three small dams serviced by small pumps supply water for the irrigation.

FIGURE 1



Portland Ferry: Closed 8.00am to 8.00pm, 6.00pm to 6.30pm Monday to Friday, 12.30pm to 1.00pm everyday, and on the 1st Wednesday of each month from 9am to 11am.

Sackville Ferry Closed 12.45pm to 1.15pm Monday to Friday, and on the 1st Wednesday of each month from 1pm to 3pm.

The Hawkesbury River between Freeman's Reach and Penrith (Nepean River) is not navigable for any size of vessel except for a stretch at Castlereagh which is up to 5km in length and has an 8 knot speed limit.

Most roads in this area are suitable for drive vehicles only.

Site Location



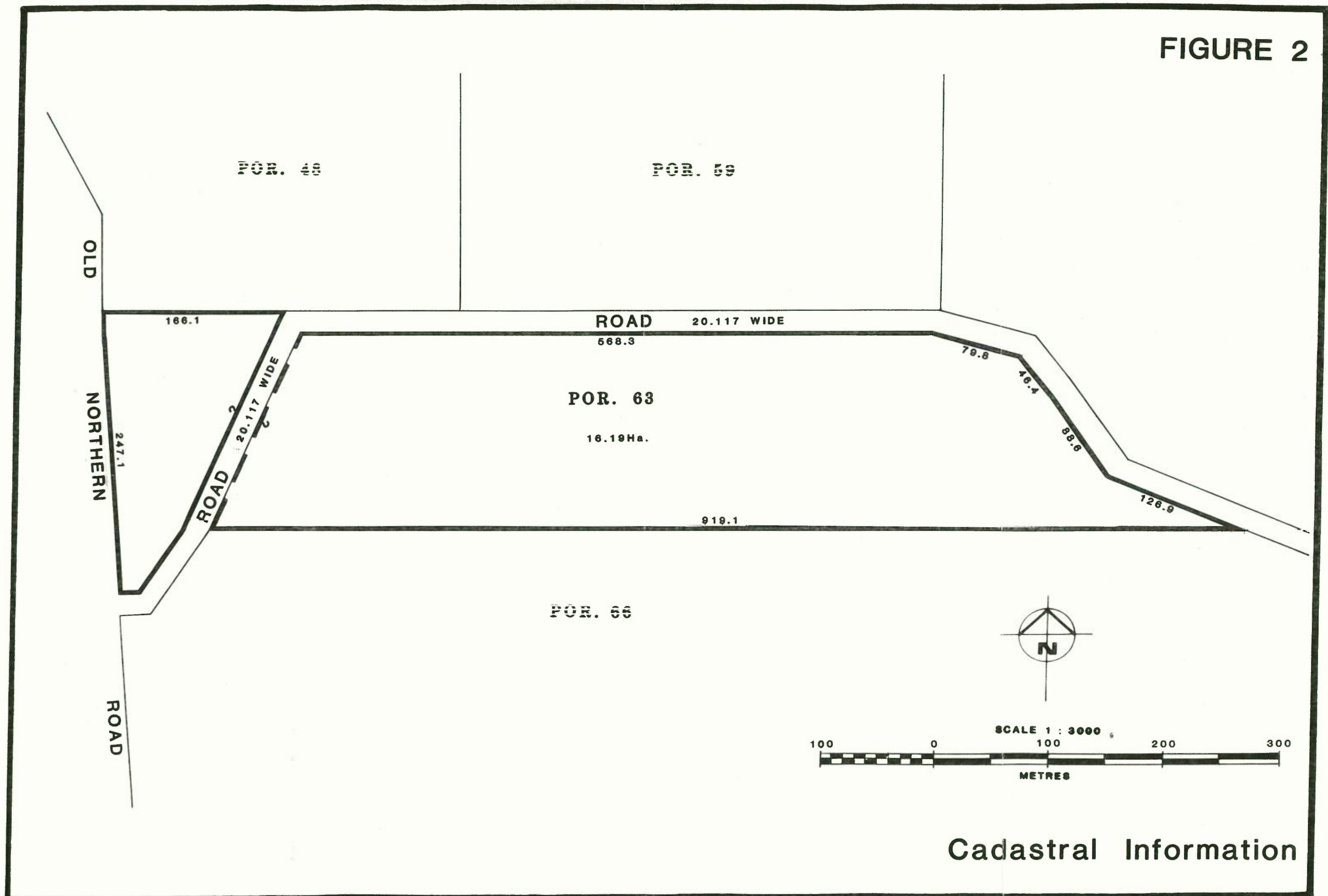
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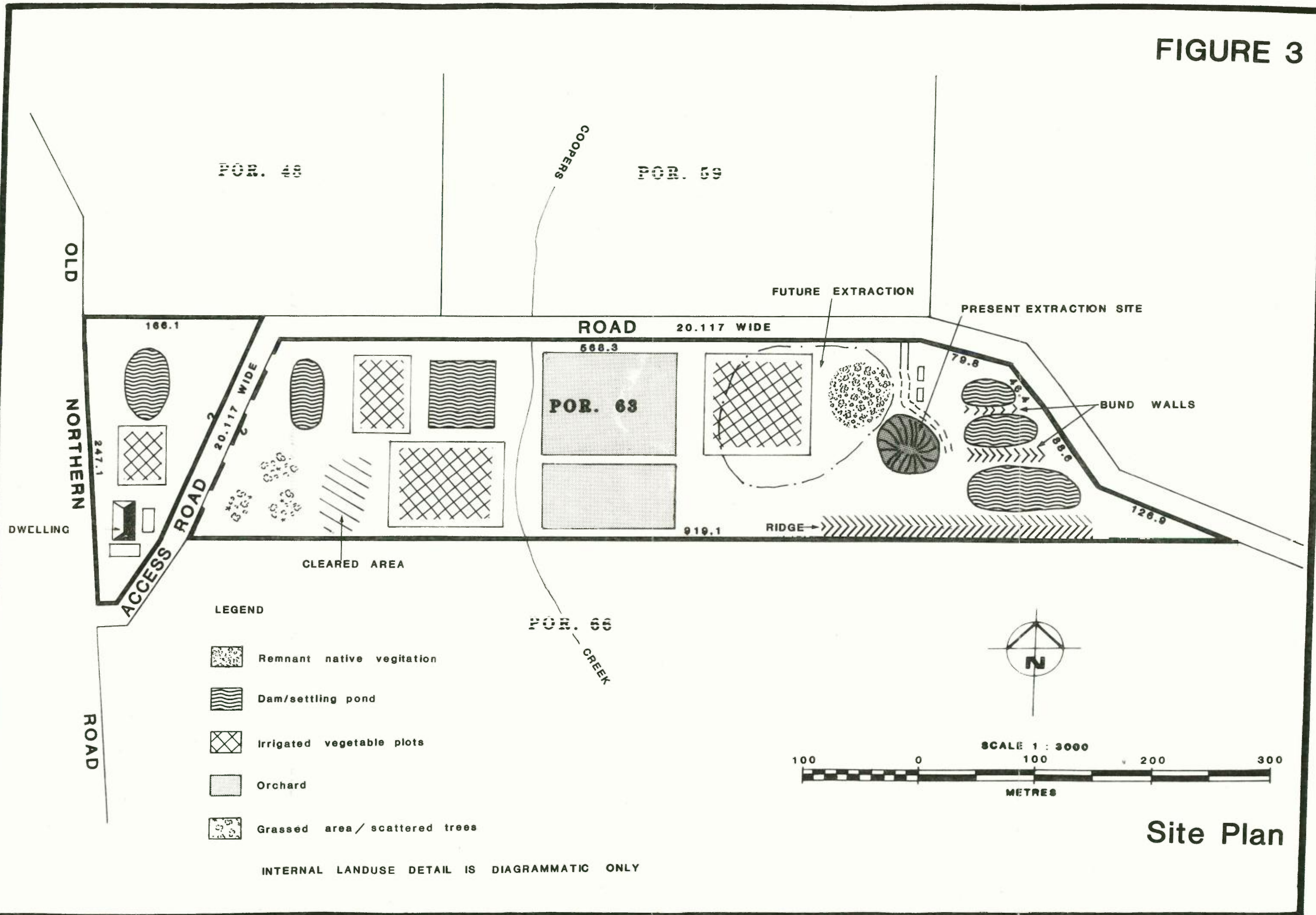
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FIGURE 2








Cadastral Information

FIGURE 3



LEGEND

-  Remnant native vegetation
-  Dam/settling pond
-  Irrigated vegetable plots
-  Orchard
-  Grassed area / scattered trees

INTERNAL LANDUSE DETAIL IS DIAGRAMMATIC ONLY

Site Plan

Sand extraction and dam construction is taking place in the eastern portion of the property and the activities (including three dams, excavation, washing, storage and stockpiling functions) cover about 5 ha.

Access to the site is via an unsealed track that services the extraction area and the buildings located on the property to the north. The track leaves Old Northern Road at the southwestern corner of the property and thence crosses to and parallels the northern boundary. (Refer Photos 1 and 2)

Mr. Daniel, at whose request this E.I.S. has been prepared, was initially approached by the land owner, Mr. Trovato, to construct, with a view to ensuring a greater supply of water on the site and as an initial stage of development, a ground tank within Portion 63. Large quantities of water are needed to 'drought-proof' the property against the devastating effects of prolonged low rainfall as has occurred over several periods in the last decade. Further landscaping of the area is to be undertaken to achieve a land form suitable for the planting of irrigated market gardens. Mr. Daniel has removed, crushed and screened the sand deposits and marketed it to Sydney Region consumers as part of the landscaping goal.

SECTION 3 PLANNING INSTRUMENTS

Portion 63 is zoned Rural C1 under the Hornsby Shire Planning Scheme. The Column V purposes specifying works which may not be carried out exclude extractive industry and thereby dictates that such use may be carried-out with the consent of Council.

Although the deemed L.E.P., contains provision that agricultural uses, including, by deduction, dam construction and land husbandry improvement, do not require development consent in the zone, the proponent in this instance has declared that his primary purpose is generally related to extraction. He therefore seeks formal approval of this aspect of the works.



PHOTOGRAPH 1 General site layout,
looking east from Old Northern Road.



PHOTOGRAPH 2 General site layout,
looking west from the knoll.

The geological deposit and extractive industry potential of part of the Maroota area have been canvassed by the Sydney Regional Environmental Study - Extractive Industry and specific regulations relating to the area have been released with the gazettal of the associated Regional Environmental Plan (R.E.P.). The aims of this plan include, amongst others:

- "(a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area and to keep the costs of supplying extractive materials to the community to a minimum - ...

- (d) to ensure that extractive industries are carried out in an environmentally acceptable manner.

Schedule 3(n) of the Regulations to the Environmental Planning and Assessment Act, 1979, list extractive industry as a form of designated development. The activities to be undertaken on Portion 63 fall into this category and thus, an Environmental Impact Statement is required to accompany the development application.

In keeping with the aims of the R.E.P. which does not specifically refer to Portion 63, this Statement addresses the current and potential impacts of the extraction process and, where these impacts are significantly negative, recommends procedures to mitigate undesirable effects.

SUMMARY OF PART 1 - SITE INFORMATION

The Hawkesbury Sandstone-based hills of the Maroota District support both rival land uses and significant deposits of marketable fine aggregate sand. Portion 63 is representative of many small land holdings in this area and supports several market garden plots, a small orchard and sufficient sand to justify its sale during property improvement works.

Sand extraction operations commonly generate intense controversy. With its publication of Sydney Regional Environmental Plan "Extractive Industry" the Department of Environment and Planning has formulated an environmentally acceptable rational approach to the satisfaction of community demand for building materials. This plan identifies the Maroota District as being a significant source of sand for the Sydney market and this extraction should be encouraged if it is carried out in an environmentally acceptable manner.

PART 2 PROPOSAL OBJECTIVES

SECTION 4 MAJOR DEVELOPMENT OBJECTIVES.

The applicant has nominated the following three major objectives of the extraction process:

1. To ensure that a permanent supply of water is available on the site for the irrigation of market vegetables which will be planted once rehabilitation measures are well under way.
2. To recontour the land to a flatter profile more suited to market gardening, and
3. To operate an extractive industry.

In achieving these three objectives a quantity of about 188000 tonnes of marketable fine aggregate will be produced. This sand is in high demand in the Sydney Metropolitan area and its marketing is considered to be an appropriate and efficient use for this product.

Mr. Daniel is familiar with the environmental problems associated with extractive activities and has developed certain environmental safeguards to be incorporated into the project. These safeguards are designed to:

1. Minimise noise, visual and siltation effects associated with the extraction process.
2. Ensure the land is rehabilitated to a usable form once extractive activities have ceased, and
3. Maximise the efficiency with which extraction and product preparation is undertaken.

SECTION 5 REHABILITATION OBJECTIVES

Sand extraction is not an end use for the land comprising Portion 63. The owner wishes to enhance the agricultural potential of his land and thus the rehabilitation measures to be taken are designed to realise this potential.

It is envisaged that the rehabilitation programme will be a progressive one, i.e. the measures undertaken to create market gardens will follow extraction when sufficiently large areas of land are available. Rehabilitation of lands not to be converted into market gardens will be undertaken to prevent erosion.

SECTION 6 EXCAVATION AND PRODUCTION OBJECTIVES

The current excavation rate averages about 150 tonnes per day. Mr. Daniel operates the site with no assistance and wishes to remain a one-person operator. He has removed about 8,000 tonnes to date and intends to extract another 180,000 tonnes (estimated) before the land is contoured to its final form.

At present the demand for the resource product is good and barring contraction in the building industry the rate of sand production should not decline. Mr. Daniel has no plans to expand the production rate on this site.

As the excavation site enlarges, rehabilitation will progressively follow and the opportunity for the planting of market gardens will avail itself as sand extraction continues.

The project is not a large or highly capital-intensive operation. The sand requires minimal processing. All the plant is mobile and will be removed from the site when rehabilitation is complete.

SUMMARY OF PART 2 - PROPOSAL OBJECTIVES

The extraction operation achieves objectives for both the landholder, Mr. Trovarto, and the applicant, Mr. Daniel. Mr. Trovarto wishes to improve the agricultural potential of his property and Mr. Daniel aims to secure employment for about five years. With regard to the latter, the extraction operation will remain a small, one man operation.

The rehabilitation of the land is an integral part of the project with improvements in agricultural quality and the prevention of erosion being the primary objectives.

PART 3 PROPOSAL DESCRIPTION

SECTION 7 THE SAND RESOURCE

The sand to be removed from the site is known in the industry as fine aggregate and consists of a highly weathered quartz dominated sand, derived from the Hawkesbury Sandstone Group. The deposit is white to yellow in colour and with a clay composition in the vicinity of 25%.

The extent and depth of the resource is unknown. Department of Mineral Resources' investigations which have concentrated on the Maroota Sand deposit centred about 3.4 km. to the south, have not extended into this area, (Refer Etheridge 1980).

SECTION 8 SAND EXTRACTION AND PREPARATION TECHNIQUE

The sand is derived from highly weathered sandstone and can be easily excavated using a Komatsu D355A Bulldozer and John Deere 644C front end loader. Thus, no explosives are necessary. Sandstone blocks of varying sizes are removed from the working face and transferred to a sieve and crushing plant which grinds the sandstone into the desired particle size. This sand is then moved along powerscreen mobile rubber conveyors and deposited in small stockpiles about 4 -5 m. high. (See Photo 3.)

Although the exact clay content of the sand is unknown Mr. Daniel has found that a mix of 5:2 parts unwashed to washed sand is acceptable to his consumers. Therefore, about 29% of the sand is washed.

Sand to be washed is placed in a Powerscreen washer (Photo 4) and water is pumped from near the surface of one of the lower two dams at the eastern section of the site. (Photo 5, fig. 3) Runoff from the washing area is directed into the uppermost dam. The washed sand is stockpiled in conical heaps and allowed to de-water.



PHOTOGRAPH 3 Looking north to crushing plant and sand stockpiles.



PHOTOGRAPH 4 Looking east to the washing plant and processing area.



PHOTOGRAPH 5

The three settling ponds on the western edge of the property. The lower two (R.H.S. of photograph) will be amalgamated to form a water supply dam.

SECTION 9 EXCAVATION AND REHABILITATION STRATEGY

Mr. Daniel has commenced extraction on the eastern side of the knoll for two reasons.

1. Runoff can be directed to the dams which are located on the eastern edge of the property, and
2. The knoll is a very effective noise screen.

Figure 4 shows an approximation of the final land form. The details of this form may alter slightly depending on the wishes of the landowner but the generalised slope, from the access mound to the property's southern boundary, will remain.

The noise screening effect of the gradually diminishing knoll will be retained throughout most of the project life. The screen will be removed prior to land contouring.

The top soil associated with the study site has been stockpiled for future application to mined and contoured areas. Prior to topsoil spreading the ground will be deep-ripped to create a relatively deep soil profile and ensure the good draining characteristics essential for market gardening and orcharding. Grasses will be sown to stabilise the topsoil and the planting of market garden crops will follow. This end result will retain the visual and environmental characteristics compatible with the rural surroundings.

The prevention of soil erosion is of paramount importance. Areas not intended for market gardens will be sown with grasses to stabilise the topsoil and prevent the movement of sediments into Coopers Creek.

The two lower settling ponds (refer Figure 3) will be amalgamated to create a relatively extensive water storage body and thus a large supply of irrigation water. The uppermost settling pond will be drained and the land rehabilitated for use as market gardens.

SECTION 10 SAND TRANSPORTATION

10.1 Vehicle Access

Access to the site is via the unmade road described in Section 2.2. Portion 63 shares a common entry onto Old Northern Road with Portion 66 to the south and Portion 59 to the north. Sight lines are 200m. and 300m. for the southern and northern approaches respectively.

The road is constructed of road making base which lowers the potential for dust generation.

10.2 Traffic generation and hours of operation

The average load of sand transported from the site weighs 15 tonnes. Mr. Daniel reported that about 10 trucks per day visit the site thus generating 20 truck movements per day. As Mr. Daniel is the only person working at the site only two private vehicle movements per day are generated.

Sand extraction takes place from about 7:00 a.m. until 3.30 p.m. during weekdays only. It is during these hours that machinery is in operation.

SECTION 11 EMPLOYMENT

Mr. Daniel is the sole operator and worker on the site and does not intend employing any assistants. The transport of sand to market provides work for truck drivers although this employment would not be solely related to Mr. Daniel's operation.

SECTION 12 ENERGY REQUIREMENTS

With the exception of his personal transport all the vehicles and equipment used by Mr. Daniel are diesel powered and the current rate of diesel consumption is approximately 750 litres per week.

SUMMARY OF PART 3 - PROPOSAL DESCRIPTION

There is within the property a pronounced knoll lying sufficiently far from Old Northern Road as to preclude its ready visibility from that road. It is from within this knoll that the sand extraction operation will occur. In order to add to the sight and sound attenuation already afforded by distance from the road and other properties, sand removal will take place from the eastern side of the knoll and will progress steadily towards the barrier afforded by the retained western face. The sand is soft and friable and needs little preparation prior to its transport to Sydney markets via trucking contractors. Rehabilitation of the site will be undertaken by recontouring the land, deep ripping and spreading of topsoil, planting of grasses and the cultivation of crops.

PART 4 THE PHYSICAL AND BIOLOGICAL ENVIRONMENTS AND
IMPACT POTENTIAL

SECTION 13 GEOLOGY OF THE MAROOTA DISTRICT

13.1 Description

The Maroota district lies within the Sydney Region in an area dominated by the presence of two major consolidated lithologies, i.e., the Hawkesbury Sandstones and the Ashfield Shales. At Maroota these units are overlain, on the ridge crests, by a series of sedimentary deposits (refer stratigraphic sequence in table 13.1).

Table 13.1 Stratigraphic Units

<u>AGE</u>	<u>UNIT</u>	<u>LITHOLOGY</u>
Quaternary	Soils	Variable
Tertiary	Unnamed Maroota Sand	Basalt Sand, gravel, clayey sand, and clay
Triassic	Ashfield Shale Hawkesbury Sandstone	Shale and laminite Quartzose sandstone with shale lenses

The Maroota Sands have been systematically investigated by the Geological Survey of the N.S.W. Department of Mineral Resources (Uren 19973, Gobert

1975 and Etheridge 1980). However, little investigation of other important sand sources in the area, including those being worked on Portion 63, has been undertaken.

Portion 63 appears to cover an area of highly weathered Hawkesbury sandstone similar to that occurring further south towards Maroota (see Figure 5). Raw Hawkesbury Sandstone is generally massive with well developed cross bedding and intercalations of shale and siltstone. Bulk grain size is generally in the range of fine to medium sand but sorting is generally poor with some silt and pebble grains being present. The poor sorting is termed well graded in the sand industry and is highly desirable in fine aggregate sand. The weathered rock is white to red-brown in colour. Easy extraction is facilitated by its soft and friable composition. Where the weathered zone has occurred consistently above the water table it is leached, thus being a loose white sandy soil, known as eluvial sand (Etheridge 1980)

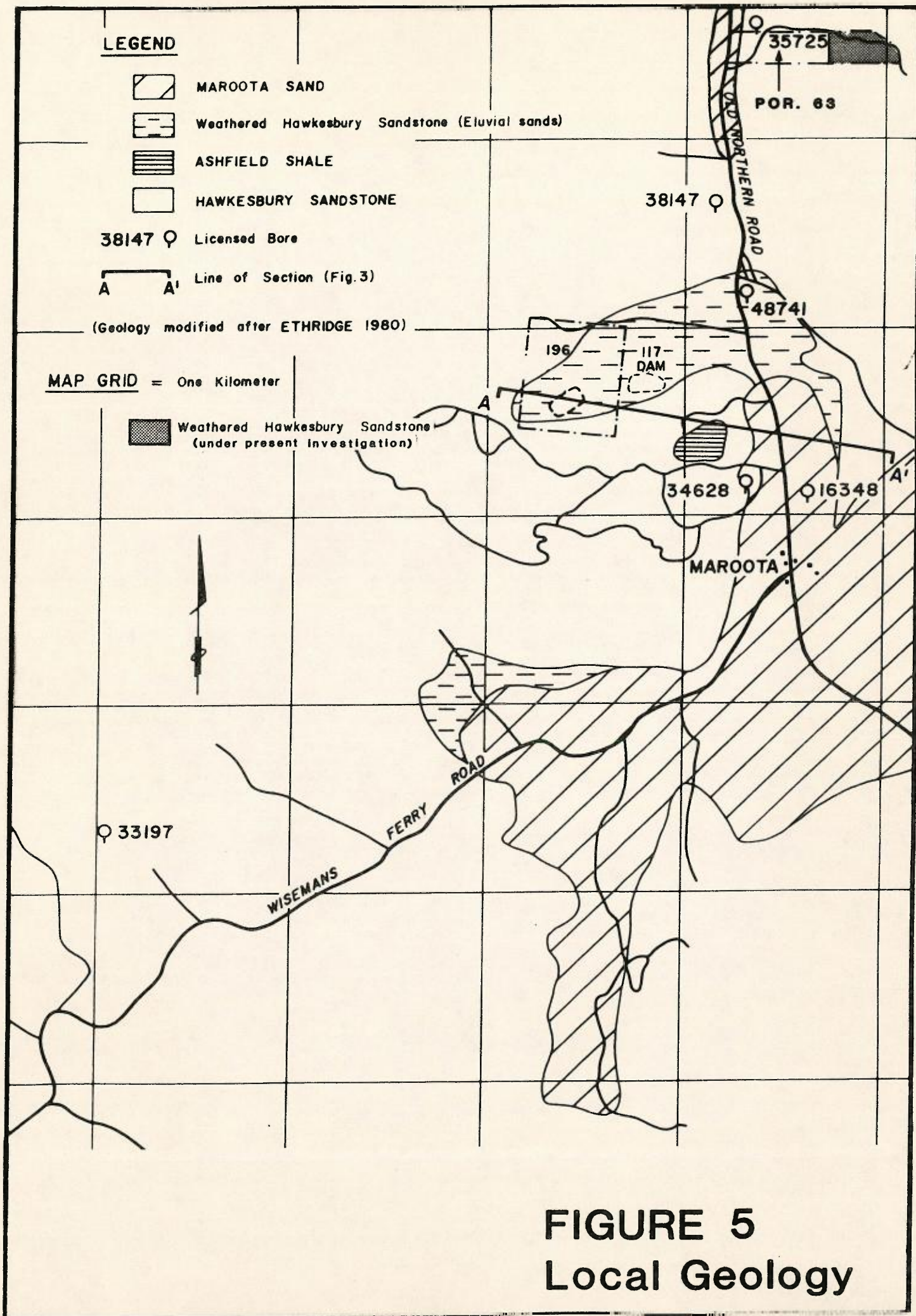
13.2 Impact Potential

The Hawkesbury Sandstones are extremely common in the Sydney region and the loss of the amount proposed will have an insignificant effect on this geologic unit.





SECTION 14 TOPOGRAPHY, DRAINAGE AND LAND SYSTEMS

14.1 Topography and drainage


The topography of the Maroota district is one of undulating hills with incised valleys draining small tributaries into the Hawkesbury River. However, on the Maroota Ridge where unconsolidated sands and heavily weathered sandstones occur this rugged topography gives way to more gently sloping terrain. On the eastern side of Old Northern Road, in the vicinity of Portion 63, Coopers Creek drains several properties (Portions 48, 59, and 66 for example) in the area before entering the National Park.



LEGEND

-  MAROOTA SAND
-  Weathered Hawkesbury Sandstone (Eluvial sands)
-  ASHFIELD SHALE
-  HAWKESBURY SANDSTONE

38147 ♀ Licensed Bore

 Line of Section (Fig.3)

(Geology modified after ETHRIDGE 1980)

MAP GRID = One Kilometer


-  Weathered Hawkesbury Sandstone (under present investigation)

FIGURE 5
Local Geology

The land surface within Portion 63 slopes on a 1:10 gradient eastward from Old Northern Road towards the northern drainage channel of Coopers Creek. In the northern half of the property the land rises up again to form a small knoll comprised of the weathered sandstone subject of this application. South and east of the knoll the land surface falls away and forms part of the headwaters of Coopers Creek.

Runoff from the extraction site is directed into Coopers Creek although there are no well defined tributaries present. The drainage pattern in the area east of the knoll has been heavily disturbed by the extraction activities and the construction of three settling ponds. Runoff from the knoll area is interrupted by a ridge, between Portion 63 and the adjacent property to the south, which directs water to the lowermost settling pond. All dirty water runoff from the extraction site passes through the settling ponds and consequently does not enter Coopers Creek.

Drainage into the site is negligible as the extraction area occupies a small enclosed catchment on the highest ground in the eastern section of the property. (see Figure 3)

Following the cessation of extractive activities and the completion of land rehabilitation there will be little change in the direction of drainage as the flows will be directed towards Coopers Creek (Figure 4). Contouring will ensure that no poorly drained areas or sites prone to erosion will be created.

14.2 Land systems on Portion 63

Portion 63 represents a totally man-dominated land system, the natural landscape having been modified to facilitate agricultural activities. This modification process is continuing.

The major land subsystems present on the site include:-

1. Cultivated land - market garden and orchards rely on water pumped from the existing dams on the property. The plots are contour ploughed to reduce erosion and the orchard plot is planted with grass between the trees to stabilise the soil, (refer Photos 1 and 2).
2. Settling ponds and extraction site - the settling ponds are an integral part of the extraction process. Mr. Daniels' series of three ponds is a very efficient way of reducing the probability of fines reaching Coopers Creek. This entire subsystem is highly disturbed and supports very little vegetation but this is to be expected for the type of activity being undertaken, (refer Photos 5, 6 & 7).
3. Tributary channels of Coopers Creek - these channels, including that marked on the 1:25000 map "Lower Portland" have been heavily modified and are almost obscured by agricultural activities. However, it is likely that drainage tends to follow similar pathways to the undisturbed parts of Coopers Creek.

Thus Portion 63 is a representative example of many properties in the Maroota District and does not comprise any outstanding or unusual landscape or ecologic attributes. The proximity of the National Park and in particular the presence of Coopers Creek dictates that the effects of the extraction are confined totally to the property.

14.3 Impact Potential

One of the end products of the sand extraction operation is the attainment of a land form more suited to the growing of vegetable crops. The removal of the knoll will constitute a major change to the topography of the area but negative effects of such removal will be minimal. The drainage pattern will remain relatively unchanged with runoff still eventually entering Coopers Creek.



PHOTOGRAPH

6

Drainage from excavation site entering the southwestern corner (L.H.S. of photo) of Dam 3. Note the small delta formed where sediment is deposited as water enters the dam.

Drainage from surface layers of Dam 1 into Dam 2.



PHOTOGRAPH

7

SECTION 15 SOILS

15.1 Soil Description

The soil associations of the Maroota district have been poorly studied but are similar to the Somersby soils to the north-east (Murphy et al, in prep.). The generalised soil profile typical of this area is described below.

1. A loose brown acidic sandy loam which occurs as a topsoil. Rock fragments and ironstone nodules may also be present.
2. A yellow earthy sandy clay loam which occurs as a subsoil.
3. A white sandy clay loam which is strongly weathered sandstone bedrock. This is the sand which is being marketed.

The depth of the top two layers varies according to the slope gradient but is generally 10-30 cm. The underlying weathered sandstone may be up to 10m. thick.

15.2 Impact Potential

The Soil Conservation Services notes that this soil type is highly erodable with poor water retention properties and a low nutrient status. However, with suitable fertilisers and lime application they can be quite productive. The major impact on the soil of Portion 63 will be caused during its grooming to a more productive status.

SECTION 16 FLORA AND FAUNA

16.1 Brief Description of Communities

Due to the extent of past cultivation and extractive activities there is very little native vegetation on the site. A small patch of native vegetation of

about 200 sq. m. in area remains at the top of the knoll but it is heavily disturbed by track marks and weeds (Photos 8 and 9). This vegetation has regenerated following clearing of the site about 5 years ago. The remnant vegetation indicates that it was probably similar in its original form to that comprising much of the sandstone country in Marra Marra National Park. Common trees in the park include scribbly gum (Eucalyptus haemastoma), red bloodwood (e. gummifera), Sydney peppermint (e. piperita), smooth barked apple (Angophora costata) and several Banksia and Casuarina species. This association is termed the Hawkesbury Sandstone Complex by Benson (1980).

It is unlikely that any native marsupials inhabit Portion 63. Native vertebrate fauna is likely to be restricted to a few species of birds and possibly some reptiles.

16.2 Impact Potential

The loss of the remaining patch of native vegetation is highly unlikely to have any impact on native flora and fauna in the district as the area is too small to be a viable habitat for a representative sample of the district's biota.

SECTION 17 HYDROGEOLOGIC SYSTEM

17.1 Groundwater in the Maroota District

The Department of Mineral Resources has not identified any groundwater sources near Portion 63 and it is unlikely that the Maroota aquifer persists in this vicinity. Certainly, the excavations undertaken to date have not encountered groundwater and Mr. Daniel does not intend digging any deeper.

According to Etheridge (1980) sand mining can have detrimental impacts on groundwater sources if adequate precautions are not taken. The aquifer in the Maroota district is located to the south of Portion 63 and occurs primarily in the Maroota sand beds. Although the weathered Hawkesbury sandstone is permeable, most groundwater is confined to the Maroota Sands.



PHOTOGRAPH 8 The vegetated area on top of the knoll.
Note the vehicle tracks and piles of soil.



PHOTOGRAPH 9 Highly disturbed nature of the vegetated area.

17.2 Impact Potential

The impact of extraction and rehabilitation on the hydrogeologic system does not appear to be markedly different from those generated by the cultivation activities on the site, i.e. minor alteration of drainage patterns and percolation.

SECTION 18 ACOUSTIC ENVIRONMENT

18.1 Introduction

This section provides the results and findings of studies of the acoustic environment in the immediate vicinity of Portion 63.

The object of the study was to ascertain what impact, if any, the dam construction/extraction activities have on the local acoustic environment.

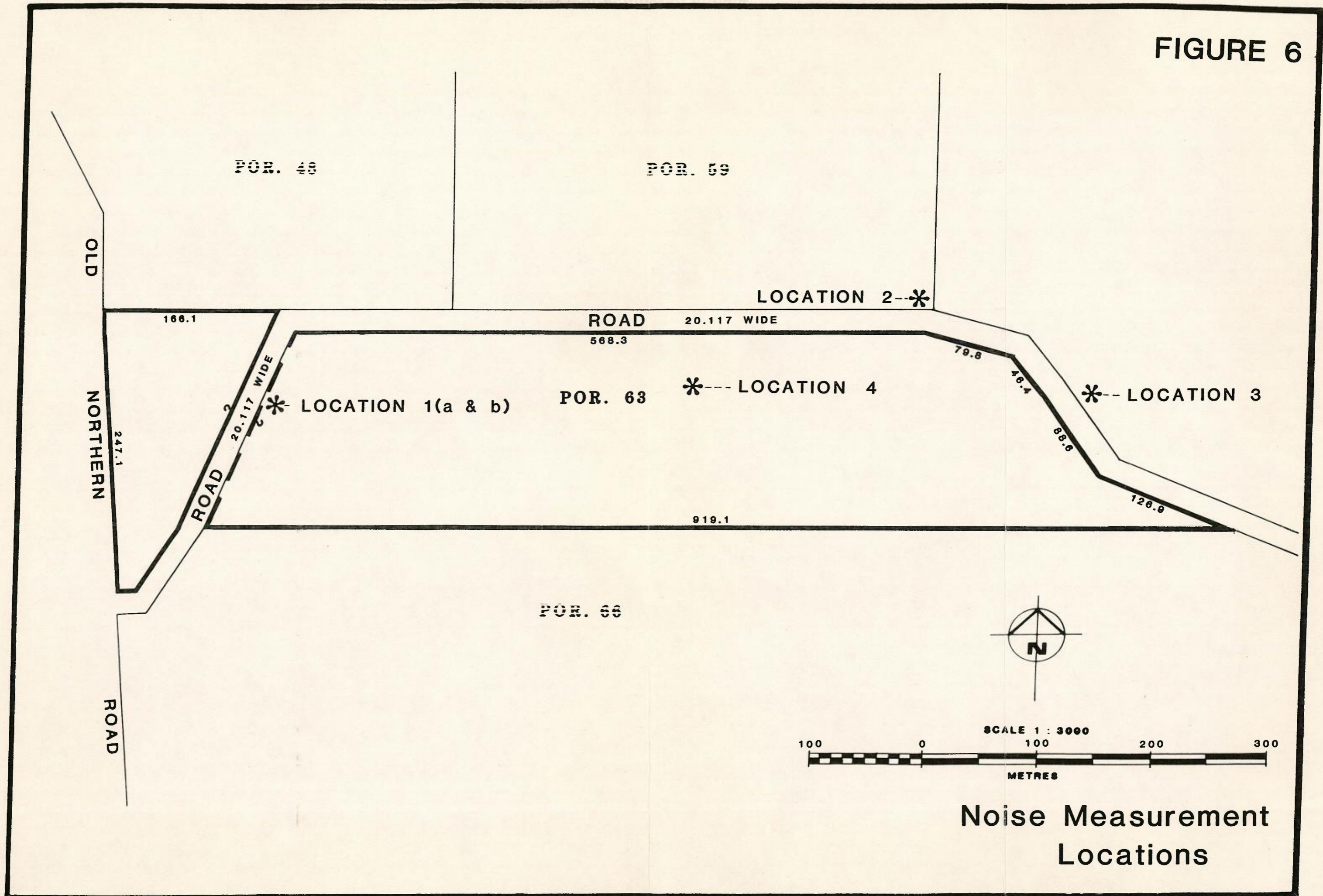
18.2 Methodology

All measurements of sound pressure levels were carried out in accordance with Australian Standards AS1055, 1978 "Noise Assessment in Residential Areas" and the requirements of the State Pollution Control Commission - Noise Control Guide, N1014 "Application for Approval of New Work - Requirements".

Equipment used for sound pressure levels measurements consisted of Bruel & Kjaer Integrating Impulse Sound Level Meter Type 2226. The instruments were calibrated prior to and after measures using a Sound Level Calibrator Type 4230.

Measurements were taken at four locations (Refer Figure 6). Each set of measurements was of 20 minute duration using commulative 60s Leq and then converting this to a 20 minute Leq using standard conversion indices.

FIGURE 6



Noise Measurement Locations

At location 1 (near residence on Old Northern Road) ambient sound pressure levels were monitored during a cessation of operations in the dam pit. The recorded ambient noise levels were frequently punctuated by traffic noise along Old Northern Road.

Sound Pressure Levels (SPL) were also measured at Locations 2, 3, 4 and at Location 1 while dam construction operations were in progress.

By then comparing the SPL's at the four locations and comparing the ambient versus plant-in-operation measurements at Location 1, a direct assessment of the impact which the dam construction contributes to the overall acoustic environment was possible.

18.3 Results

Results of 20 Min Leq Sound Pressure Level Measurements at Four Reference Measuring Locations are presented below in Table 18.1.

Location	Time	20 Min Leq S.P.L. dB(A)	Comments
1A. 500 m. west of excavation site	0940	46.5	All plant off. Plant on neighbouring property operating. Cars on Old Northern Road.
1B.	1230	48.5	All plant operating, including that on neighbouring property. Cars on Old Northern Road.
2. 70 m. north of excavation site	1100	57.5	All plant operating.
3. 130 m. east of excavation site	1130	60.0	All plant operating.
4. 200 m. west of excavation site	1200	49.5	All plant operating.

It should be noted that the measurements obtained probably represent the maximum levels. Although machinery operates throughout most of the day, the period when all plant is operating is restricted to about 2-2½ hours in the middle of the day.

Three trucks passed within 10 m. of the recording instrument during two of the recording periods. Peak SPL's of 80+ dB(A) were recorded but this level declined rapidly as the distance between the truck and the instrument increased.

18.4 Outline of Acoustic Effects and Possible Impact

The 20 minute Leq sound pressure level (SPL) monitored at Site 1 while extractive operations were in process are approximately 4.5 dB(A) above the measured background level (refer Figure 3.4 of Model No. 2226 Handbook for conversion curve). This is a relatively minor increase in the comparative loudness of the sound and indicates that permanent residents in the area could expect nil to very little noise disturbance associated with the extractive activities on Portion 63. Australian Standard 1055-1978 (Page 14) notes that excesses of 5dB(A) or less may be of marginal significance.

Mr. Daniel's assertion that the knoll is an effective sound barrier is well supported by the SPL figures obtained. There is a dramatic drop in 20 minute Leq SPL on the western side of the knoll where the extraction is screened compared to the eastern side where there is no screening effect.

SECTION 19 THE ATMOSPHERIC ENVIRONMENT

19.1 Potential Effects of Dust

As already stated, Maroota is a well renowned orchard area. The New South Wales Department of Agriculture considers that dust is of greater economic significance to State horticultural production than is any other form of air pollution.

There are three main areas in which substantial dust problems may affect fruit tree growth and cropping. In order of importance these are:-

1. The most severe effect of dust is on the general growth of plants. This is because of the shading effect of the dust on the foliage and the subsequent reduction in the rate of photosynthesis. The direct result of this reduction is firstly in the stunting of vegetative growth and secondly in the reduction of cropping potential in terms of both crop numbers and crop size.
2. The direct relationship between the amount of dust on the foliage and the incidence of significant numbers of plant sap-sucking insects is well recognised in production horticulture. This relationship, however, does not appear to have been quantified.

The dust has the effect of sheltering both the eggs and the nymphal stages of pests like plant mites and insects such as the aphids and scale insects. It also severely limits the ability of solutions of pesticides to wet the surface of the foliage, thus reducing the effectiveness of such solutions as pest controllers.

3. In the very competitive fresh fruit and vegetable market, it is quality produce which commands a premium. Less attractive crops often attract a price below cost of production.

19.2 Potential dust sources and mitigation procedures

Five main potential sources of dust have been identified for the dam construction project:-

- . access road
- . excavation site
- . sowing and grading area
- . stockpile area
- . on-site plant tracks and loading areas.

The access road is constructed of road making base and the potential for dust generation is slim. However, if the road deteriorates to the extent that dust becomes a problem, a water truck will be used to dampen the road and reduce the risk.

Excavation activities can generate a considerable quantity of dust if the activities are carried out on dry material. However, the texture of the parent resource, that is, very soft sandstone and coarse sand, results in little dust being raised and dispersed from the excavation area. In addition, the high permeability of the sandstone encourages water to percolate deep into the weathered profile and thus the extracted sand is quite commonly damp even after periods of low rainfall.

If left for long periods the exposed stockpile sand will tend to dry out and increase its dust generating potential. However, the nature of the marketing of the resource, with the amount of material being extracted depending on demand, results in stockpiled sand being transported off-site before having a chance to dry out. All trucks are required to have their loads covered with a tarpaulin before leaving the site.

At present the generation of a dust problem on Portion 63 does not appear to be evident. Mr. Daniel is aware of some of the techniques used to control dust if it becomes a problem and the stabilisation of dust prone

areas will be undertaken. The Soil Conservation Service (Quilty *et. al.*, 1978) suggest a variety of techniques, including vegetative cover, tillage, barriers and irrigation, all of which could be used on the subject site.

19.3 Climatic Considerations

When considering the dust generating potential of such an operation, it is important to consider the wind conditions, wind being the principal conveyor of dust.

Wind data is available from a gauging station operated by the Bureau of Meteorology at Glenorie Post Office. As Glenorie is located only 20 km. to the south and because the Dam site is situated on a ridge, it is expected that there would be minimal local divergence from conditions experienced at Glenorie.

Figures 7 & 8 displays wind probability roses for both 9 a.m. and 3 p.m. for the three periods, January to April, May to August and September to December and these were then combined to produce annual morning and evening probability roses. It can be seen, for morning breezes, that during the whole of the year the predominant wind direction occurs in a sector between north west and south west with by far the majority of movements rising from the north west arm. For evening breezes, although May to August movements occur generally from between the same north west to south west sectors, the predominant annual movement is from the north-east to south-east sector with the greatest percentage coming from the east.

Due to the size of the sand particles in the subject deposit the wind speed is important in determining the potential for dust to be transported off-site. Tables 19.1 and 19.2 list the average monthly morning and evening winds with average speeds, highest wind speeds and percentage occurrence and prevailing wind direction. This reveals that the winds which will have the most significant potential to transport any dust generated are the strong evening breezes blowing predominantly from the easterly sector.

MONTH	% CALM DAYS	AVE. SPEED WINDS (KM/HR.)	MAJOR WIND DIRECTION	HIGHEST WIND SPEED PER HR. % OCCURRENCE	PREVAILING WIND DIRECTION
JAN.	12	7.25	E	21-30 4%	SW-E
FEB.	14	6.63	SW	21-30 8%	S-SW
MARCH	9	6.65	W	21-30 4%	S-NW
APRIL	10	6.65	NW	31-40 2%	SW-NW
MAY	7	9.22	NW	31-40 1%	W-NW
JUNE	8	8.83	NW	31-40 3%	SW-NW
JULY	7	7.29	NW	21-30 10%	W-NW
AUG.	5	10.23	NW	31-40 6%	SW-NW
SEPT.	7	10.17	NW	31-40 3%	SW-NW
OCT.	7	12.22	NW	41-50 1%	S-NW
NOV.	11	9.85	NW	31-40 3%	S-NW
DEC.	11	10.22	E	41-50 1%	SW-E

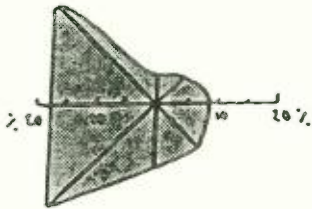
Table 19.1 - 9 a.m. Winds.

MONTH	% CALM DAYS	AVE. SPEED WINDS (KM/HR.)	MAJOR WIND DIRECTION	HIGHEST WIND SPEED PER HR. % OCCURRENCE	PREVAILING WIND DIRECTION
JAN.	-	19.35	E	31-40 9%	NE-SE
FEB.	2	14.10	E	31-40 8%	NE-S
MARCH	-	14.08	E	31-40 3%	E-SE
APRIL	2	10.52	E	31-40 3%	NE-SE & W-NW
MAY	-	11.96	NW	31-40 11%	SW-NW
JUNE	2	12.72	SW	41-50 3%	SW-NW
JULY	-	13.25	W-NW	41-50 1%	W-NW
AUG.	2	17.54	W	51 2%	W
SEPT.	2	17.34	E	41-50 4%	NE-E
OCT.	3	16.66	E	41-50 1%	E
NOV.	2	21.07	E	31-40 24%	E
DEC.	-	23.73	E	41-50 3%	E

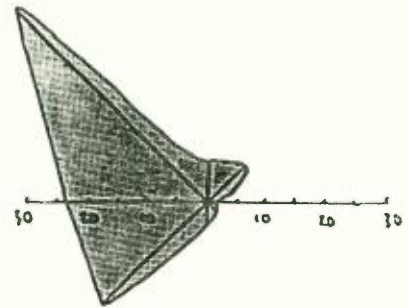
Table 19.2 - 3 p.m. Winds.

FIGURE 7

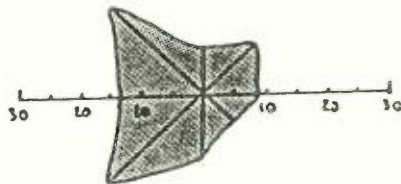
JANUARY TO APRIL



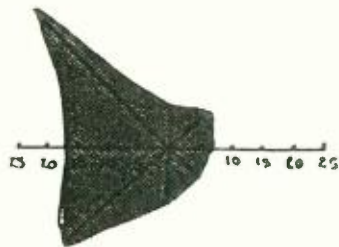
MAY TO AUGUST



SEPTEMBER TO DECEMBER



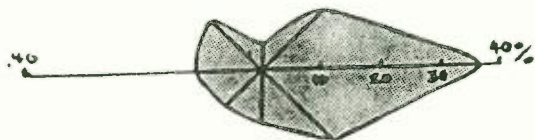
ANNUAL AVERAGE



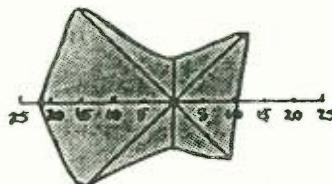
9A.M. WIND DIRECTION
PERCENTAGE PROBABILITY

FIGURE 8

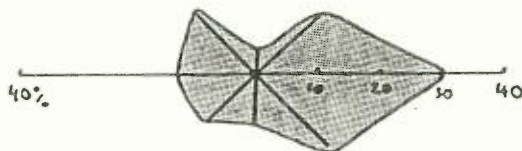
JANUARY TO APRIL



MAY TO AUGUST



SEPTEMBER TO DECEMBER



ANNUAL AVERAGE



3P.M. WIND DIRECTION

PERCENTAGE PROBABILITY

As most of the local agricultural holdings lie south and east of the site, (i.e. upwind of the strongest winds) and because of the relatively coarse-damp nature of the sand, it is anticipated that the project will not generate dust in volumes likely to have significant adverse impact on local land uses.

SECTION 20 ARCHAEOLOGIC INVESTIGATIONS

The long history of agricultural activity on Portion 63 has disturbed the topsoil to a considerable depth and because the extraction operation has already stripped and removed a large quantity of surface material there was little original surface left to inspect. Consequently, the possibility of any archaeological relics being present in the area is extremely low (refer Attachment 3 for a full description).

SECTION 21 SUMMARY OF THE ENVIRONMENTAL EFFECTS OF THE PROPOSED EXTRACTION

Table 21.1 summarises the activities which may have environmental effects of concern and the mitigating procedures currently in place or proposed. It should be noted that some 'impacts' such as topographic change are desired by the landowner and therefore no mitigating procedures are necessary. Other proposed mitigating procedures are conditional on the identification of a significant problem.

Table 21.1 Impact and Mitigative Procedures Summary

Perceived impact	Causes	Impact Magnitude	Current mitigation procedures	Mitigation procedures promised if needed
Loss of native flora & fauna habitats	Clearing of vegetation and disturbance of ground.	Minor	Nil - area of habitat	Not applicable as farming is to be the preferred land use
Topographic modification	Extraction	Major	Nil	Not applicable as topography is being deliberately modified.
Noise Pollution	Operation of machinery	Minor	Operation during daylight hours. Earth bank screen.	
Dust generation	Extraction, traffic	Minor but potentially major	Nil	Application of water to dust source areas
Siltation	Land opened to erosion by wind & water.	Minor but potentially major	All drainage directed into settling ponds	Revegetation, will be carried out before an erosion problem occurs.
Aesthetic (visual) disturbance	A subjective judgment that the visual characteristics are no longer appealing.	Minor but potentially major	Confinement of activity behind the knoll when viewed from Old Northern Road	Planting of vegetation screens

SUMMARY OF PART 4 -THE PHYSICAL AND BIOLOGICAL
ENVIRONMENT AND IMPACT POTENTIAL.

Hawkesbury Sandstone is the dominant lithology in the Maroota District. When weathered, the resultant sand is highly desirable in the building industry. The impact of the proposal on the geology of the District will be negligible.

The topography is controlled by the geology. Where the sandstone is heavily weathered, gently undulating hills are formed in contrast to the steep cliffs and valleys defined in the unweathered sandstone. The extraction area is located in the headwaters of Coopers Creek which drains into the Hawkesbury River after passing through Marra Marra National Park.

The major land system represented on Portion 63 is agricultural with minor areas devoted to extraction and dams. As such, Portion 63 is typical of many surrounding properties.

The combination of three settling ponds and progressive rehabilitation of extracted areas will ensure that the transport of fines into the National Park will be minimised.

Soils developed on Hawkesbury sandstone are generally poor and those at Maroota are no exception. However, with fertilizer application their fertility can be improved and thus will be the major impact of the extraction/rehabilitation project.

A small segment of highly disturbed native vegetation on the site represents the regrowth following clearing about five years ago. Its size and disturbed nature precludes the presence of any significant fauna and the biological value of the area as a whole is extremely low.

The Maroota Aquifer does not exist in the vicinity of Portion 63 and hence the impact of land disturbance on subsurface drainage will be comparable to that within other cultivated areas on the property.

Sound Pressure Levels recorded on the site demonstrated an expected decrease away from the extraction area. This decrease was enhanced by the location of machinery behind the knoll which screens residential dwellings from significant increases in noise levels.

Dust has detrimental effects on agricultural production. The two main dust source areas are the extraction/stockpile site and the access road. The construction materials within the road, coarse sand and road base, result in low probability of dust generation. If dust becomes a problem during prolonged dry periods, water trucks will be used to dampen dust sources.

The site was surveyed by an archaeologist, Dr. Laila Haglund, who reported that the site was so heavily disturbed that there was little probability of any archaeological relics being present in the area.

PART 5 LAND USE, SOCIAL AND ECONOMIC IMPLICATIONS

SECTION 22 LAND USE AND PLANNING

22.1 The Local District

The land in the local district is either in a natural condition or developed for agricultural, rural residential, and/or minor resource extraction purposes. This pattern of land use is expected to continue in the foreseeable future.

The Cattai - Maroota area is already the focus of small resource extraction operations which appear to be reasonably successful and acceptable in terms of environmental impact.

As discussed in Part 4 the works associated with construction of this isolated dam, and the land recontouring which will follow are not expected to have any significant negative impact upon, or compromise the economic viability of, existing or future land uses in the district.

22.2 Present and Future Land Use

In a report entitled "Extractive Industry in the Hawkesbury Region" the S.P.C.C. (1977) stated that

"... as far as possible sand and gravel extraction be confined to areas where optimum resource utilization can be achieved with least environmental impact. In these areas the operations should be coordinated so that they are planned, programmed and concluded to minimize overall environmental problems and create areas that can be put to useful purposes as quickly as possible".

This point is reiterated in the recent report by the SPCC, "Water Quality in the Hawkesbury-Nepean River". (1983)

This extraction project has all the qualities required to satisfy the above Government recommendations.

- . The extraction is being undertaken in an area of negligible ecological and archaeological significance and thus the potential for significant negative environmental impacts is low.
- . Dam construction and land re-contouring will dramatically increase the agricultural potential of this site by increasing the total water supply available to the entire property. In addition, the Department of Agriculture has recognised the importance of conserving quality agricultural land for future generations. However, these lands need to justify their economic existence in order to avert pressures for rezoning to alternate land uses.

22.3 Impact on the Local Area

Due to the isolation and nature of the extraction operation, and for reasons discussed in Part 4, it is not expected to significantly impact upon or compromise the viability or economics of existing or future land uses in the district.

The extraction project will not generate chemical or sedimentary pollutants capable of causing deterioration of water quality in Coopers Creek and Marra Marra National Park. Three settling ponds which are an integral part of the extraction process act as sediment detention basins which effectively reduce off-site movement of any material. (Photos 5, 6 and 7)

Acoustic, atmospheric and visual impacts will be minor and will not significantly affect the amenity of the local rural area or the lifestyle of its residents.

SECTION 23 TRANSPORTATION SYSTEM

23.1 Sight Lines and Safety Considerations

Although Old Northern Road is capable of carrying relatively large vehicles, its twisting and winding nature necessitates special consideration of the safety aspects affecting all road users.

The access road to Portion 63 leaves Old Northern Road to the right (as one faces north) towards the southern end of a straight stretch sagging about 10 metres in the middle. Both the northern and southern approaches are corners.

Sight distances to north and south were measured according to guidelines presented in NAASRA (1979, 1980) at 300 metres and 200 metres respectively.

These sight-lines were assessed according to the following criteria.

1. A truck turning across traffic or entering traffic needs at least ten seconds to move from rest to a position fully clear of any danger. A car travelling at 100 km/hr. covers almost 280m. in ten seconds. Hence the safe sight distance almost 280m.
2. A car or truck following the truck decelerates according to the formula

$$D_s = \frac{RT}{3.6} + \frac{V^2}{254f.}$$

where D_s = stopping distance in metres
 f = equivalent uniform longitudinal stopping distance
(in gravities)
 R_T = driver reaction time (seconds)
 V = initial speed of vehicle (klm/hr.)

For the purposes of this calculation the variables given the values as follows:

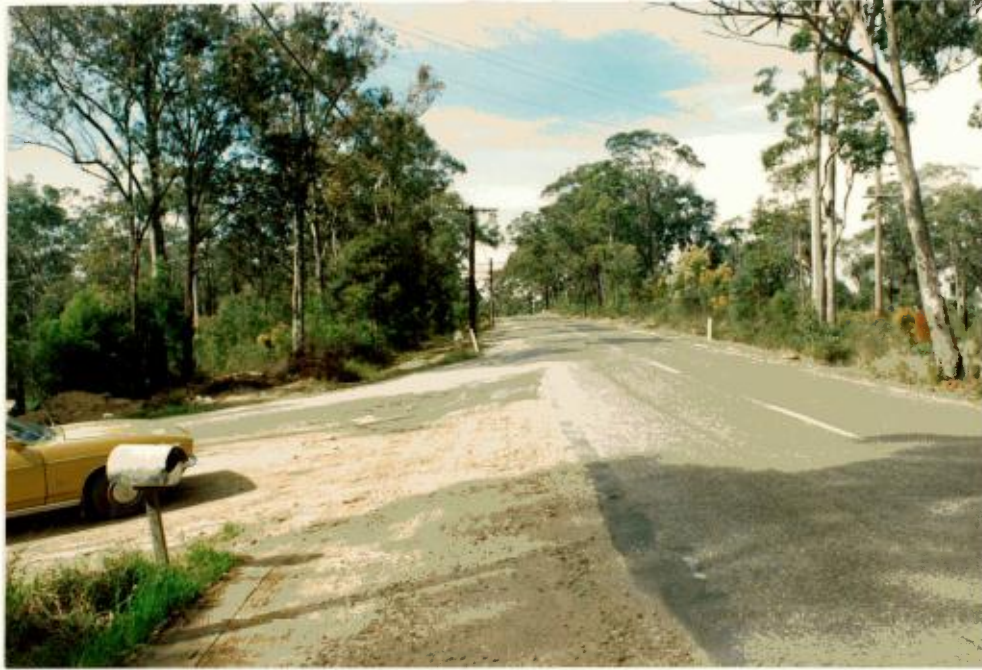
f = 0.4 (refer Table 5.1, NAASRA 1980)
 R_T = 1.5 (an appropriate reaction time for a winding road)
 V = 100 km/hr (maximum car speed limit)

These values yield a stopping distance value of 140m., i.e. well within the 200m. sight distance.

For trucks with a laden weight of 9.5 tonnes or more, the maximum legal speed limit is 80km/hr. Assuming the truck decelerates at one third of the rate of a car travelling at the same velocity (that is 0.5g) the corresponding stopping distance is 185m.

At the intersection in question there are several important points which should be taken into account:

1. Sand trucks travel only south to the Sydney Metropolitan markets when fully laden and hence approach the intersection when unladen from the south;
2. The sand trucks only cross oncoming traffic when unladen and the 10 second/280 metre sight-line is therefore applicable.
3. If the sand truck has to wait for a gap in the oncoming traffic, cars and trucks following from the south need 140m. and 185m. respectively to stop in time.



PHOTOGRAPH 10 Old Northern Road looking south from access road on L.H.S. of photo.



PHOTOGRAPH 11 Old Northern Road looking north from access road on R.H.S. of photo.

The criteria and assumptions presented suggest that the sand trucks generated by this extractive operation will not provide a safety hazard to other motorists on Old Northern Road.

23.2 Traffic Generation

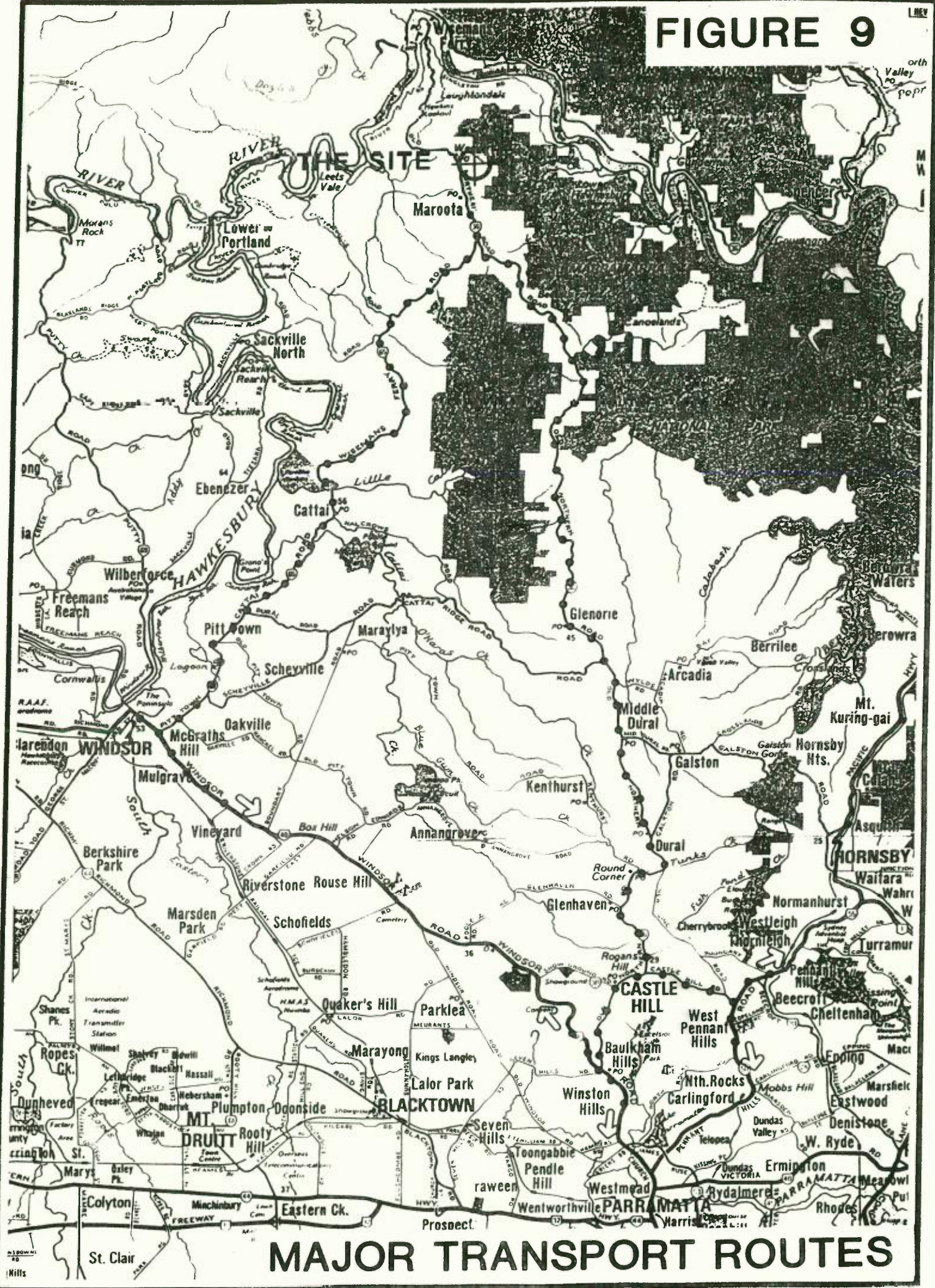
Using present extraction rates as a base line for traffic generation it is expected that loaded trucks will be injected into the Old Northern Road traffic flow at an average rate of 10 trucks per day. Most heavy vehicle movements to and from the site will occur during the period of 7.30 a.m. to 3.30 p.m. on normal working days.

As this section of Old Northern Road already accommodates a relatively low (abt 1800 pd.) volume of traffic the movements generated by this proposal will not significantly increase local traffic volumes (see Table 23.3 at page 36). The Sydney Region transport system, and those responsible for its management, must accept that traffic volumes and truck movements will continue, and probably rise, as the development of urban areas requires resources which often can only be located and supplied from rural areas beyond the suburban periphery. Increases in traffic volumes should not be viewed as undesirable - it is a major function of roads to provide efficient connections between different land uses and between places where natural resources are extracted and used.

Phil Daniels supplies sand to users throughout the Sydney Region and further afield. Trucks transporting this sand use arterial roads and avoid the quieter residential streets of Sydney. (Refer Figure 9)

The operation is not expected to have adverse impact on the local, subregional or regional transport systems. Nor is it likely to cause significant increases in traffic congestion or unsafe traffic movements along Old Northern Road.

FIGURE 9



MAJOR TRANSPORT ROUTES

SECTION 24 MARKET AND ECONOMIC IMPLICATIONS

24.1 Value of the Sand Resource

Taking an average value per tonne of \$8.50 and a recoverable deposit of 188,000 tonnes the value of the resource, at today's prices, is about \$1.6 million. However, this value is a minimum as changes in the price of the sand will occur over the working life of the extraction site. Such changes are unpredictable in such a volatile market.

24.2 Extraction of Sand Resources in the Sydney Region

According to a report compiled by the Department of Mineral Resources in 1980 entitled "Construction Sand Resources for Sydney 1981-2020" (Wallace 1980), the Sydney region faces a potential shortage of some types of construction sand between now and the year 2000 unless a management program is put into practice with appropriate planning controls.

The Sydney region in 1978/79 produced and consumed about 5.1 million tonnes of construction sand, the breakdown being:-

	<u>Tonnes</u>	<u>%</u>
River sand	2.74 mil	54
Dune estuary sand	1.58 mil	31
Mortar bricklayer's sand	0.76 mil	15
	<hr/>	
	5.08 mil	
	<hr/>	

Future demand from the region for the 1981-2020 A.D. period is estimated at:-

	<u>Tonnes</u>
River sand	169 mil
Dune estuary sand	92 mil
Mortar bricklayer's sand	46 mil
	<hr/>
	307 mil
	<hr/>

According to the Department of Mineral Resources' report, the Maroota sand is a mixed deposit containing a very well graded mixture of coarse, medium and fine grained sand. Table 24.1 reveals the identified sources of coarse - medium and fine grained sand in the Sydney Region.

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Newbury
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Although on paper there appear to be adequate reserves, it is emphasised that most of this sand is not presently available for extraction and is emphasised in a quote taken from the Department of Mineral Resources' report:-

"It would appear that for the medium to long term, one or both of the major potential sources, namely Richmond Lowlands or St. Albans, will have to be made available. Alternatively several of the smaller to moderate sized sources such as Maroota, marine aggregate, or dredging the Macdonald River could be made available. Each of these sources has its problems but if nothing is done soon to release one or more of these sources, Sydney could face a severe shortage of this type of sand".

In addition the Department states:-

"Key sources are Penrith Lakes Scheme, Kurnell Peninsula, Richmond

Lowlands and either (or both) Maroota and marine aggregate. These sources, ideally, should be made available for extraction in the future".

Even though the extraction operation which is the subject of this proposal is of a relatively minor scale, the proponent company has established a significant market, consisting of some 30 regular customers. The operation does not appear to conflict with the Department's Regional extraction strategy.

TABLE 23.3 CURRENT ANNUAL AVERAGE DAILY TRAFFIC VOLUMES ON OLD NORTHERN ROAD

LOCATION	AADT
Wiseman's Ferry	1450
Maroota (north of Bay Road)	1800
Maroota (south of Bay Road)	1650
Forest Glen	1540
Glenorie	2660
Middle Dural	6760
Dural (north of Galston Road)	7840
Dural (south of Galston Road)	15920
Dural (west of New Line Road)	12350

Source: DMR 'Traffic Volumes and Supplementary Data - 1983'.

Table 24.1 Sand Resources in the Sydney Region
(Source - Wallace 1980)

PART A SOURCES OF COARSE - MEDIUM GRAINED SAND

SOURCE	ESTIMATED QUANTITY (million tonnes)	CLASSIFICATION	AVAILABILITY
Penrith Lakes Scheme	50	indicated reserves	available
Richmond Lowlands	86	indicated reserves	unavailable
* Maroota	15	indicated resources	unavailable
Nepean River - dredging above Wallacia	5	indicated resources	mostly available
Hawkesbury River - dredging N.Richmond- Wisemans Ferry	(max.)60	indicated resources	mostly available
Colo River - dredging	(max.)20	indicates resources	unavailable
Berowra Creek - dredging	(max.) 3	indicated resources	unavailable
Georges River/ Woronora River	(min.)11	indicated reserves	mostly unavailable
River-dredging Marine aggregate	10	indicated resources	unavailable
Total	260	mostly indicated	mostly unavailable

TABLE 24.1 Sand Resources in the Sydney Region (Contd.)

PART B SOURCES OF FINE - MEDIUM GRAINED SAND

SOURCE	ESTIMATED QUANTITY (million tonnes)	CLASSIFICATION	AVAILABILITY
Kurnell Peninsula	15	indicated reserves	mostly available
Pagewood-Eastlakes area	5	indicated resources	mostly unavailable
Narrabeen Lake/ Middle Harbour	5	indicated resources	mostly unavailable
Richmond Lowlands Macdonald River - dredging and flood over bank deposits	112	indicated reserves	unavailable
St. Albans area	20	indicated resources	unavailable
Marine aggregate	30	indicated resources	unavailable
* Maroota	12	indicated resources	unavailable
Pittwater -	15	indicated resources	unavailable
Port Hacking	(max) 100	estimate only	unavailable
Other sources	unknown	not yet investigated	mostly unavailable

24.3 Agricultural Benefits

As was pointed out in Section 22.2 the Department of Agriculture has recognised the importance of preserving better agricultural land for future generations. However, these agricultural lands need to justify their existence economically to avoid pressure for re-zoning to alternate land uses.

Through the construction of the dam and recontouring of the land on Portion 63, the agricultural potential of the land will be significantly enhanced. Once completed, the dam will ensure that the agricultural pursuits of the Trovartos will become, and remain, economically profitable even during long periods of low rainfall.

SECTION 25 ALTERNATIVES TO THE PROPOSAL

Several alternatives to both the proposal and various aspects thereof have been considered. These include:-

- . 1. Alternative transport routes - these are considered to either cause equivalent problems or to be less efficient than the present routes;
- . 2. Recontouring the land without removing the sand - prohibitively expensive;
- . 3. The "do nothing" option - is, in the opinion of the consultant, equivalent to ignoring the economic potential of the sand resource. In addition the "do nothing" option denies the proprietor of Portion 63 of the opportunity to upgrade the agricultural potential of the property, effectively denying its economic potential.

The fact that the agricultural potential of this property will be significantly upgraded while simultaneously supplying a valuable and necessary raw

material to the Sydney region creates a situation whereby resources are used efficiently with minimal environmental impact. This, in the opinion of the consultant, justifies the extraction and marketing of this resource.

SUMMARY OF PART 5 - LAND USE, SOCIAL AND ECONOMIC IMPLICATIONS

The Maroota District is primarily a rural area with several small extraction projects currently operating. The N.S.W. State Government has identified this general area as being an important source of construction sand for the Sydney region. The future of such extraction projects seems assured.

The small scale of the Portion 63 operation and the attention being given to both minimising negative environmental impacts and promoting rehabilitation, suggests that the benefits of improved agricultural land, water supply and increased financial return outweigh the minor environmental costs.

Careful consideration of the traffic related aspects of the proposal has concluded that the number of extra vehicle movements generated will not be significant. The safety of motorists using Old Northern Road in the vicinity of Portion 63 will not be compromised by trucks entering or leaving the access road.

The increasing scarcity of suitable and accessible fine aggregate sand for the Sydney Metropolitan Area has emphasised the importance of deposits at Maroota and related, accessible areas. The production/non-production of sand from the Maroota District (including Portion 63) has regional as well as local ramifications.

A consideration of alternatives to the proposal suggests that there are no viable counter proposals in which the objectives of the landowner and the applicant are achieved.

SECTION 26 REFERENCES

- Benson, D.H. (1980) Notes accompanying the Vegetation Survey of N.S.W. - Penrith Sheet, (North West Sector Study), National Herbarium of N.S.W.
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Marra Creek State Park. Geol. Surv. of
N.S.W., Dept. of Mines. Rep. No.
GS1973/006.

Wallace, I. (1980)

Construction Sand Resources for Sydney
1981-2020 - Position Paper. Geol. Surv. of
N.S.W., Dept. Mineral Resources, Rep No.
1980/292.

ATTACHMENT 1

Clause 35 consultation with the
Department of Environment and Planning.



Department of Environment and Planning



Colin Donges,
Colin Donges & Associates,
P.O. Box 244,
DURAL. N.S.W. 2158

Remington Centre
175 Liverpool Street, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX. 15 Sydney

Telephone: (02) 266 7111 Ext. 7234

Contact: S. Jones

Our reference: 86/1680

Your reference: B623 CCD:LS

Dear Sir,

PROPOSED EXTRACTIVE INDUSTRY
PORTION 63, PARISH OF FREDERICK, OLD NORTHERN ROAD, MAROOTA

Reference is made to your letter of 7 August, 1986 with regard to the above mentioned proposal. It would now appear that extractive industries are permissible under the provisions of Hornsby LEP 10. Please accept our apologies for any inconvenience or delay our earlier advice may have caused.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Hornsby Shire Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No.1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

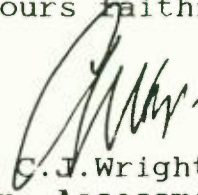
- any possible effects on the nearby Marra Marra National Park eg. depending on location of the extractive industry within Portion 63, visual aspects may be a concern and careful consideration should also be given to proposed soil erosion controls.

4. Attachment No.2 is a guide to the type of information most likely to be relevant to the development you propose; not all of the matters raised therein may be appropriate for consideration in the EIS for your proposal; equally, the guide is not exhaustive.

5. In preparing your EIS you should approach Hornsby Shire Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully,



1/4/86

C.J. Wright
Manager, Assessments Branch
Delegate for the Director

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements:

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation, 1980, as amended, the contents of an EIS shall include the following matters:

- (a) full description of the designated development proposed by the development application;
- (b) a statement of the objectives of the proposed designated development;
- (c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
- (d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
- (e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);
- (f) justification of the proposed designated development in terms of environmental, economic and social considerations,
- (g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
- (g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
- (h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
- (i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Environment and Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.2

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR AN EXTRACTIVE INDUSTRY.

A definition of extractive industry may be found in paragraph (n) to Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, (as amended). These industries are operations undertaken for the purpose of winning sand, gravel, clay, turf, soil, rock, stone or similar substances. The definition of extractive industry specifically excludes coal, petroleum or minerals which are prescribed under the Mining Act, 1973. Extractive industries may take the form of dredging operations, quarrying operations, turf farms or various forms of land excavation etc. Processing of extracted material on the same site as the winning of the material may also constitute an extractive industry.

Extractive industries have prompted considerable public controversy in the past since, among other things, they affect visual amenity, generate heavy vehicle movements, raise dust and cause disturbance through noise and blasting. This is the prime reason for designation of extractive industries under the Environmental Planning and Assessment Act, 1979.

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for extractive industries. It is intended to assist the preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No.1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of an extractive industry. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Environment and Planning to properly understand the environmental consequences of the proposed development.

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

The EIS should address the compatibility of the proposal with any regional strategy for extractive industries in the area and with the provisions of the Local Environmental Plans for existing and proposed development.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved (highlighting any proposed crushing or blasting), disposal of wastes, landscaping and site rehabilitation. A description should also be provided of associated operations such as the transport of materials and use of the end product if likely to have environmental implications.

Particular details that may be relevant include:

- . Characteristics and economic significance of the resource ✓
- . Possible availability of alternative resources.
- . Quantity of materials to be extracted. ✓
- . Methods of extraction / plans of operations. ✓
- . Details of any blasting and/or crushing.
- . Effects of vibrations.
- . Type of machinery and equipment to be used. ✓
- . Expected life of the operation. ✓
- . Number of persons to be employed. ✓
- . Hours of operation. ✓
- . Details of necessary stockpiling. ✓
- . Access arrangements - truck routes, truck numbers etc. ✓
- . Site drainage and erosion controls.
- . Proposals for rehabilitation. ✓

2. Description of the Environment. ✓

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impacts.

Environmental impacts usually associated with extractive industries are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

- . The flow of any affected rivers or watercourses.
- . The effect of the extraction on the sediment transport rate of any affected rivers or watercourses.
- . The bed and bank stability of any affected rivers during and after completion of the operations.
- . Any possible siltation, sedimentation or downstream effects of the operation.
- . Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.
- . Details of floods and any likely effects of the operation on flood liability of surrounding lands.
- . The possible effects of flooding on the operation.
- . Effects on flora and fauna.
- . The agricultural viability of the landholding.
- . Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences.
- . Other impacts of trucking movements, including access over railways and onto highways.
- . Dust nuisance likely to be caused.
- . Effects on water quality of nearby watercourses.
- . Disposal of waste material.
- . Effects on the visual environment.
- . Any likely affectation of sites of Aboriginal archaeological or European heritage value if located in the vicinity of operations.

In addition, any potential for hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- . The State Pollution Control Commission in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- . The Soil Conservation Service regarding appropriate erosion control and rehabilitation procedures;
- . The Department of Agriculture if prime agricultural land may be affected by the proposal; and
- . The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance for the State; the National Parks and Wildlife Service if aboriginal places or relics are likely to be affected.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

ATTACHMENT 2

Councils response to enquiries
eliciting their comments.



THE COUNCIL OF THE SHIRE OF HORNSBY

296 Pacific Highway

HORNSBY

Postal Address: BOX No 37 P.O., HORNSBY 2077
(DX 9655 HORNSBY)

Colin Donges & Associates Pty Ltd
P O Box 244
DURAL NSW 2158

Dear Sir,

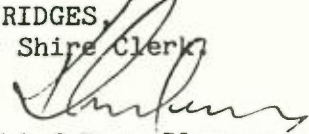
Proposed Extractive Industry, Portion 63, Old Northern Road, Maroota.
Your ref: B623 CCD:LS.

Unfortunately, it appears that a reply has not been made to your request for any details of specific matters to be investigated in the Study for the above proposal. Please accept my apology for the oversight.

However, the matters which the Department has set out appear to cover the matter fully. Council, of course, has on record your letter B618JN:DP of 30th May, which was sent as a result of the meeting on site on 20th May, 1986.

No further matters beyond those set out in the Departments letter, ref:86/1680 received by Council on 5th September, appear to require investigation.

Yours faithfully,
D.F. BRIDGES,
Deputy Shire Clerk.

Per: 
Chief Town Planner.

27th October, 1986

Council ref: T/P 6800/M.P.63
KW:NS

ATTACHMENT 3

Archaeological report

HAGLUND AND ASSOCIATES

Archaeological consultants

1 Cameron St
Balmain NSW 2041
tel 02-8184541

Sydney 21.10.1986

Attention: Duncan Leadbeater

Collin C.Donges, Director,
Collin C.Donges & Associates Pty.Ltd.
P.O. Box 244
Dural, N.S.W.2158

Our ref.: LH/M18

Dear Mr.Donges,

I include a report on my inspection of proposed extractive industry dam construction operation, Portion 63, Parish of Frederick, Maroota. As part of the area has a still relatively undisturbed surface it was necessary to inspect this. It would however be normal - and more useful - to carry out an archaeological inspection before any earthmoving activities take place!

I include two extra prints of each photograph used to illustrate my report and will lend you the negatives if you require further prints. The National Parks and Wildlife Service will need a report with a full set of original prints.

Yours sincerely



Laila Haglund

REPORT ON INSPECTION OF AREA PROPOSED FOR DAM CONSTRUCTION/EXTRACTIVE INDUSTRY, PORTION 63, PARISH OF FREDERICK, OLD NORTHERN ROAD, MAROOTA.

This inspection was commissioned by Collin C. Donges & Associates Pty. Ltd. on behalf of Mr. P. Daniel, who will arrange the dam construction and extraction within the study area which is owned by Mr. Trovarto.

The inspection was carried out 15th October 1986 in good weather and light conditions.

The purpose of the inspection was to assess whether any part or parts of the area proposed for development is likely to contain Aboriginal archaeological material, and to determine whether there is a need for further archaeological investigation. It was understood that little, if any, of the land surface remains undisturbed by recent development.

The study area is situated north of Maroota, off the east side of the Old Northern Road about 1.2km south of its junction with Laughtondale Gully Rd. at Weavers (see map). The access road forms the northern and eastern boundaries of the area, a drainage line to Coopers Creek the western. The southern boundary is defined by a fence line parallel to the northern extent of the access road, and south of this, on the valley floor, there is a belt of natural vegetation with Eucalypts and Casuarina species. To the east there is a sandstone ridge with rock outcrops, some of these forming shelters, and natural, fairly open, bushland.

The study area consists of the major (southern) part of the crest and slopes of a flat-topped, low knoll, parts of the adjoining valley floor and the western foot-slopes of the ridge to the east.

Most of the surface of the study area has been modified in the course of construction of the series of farm dams already present and the levelling to create fields for cultivation. A small area at the top of the knoll has not yet been cut into. This would be included in the future extraction area.

The proposed extraction will involve lowering the knoll by removal of the soft sandstone from the knoll; this and sand from the proposed additional dam area will be removed. The soil will be stock-piled to be spread on the levelled area.

The photographs appended show the modified areas, the small vegetated and unmodified area on the top and examples of rock surfaces within this.

There are several reasonably flat and horizontal rock exposures within the vegetated area, the sort of exposure on which one could expect Aboriginal rock engravings. It was, however, obvious that most of these rocks have been exposed in recent years; they are fairly pale in colour, carry shallow depressions indicating recent root activity and appear to be somewhat unstable. Some are clearly weathering actively. There are a few darker patches which appear to have been exposed for a long period of time.

This interpretation was confirmed by the information that the area was

cleared about five years ago. The present vegetation is therefore mainly re-growth on a reduced soil cover. Two extensive rock ledges on the southern rim of the crest of the knoll, bordering onto the modified area, appear to have been exposed also prior to the clearing. These both have extremely rough surfaces, too rough to be at all likely to carry engravings. In addition, most parts appear unstable.

However, all rock surfaces in this area were inspected in detail for traces of engravings. Each was approached from different angles so that any shadow cast by depressions in the rock would be noted. Nothing was found but for natural features and a profusion of scratch marks (from the clearing?) and track marks due to heavy earth moving equipment. There are several bulldozed tracks through this part. There are also several recent inscriptions cut into a rock surface adjoining the access track on the crest.

In addition, I searched several surfaces that had suffered only shallow disturbance (the northeastern part of the access track and a track along the south border of the area) but found no evidence of past Aboriginal presence.

I concluded that there is no visible archaeological material within the study area, that there is virtually no likelihood of such material being present below the surface and that the area does not warrant further archaeological inspection.

The study area appears fairly unlikely to have had archaeological potential. However, an inspection for Aboriginal sites should be carried out prior to clearing and surface modification, while there is some possibility that archaeological material may be retained, if present. The ridge to the east of the study area appears likely to have archaeological potential and should not be interfered with without prior investigation.

Sydney 16th October 1986



Laila Haglund

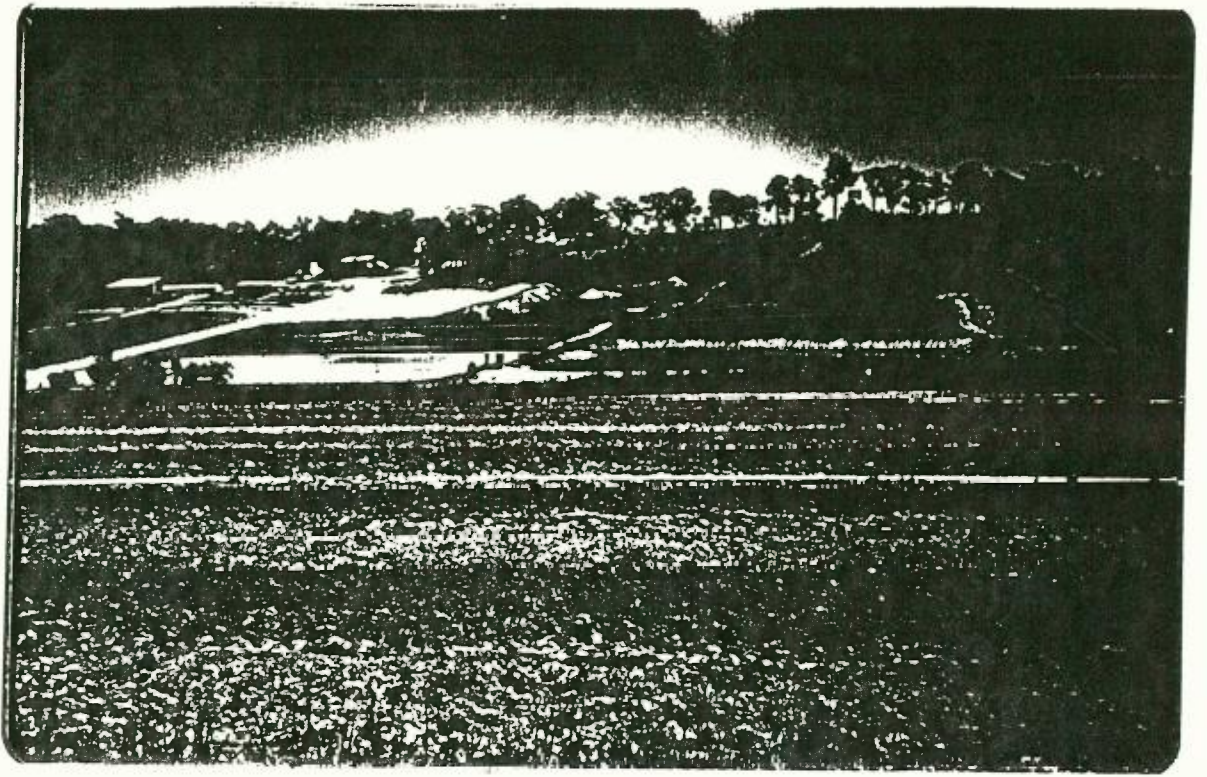


Fig.1 The cultivated area west of the proposed extraction area.
Camera facing south of west.

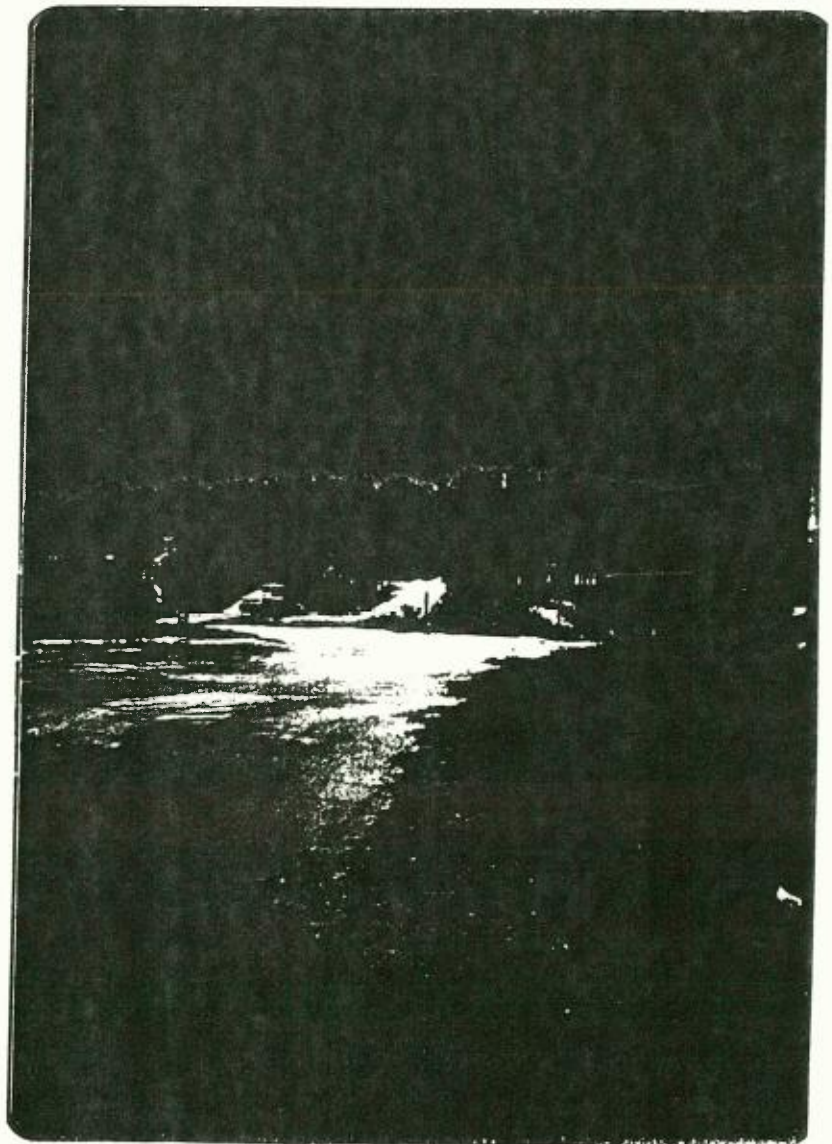


Fig.2 Eastern part of the track forming the northern boundary of
the study area. Looking toward the eastern sandstone ridge.

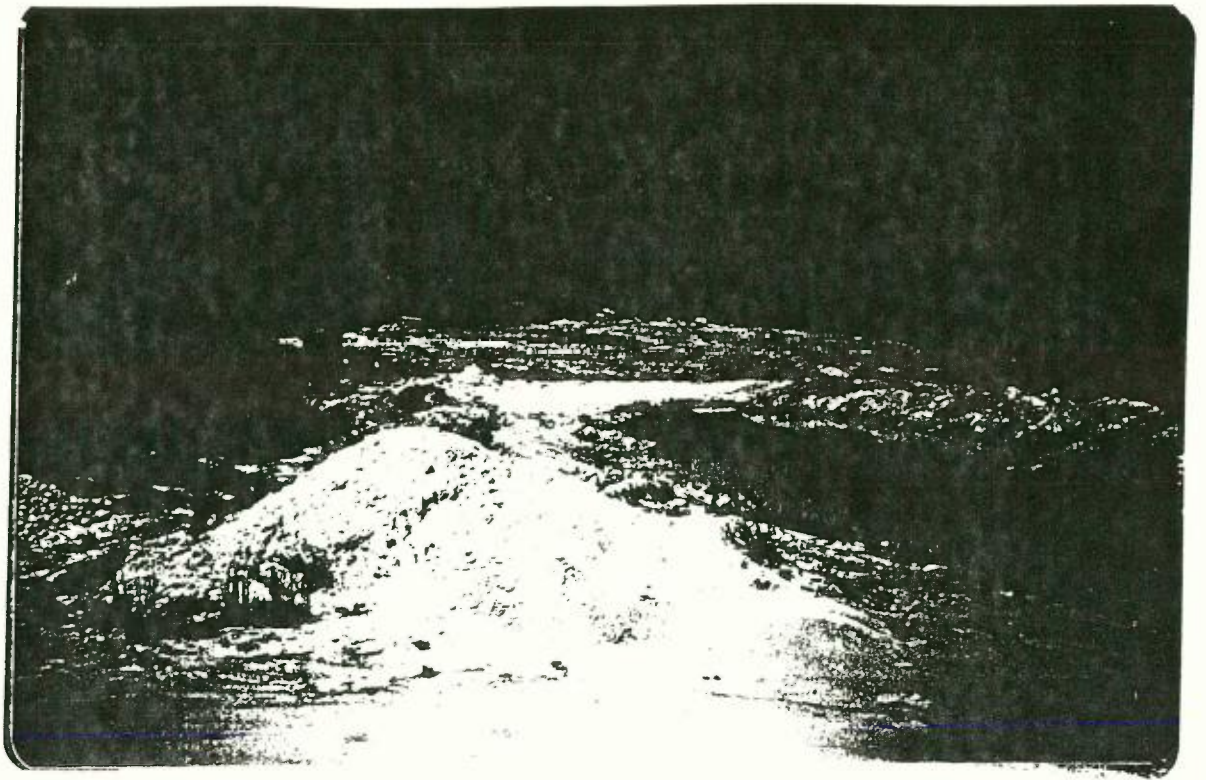


Fig.3 View over upper part of present extraction area and top dam.
Camera facing east.

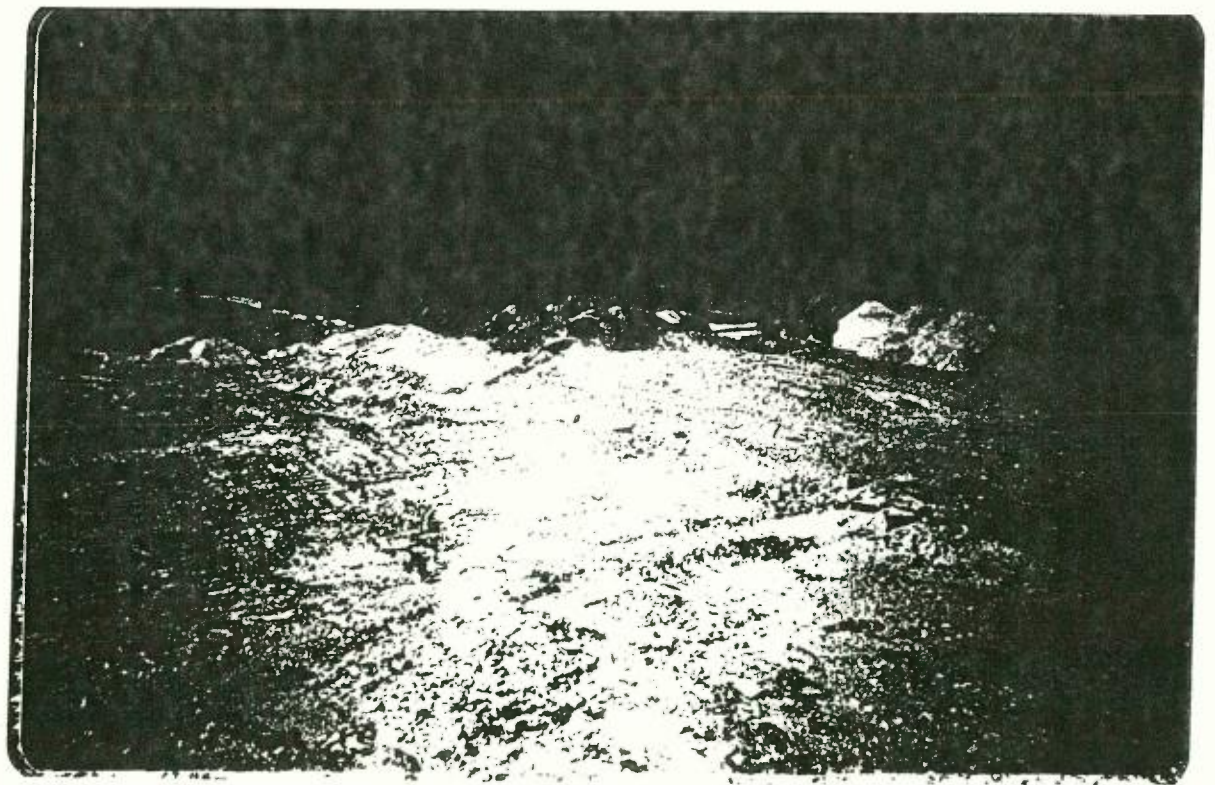


Fig.4 View over lower part of present extraction area and dam.
Camera facing southeast.



Fig.5 View over rockledge on border between present and proposed extraction area (at south end of top of knoll). Note dark colour of ledge. Camera facing northeast.



Fig.6 Closer view of ledge shown in Figure 5. Camera facing southwest.

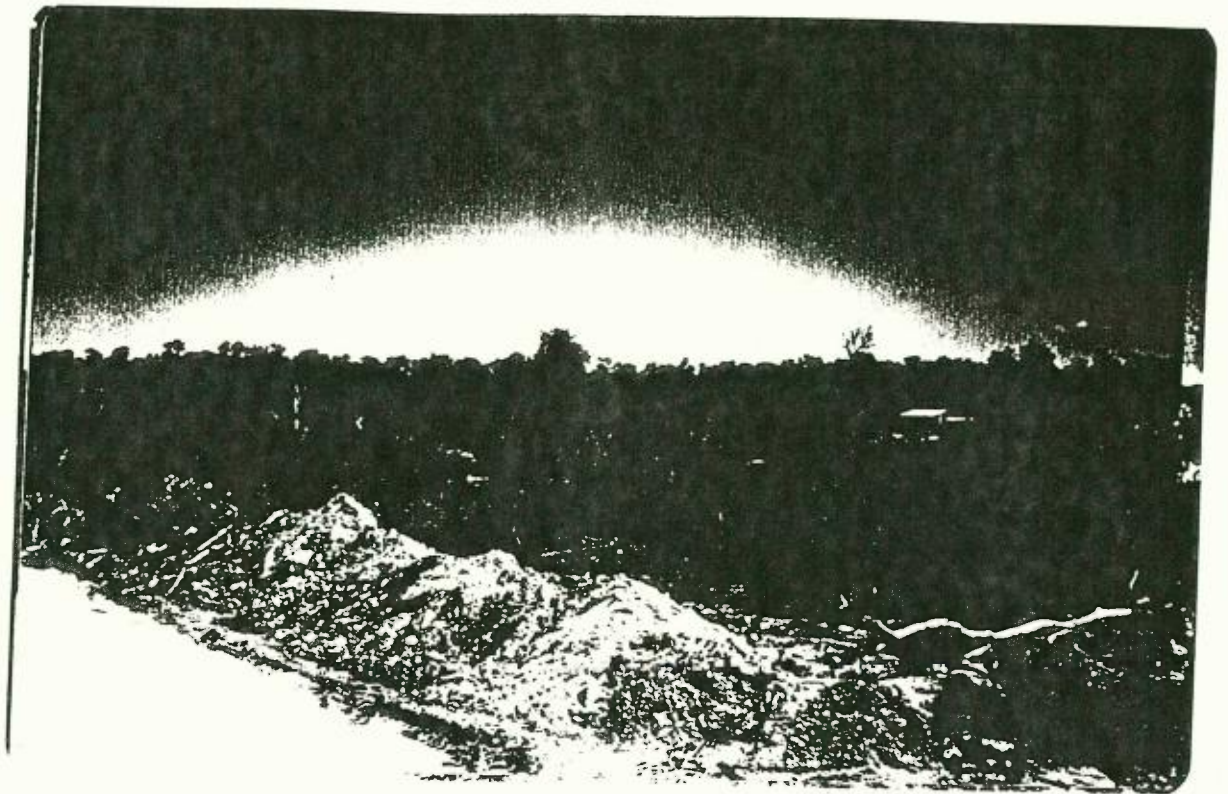


Fig.7 View over proposed extraction area. Note scrubby regrowth after clearing. Camera facing west of south.



Fig.8 Closer view of rock exposure within proposed extraction area. Note pale colour of rock exposed by clearing and small patch of darker rock, probably exposed before this. Camera facing east of south.

ATTACHMENT 4

Contributors

CONTRIBUTORS TO THE ENVIRONMENTAL IMPACT STATEMENT

Project Management

Collin C. Donges
M.I.S. Aust., Dip. T.C.P.,
M.R.T.P.I., F.R.I.C.S., M.R.A.P.I.,
Dip. Enc. Stud., L.G.T.C.P.

Research Compilation

Duncan Leadbitter
B. Sc. (Hons.)

Archaeological Survey

Laila Haglund
Dip. Prehist. (London),
Ph.D. (Stockholm), F.R.A.I.,
M.A.A.C.A.

Graphics

John Nisted

DANIEL, P.

EIS
401

Extractive industry, Portion 63,
Parish of Frederick, County of
Cumberland

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(i)

PREAMBLE

This Environmental Impact Statement has been prepared to accompany a development application, to be lodged with Hornsby Shire Council, and in which consent will be sought for the carrying-out of an extractive industrial operation within Portion 63, Parish of Frederick, County of Cumberland.

Subject Portion, as indicated in the following Regional Location Map, is situated to the east of Old Northern Road and to the north of Wisemans Ferry Road, at Maroota. The shape and dimension of the 16 ha. parcel are shown on a sketch plan, Figure 2, in Part 1 of this document.

Attachment 1 at the end of this Statement is a copy of the Director's Clause 35(2) response to the Clause 35 (1) consultation as previously sought.

This Clause 35 (2) letter, having given notification that the Director has requested careful consideration to be given to soil erosion controls, visual aspects and any possible effects on Marra Marra National Park. In Paragraph 5 it is suggested that Hornsby Council should be approached for any comments which it may have in relation to the proposal. Council was duly consulted by telephone and confirmatory letter. A copy of Council's response is at Attachment 2.

The format followed by this E.I.S. is based on the content of Clause 34 of the Environmental Planning and Assessment Regulation 1980.

COLLIN C. DONGES & ASSOCIATES PTY. LIMITED

A handwritten signature in black ink, appearing to read 'Collin C. Donges', is written over a horizontal line. The signature is cursive and somewhat stylized.

Per: Collin C. Donges.

(ii)

CERTIFICATE
ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (SECTION 77(3)(d)).
ENVIRONMENTAL IMPACT STATEMENT

(i) This Statement has been prepared on behalf of Mr. P. Daniel being the applicant making the development application referred to below.

(ii) The Statement accompanies the development application made in respect of the development described as follows:-

Dam construction and transport of sand from the site.

(iii) The development application relates to the land described as follows:

Street Old Northern Road

Locality/Suburb Maroota

Real Property description Portion 63 Parish of
Frederick, County of Cumberland

(iv) The contents of this statement, as required by clause 34 of the Environmental Planning and Assessment Regulation, 1980, are set forth in the accompanying pages.

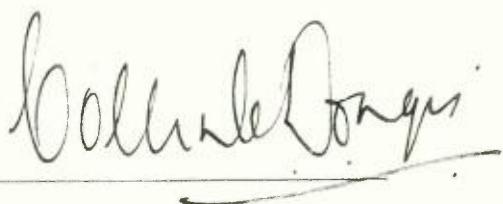
(v) Name, Qualifications and Address of person who prepared Environmental Impact Statement:-

Collin C. Donges, MIS Aust., Dip. TCP., MRTPI, FRICS, MRAPI, Dip.
Env. Stud., LGTCP, Dip. Leis. St., Reg'd Land
Agent

of 939 Old Northern Road, Dural, N.S.W. 2158.

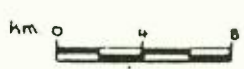
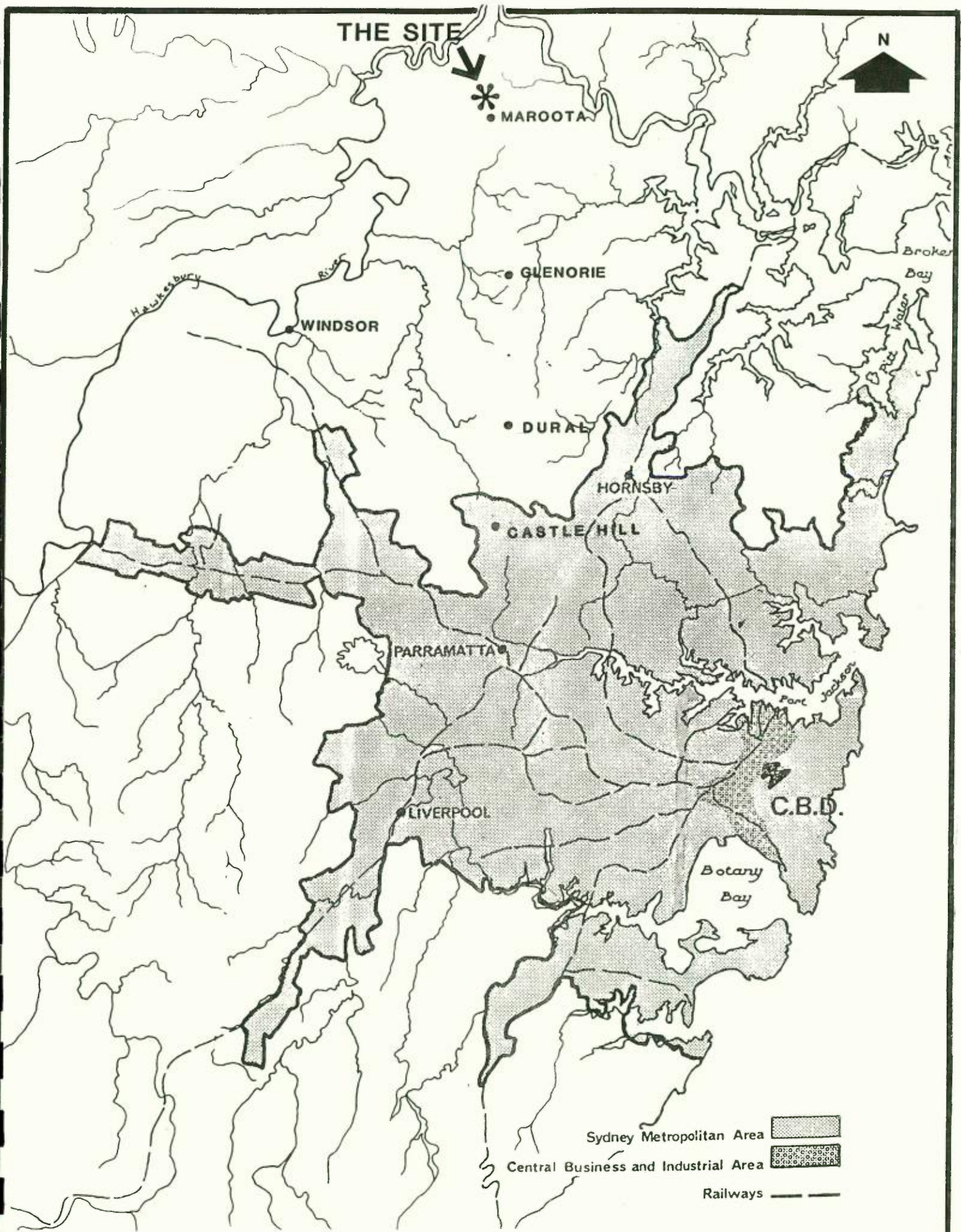
(vi) Certificate

I, Collin C. Donges of Collin C. Donges & Associates Pty. Limited, hereby certify that I have prepared the contents of this Statement in accordance with clauses 34 and 35 of the Environmental Planning and Assessment Regulation, 1980.



Signature

11.11.86



Regional Location

EXECUTIVE SUMMARY

Following is a condensation of the summaries of each part of this Statement. Each such summary is preceded by its part number and title.

1 - SITE INFORMATION

The Hawkesbury Sandstone-based hills of the Maroota District support both rival land uses and significant deposits of marketable fine aggregate sand. Portion 63 is representative of many small land holdings in this area and supports several market garden plots, a small orchard and sufficient sand to justify its sale during property improvement works. (Page 3)

Sand extraction operations commonly generate intense controversy. With its publication of Sydney Regional Environmental Plan "Extractive Industry" the Department of Environment and Planning has formulated an environmentally acceptable rational approach to the satisfaction of community demand for building materials. This plan identifies the Maroota ^{sand deposit} District as being a significant source of sand for the Sydney market and this extraction should be encouraged if it is carried out in an environmentally acceptable manner. (Page 4)

2 - PROPOSAL OBJECTIVES

The extraction operation achieves objectives for both the landholder, Mr. Trovarto, and the applicant, Mr. Daniel. Mr. Trovarto wishes to improve the agricultural potential of his property and Mr. Daniel aims to secure employment for about five years. With regard to the latter, the extraction operation will remain a small, one man operation. (Page 7)

The rehabilitation of the land is an integral part of the project with improvements in agricultural quality and the prevention of erosion being the primary objectives. (Page 7)

3 - PROPOSAL DESCRIPTION

There is within the property a pronounced knoll lying sufficiently far from Old Northern Road as to preclude its ready visibility from that road. It is from within this knoll that the sand extraction operation will occur. In order to add to the sight and sound attenuation already afforded by distance from the road and other properties, sand removal will take place from the eastern side of the knoll and will progress steadily towards the barrier afforded by the retained western face. The sand is soft and friable and needs little preparation prior to its transport to Sydney markets via trucking contractors. Rehabilitation of the site will be undertaken by recontouring the land, deep ripping and spreading of topsoil, planting of grasses and the cultivation of crops. (Page 11)

4 - THE PHYSICAL AND BIOLOGICAL ENVIRONMENT AND IMPACT POTENTIAL.

Hawkesbury Sandstone is the dominant lithology in the Maroota District. When weathered, the resultant sand is highly desirable in the building industry. The impact of the proposal on the geology of the District will be negligible. (Page 27) ?!

The topography is controlled by the geology. Where the sandstone is heavily weathered, gently undulating hills are formed in contrast to the steep cliffs and valleys defined in the unweathered sandstone. The extraction area is located in the headwaters of Coopers Creek which drains into the Hawkesbury River after passing through Marra Marra National Park. (Page 27)

The major land system represented on Portion 63 is agricultural with minor areas devoted to extraction and dams. As such, Portion 63 is typical of many surrounding properties. (Page 27)

The combination of three settling ponds and progressive rehabilitation of extracted areas will ensure that the transport of fines into the National Park will be minimised. (Page 27)

Soils developed on Hawkesbury sandstone are generally poor and those at Maroota are no exception. However, with fertilizer application their fertility can be improved and thus will be the major impact of the extraction/rehabilitation project. (Page 27)

A small segment of highly disturbed native vegetation on the site represents the regrowth following clearing about five years ago. Its size and disturbed nature precludes the presence of any significant fauna and the biological value of the area as a whole is extremely low. (Page 27)

The Maroota Aquifer does not exist in the vicinity of Portion 63 and hence the impact of land disturbance on subsurface drainage will be comparable to that within other cultivated areas on the property. (Page 27)

Sound Pressure Levels recorded on the site demonstrated an expected decrease away from the extraction area. This decrease was enhanced by the location of machinery behind the knoll which screens residential dwellings from significant increases in noise levels. (Page 28)

Dust has detrimental effects on agricultural production. The two main dust source areas are the extraction/stockpile site and the access road. The construction materials within the road, coarse sand and road base, result in low probability of dust generation. If dust becomes a problem during prolonged dry periods, water trucks will be used to dampen dust sources. (Page 28)

The site was surveyed by an archaeologist, Dr. Laila Haglund, who reported that the site was so heavily disturbed that there was little probability of any archaeological relics being present in the area. (Page 28)

5 - LAND USE, SOCIAL AND ECONOMIC IMPLICATIONS

The Maroota District is primarily a rural area with several small extraction projects currently operating. The N.S.W. State Government has identified this general area as being an important source of construction sand for the Sydney region. The future of such extraction projects seems assured. (Page 41)

The small scale of the Portion 63 operation and the attention being given to both minimising negative environmental impacts and promoting rehabilitation, suggests that the benefits of improved agricultural land, water supply and increased financial return outweigh the minor environmental costs. (Page 41)

Careful consideration of the traffic related aspects of the proposal has concluded that the number of extra vehicle movements generated will not be significant. The safety of motorists using Old Northern Road in the vicinity of Portion 63 will not be compromised by trucks entering or leaving the access road. (Page 41)

The increasing scarcity of suitable and accessible fine aggregate sand for the Sydney Metropolitan Area has emphasised the importance of deposits at Maroota and related, accessible areas. The production/non-production of sand from the Maroota District (including Portion 63) has regional as well as local ramifications. (Page 41)

A consideration of alternatives to the proposal suggests that there are no viable counter proposals in which the objectives of the landowner and the applicant are achieved. (Page 41)

PART 1 SITE INFORMATION

SECTION 1 SITE LOCATION

Portion 63, the whole of the land in Certificate of Title Volume 4242 Folio 67, is located in western Hornsby Shire, about 3 km. north of Maroota and approximately 8 km. south of Wisemans Ferry (Figure 1).

The Maroota area is primarily a rural district with farming allotments being confined to the crests of the Maroota Ridge along which Old Northern Road passes in a north-south direction. Portion 63 lies at the head of Cooper's Creek which drains the eastern flank of the ridge and then joins the Hawkesbury River.

East of Portion 63 lies Marra Marra National Park and the dissected Hornsby plateau which supports extensive stands of native forest. The developed land is generally poor and capable of supporting little agriculture without intensive modification.

SECTION 2 SITE DIMENSIONS AND EXISTING DEVELOPMENT

2.1 Dimensions

Portion 63 covers an area of 16 ha. in the shape depicted in Figure 2. The southern boundary measures about 920 m. and the northern boundary 740 m.

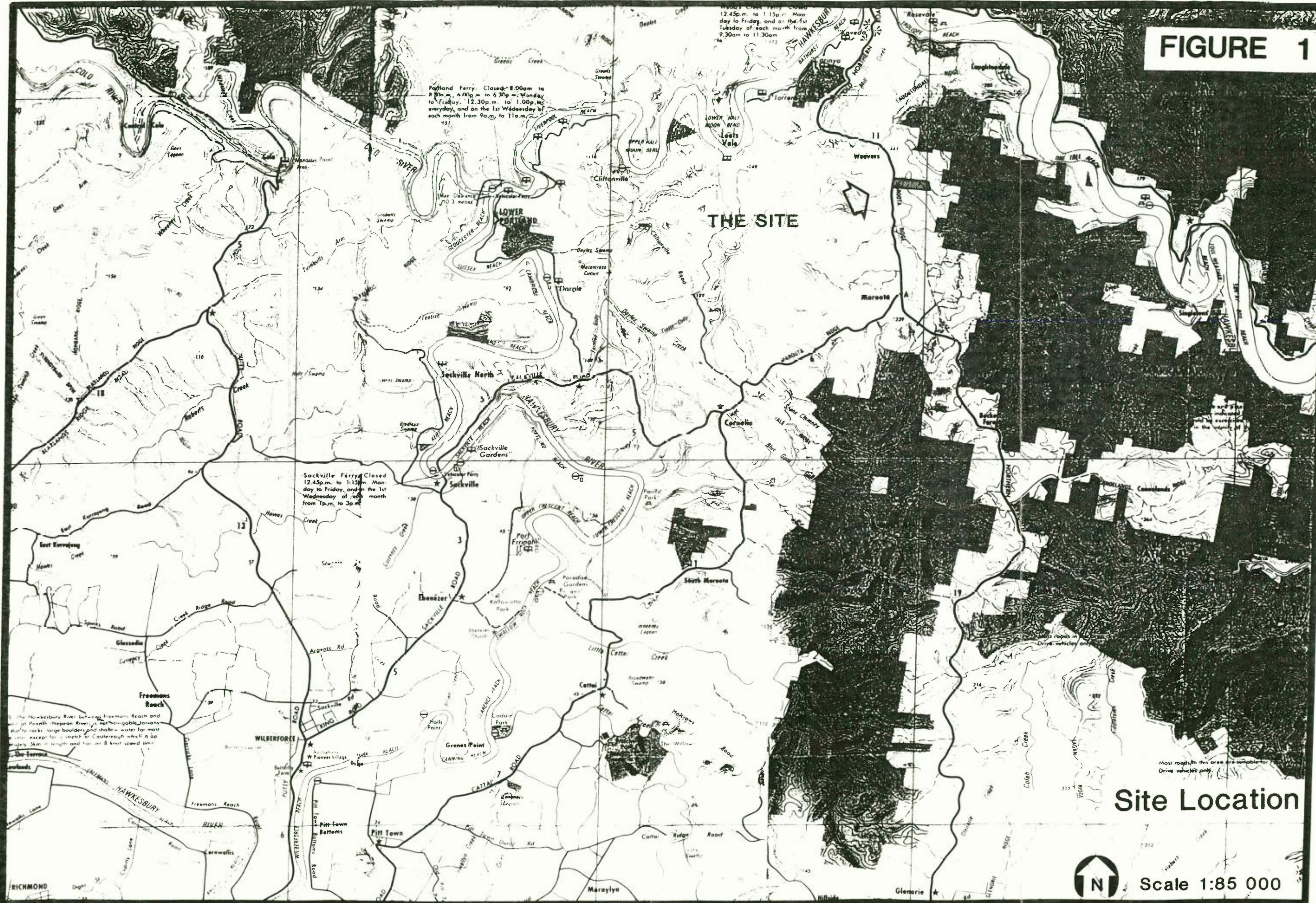
Properties surrounding Portion 63 to the north, south and west are rural holdings of between 16 and 50 ha.

2.2 Existing Development

The land, purchased in 1969 by Mr. & Mrs. J. Trovato, is still occupied by them as joint tenants. A house, garage and several small sheds are located near the access track on Old Northern Road. (Figure 3). The owners are currently tending 4 market garden plots and 1 orchard plot on their holding.

The western section of the property is, at present, devoted to irrigated vegetable cultivation, and some orcharding. (Photos 1 and 2) Three small dams serviced by small pumps supply water for the irrigation.

FIGURE 1

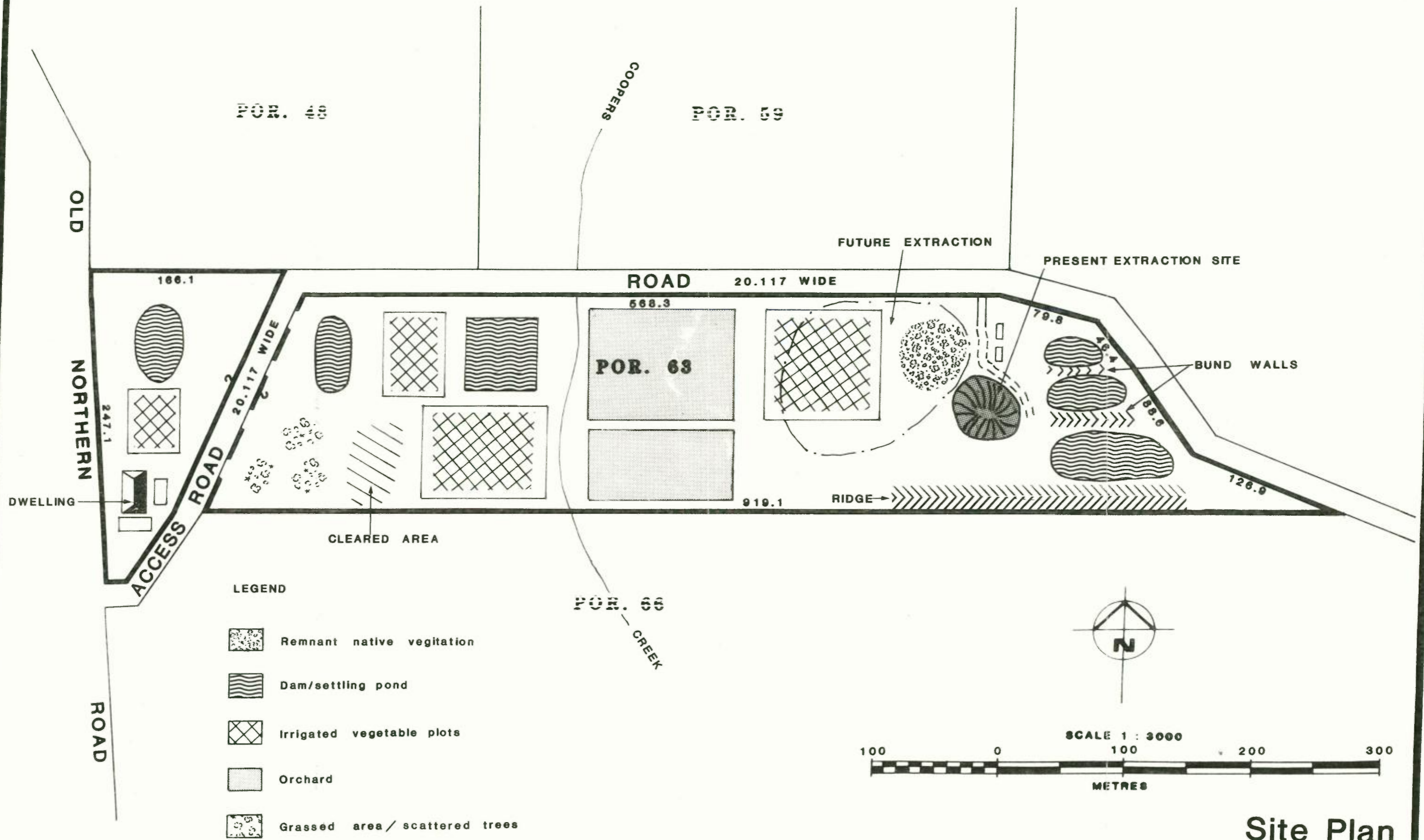







Site Location



Scale 1:85 000

FIGURE 3



- LEGEND
-  Remnant native vegetation
 -  Dam/settling pond
 -  Irrigated vegetable plots
 -  Orchard
 -  Grassed area / scattered trees

INTERNAL LANDUSE DETAIL IS DIAGRAMMATIC ONLY

Site Plan

Sand extraction and dam construction is taking place in the eastern portion of the property and the activities (including three dams, excavation, washing, storage and stockpiling functions) cover about 5 ha.

Access to the site is via an unsealed track that services the extraction area and the buildings located on the property to the north. The track leaves Old Northern Road at the southwestern corner of the property and thence crosses to and parallels the northern boundary. (Refer Photos 1 and 2)

Mr. Daniel, at whose request this E.I.S. has been prepared, was initially approached by the land owner, Mr. Trovato, to construct, with a view to ensuring a greater supply of water on the site and as an initial stage of development, a ground tank within Portion 63. Large quantities of water are needed to 'drought-proof' the property against the devastating effects of prolonged low rainfall as has occurred over several periods in the last decade. Further landscaping of the area is to be undertaken to achieve a land form suitable for the planting of irrigated market gardens. Mr. Daniel has removed, crushed and screened the sand deposits and marketed it to Sydney Region consumers as part of the landscaping goal.

SECTION 3 PLANNING INSTRUMENTS

Portion 63 is zoned Rural C1 under the Hornsby Shire Planning Scheme. The Column V purposes specifying works which may not be carried out exclude extractive industry and thereby dictates that such use may be carried-out with the consent of Council.

Although the deemed L.E.P., contains provision that agricultural uses, including, by deduction, dam construction and land husbandry improvement, do not require development consent in the zone, the proponent in this instance has declared that his primary purpose is generally related to extraction. He therefore seeks formal approval of this aspect of the works.



PHOTOGRAPH 1 General site layout,
looking east from Old Northern Road.



PHOTOGRAPH 2 General site layout,
looking west from the knoll.

The geological deposit and extractive industry potential of part of the Maroota area have been canvassed by the Sydney Regional Environmental Study - Extractive Industry and specific regulations relating to the area have been released with the gazettal of the associated Regional Environmental Plan (R.E.P.). The aims of this plan include, amongst others:

- "(a) to facilitate the development of extractive resources in proximity to the population of the Sydney Metropolitan Area and to keep the costs of supplying extractive materials to the community to a minimum - ...

- (d) to ensure that extractive industries are carried out in an environmentally acceptable manner.

Schedule 3(n) of the Regulations to the Environmental Planning and Assessment Act, 1979, list extractive industry as a form of designated development. The activities to be undertaken on Portion 63 fall into this category and thus, an Environmental Impact Statement is required to accompany the development application.

In keeping with the aims of the R.E.P. which does not specifically refer to Portion 63, this Statement addresses the current and potential impacts of the extraction process and, where these impacts are significantly negative, recommends procedures to mitigate undesirable effects.

SUMMARY OF PART 1 - SITE INFORMATION

The Hawkesbury Sandstone-based hills of the Maroota District support both rival land uses and significant deposits of marketable fine aggregate sand. Portion 63 is representative of many small land holdings in this area and supports several market garden plots, a small orchard and sufficient sand to justify its sale during property improvement works.

Sand extraction operations commonly generate intense controversy. With its publication of Sydney Regional Environmental Plan "Extractive Industry" the Department of Environment and Planning has formulated an environmentally acceptable rational approach to the satisfaction of community demand for building materials. This plan identifies the Maroota District as being a significant source of sand for the Sydney market and this extraction should be encouraged if it is carried out in an environmentally acceptable manner.

PART 2 PROPOSAL OBJECTIVES

SECTION 4 MAJOR DEVELOPMENT OBJECTIVES.

The applicant has nominated the following three major objectives of the extraction process:

1. To ensure that a permanent supply of water is available on the site for the irrigation of market vegetables which will be planted once rehabilitation measures are well under way.
2. To recontour the land to a flatter profile more suited to market gardening, and
3. To operate an extractive industry.

In achieving these three objectives a quantity of about 188000 tonnes of marketable fine aggregate will be produced. This sand is in high demand in the Sydney Metropolitan area and its marketing is considered to be an appropriate and efficient use for this product.

Mr. Daniel is familiar with the environmental problems associated with extractive activities and has developed certain environmental safeguards to be incorporated into the project. These safeguards are designed to:

1. Minimise noise, visual and siltation effects associated with the extraction process.
2. Ensure the land is rehabilitated to a usable form once extractive activities have ceased, and
3. Maximise the efficiency with which extraction and product preparation is undertaken.

SECTION 5 REHABILITATION OBJECTIVES

Sand extraction is not an end use for the land comprising Portion 63. The owner wishes to enhance the agricultural potential of his land and thus the rehabilitation measures to be taken are designed to realise this potential.

It is envisaged that the rehabilitation programme will be a progressive one, i.e. the measures undertaken to create market gardens will follow extraction when sufficiently large areas of land are available. Rehabilitation of lands not to be converted into market gardens will be undertaken to prevent erosion.

SECTION 6 EXCAVATION AND PRODUCTION OBJECTIVES

The current excavation rate averages about 150 tonnes per day. Mr. Daniel operates the site with no assistance and wishes to remain a one-person operator. He has removed about 8,000 tonnes to date and intends to extract another 180,000 tonnes (estimated) before the land is contoured to its final form.

At present the demand for the resource product is good and barring contraction in the building industry the rate of sand production should not decline. Mr. Daniel has no plans to expand the production rate on this site.

As the excavation site enlarges, rehabilitation will progressively follow and the opportunity for the planting of market gardens will avail itself as sand extraction continues.

The project is not a large or highly capital-intensive operation. The sand requires minimal processing. All the plant is mobile and will be removed from the site when rehabilitation is complete.

SUMMARY OF PART 2 - PROPOSAL OBJECTIVES

The extraction operation achieves objectives for both the landholder, Mr. Trovarto, and the applicant, Mr. Daniel. Mr. Trovarto wishes to improve the agricultural potential of his property and Mr. Daniel aims to secure employment for about five years. With regard to the latter, the extraction operation will remain a small, one man operation.

The rehabilitation of the land is an integral part of the project with improvements in agricultural quality and the prevention of erosion being the primary objectives.

PART 3 PROPOSAL DESCRIPTION

SECTION 7 THE SAND RESOURCE

The sand to be removed from the site is known in the industry as fine aggregate and consists of a highly weathered quartz dominated sand, derived from the Hawkesbury Sandstone Group. The deposit is white to yellow in colour and with a clay composition in the vicinity of 25%.

The extent and depth of the resource is unknown. Department of Mineral Resources' investigations which have concentrated on the Maroota Sand deposit centred about 3.4 km. to the south, have not extended into this area, (Refer Etheridge 1980).

SECTION 8 SAND EXTRACTION AND PREPARATION TECHNIQUE

The sand is derived from highly weathered sandstone and can be easily excavated using a Komatsu D355A Bulldozer and John Deere 644C front end loader. Thus, no explosives are necessary. Sandstone blocks of varying sizes are removed from the working face and transferred to a sieve and crushing plant which grinds the sandstone into the desired particle size. This sand is then moved along powerscreen mobile rubber conveyors and deposited in small stockpiles about 4 -5 m. high. (See Photo 3.)

Although the exact clay content of the sand is unknown Mr. Daniel has found that a mix of 5:2 parts unwashed to washed sand is acceptable to his consumers. Therefore, about 29% of the sand is washed.

Sand to be washed is placed in a Powerscreen washer (Photo 4) and water is pumped from near the surface of one of the lower two dams at the eastern section of the site. (Photo 5, fig. 3) Runoff from the washing area is directed into the uppermost dam. The washed sand is stockpiled in conical heaps and allowed to de-water.



PHOTOGRAPH 3 Looking north to crushing plant and sand stockpiles.



PHOTOGRAPH 4 Looking east to the washing plant and processing area.



PHOTOGRAPH 5

The three settling ponds on the western edge of the property. The lower two (R.H.S. of photograph) will be amalgamated to form a water supply dam.

SECTION 9 EXCAVATION AND REHABILITATION STRATEGY

Mr. Daniel has commenced extraction on the eastern side of the knoll for two reasons.

1. Runoff can be directed to the dams which are located on the eastern edge of the property, and
2. The knoll is a very effective noise screen.

Figure 4 shows an approximation of the final land form. The details of this form may alter slightly depending on the wishes of the landowner but the generalised slope, from the access mound to the property's southern boundary, will remain.

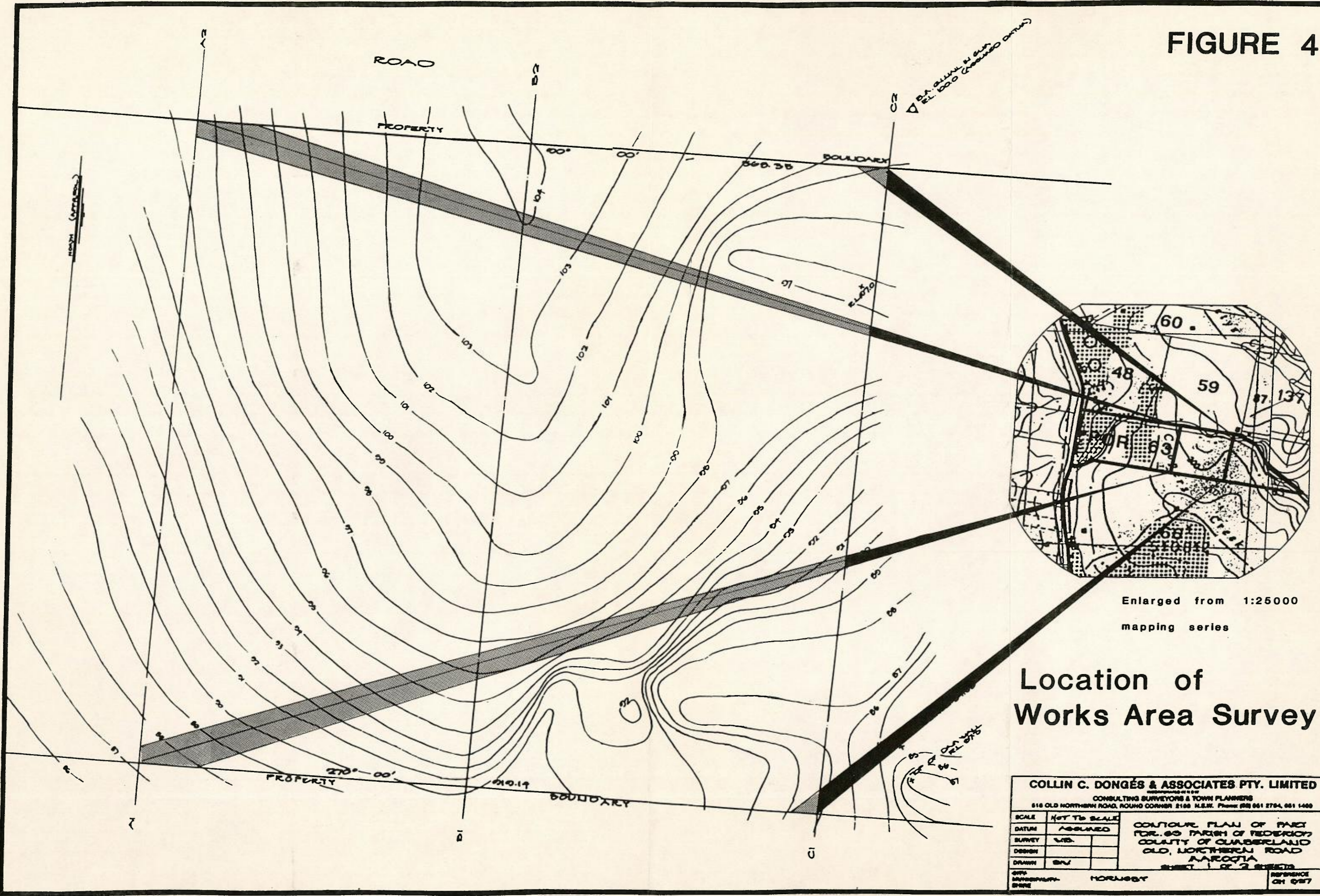
The noise screening effect of the gradually diminishing knoll will be retained throughout most of the project life. The screen will be removed prior to land contouring.

The top soil associated with the study site has been stockpiled for future application to mined and contoured areas. Prior to topsoil spreading the ground will be deep-ripped to create a relatively deep soil profile and ensure the good draining characteristics essential for market gardening and orcharding. Grasses will be sown to stabilise the topsoil and the planting of market garden crops will follow. This end result will retain the visual and environmental characteristics compatible with the rural surroundings.

The prevention of soil erosion is of paramount importance. Areas not intended for market gardens will be sown with grasses to stabilise the topsoil and prevent the movement of sediments into Coopers Creek.

The two lower settling ponds (refer Figure 3) will be amalgamated to create a relatively extensive water storage body and thus a large supply of irrigation water. The uppermost settling pond will be drained and the land rehabilitated for use as market gardens.

FIGURE 4



Enlarged from 1:25000
mapping series

Location of Works Area Survey

COLLIN C. DONGES & ASSOCIATES PTY. LIMITED	
CONSULTING SURVEYORS & TOWN PLANNERS	
518 OLD NORTHERN ROAD, ROUND CORNER 2168 N.E.W. Phone (08) 961 2764, 961 1460	
SCALE	NOT TO SCALE
DATUM	ASSUMED
SURVEY	M.S.
DESIGN	
DRAWN	SW
DATE	
CONTOUR PLAN OF PART FOR. 63 PARISH OF FEDERICK COUNTY OF QUARBERLAND OLD, NORTHERN ROAD PAROOTIA SHEET 1 OF 2 SHEETS	
BY	NORBERT
DATE	01/08/77

SECTION 10 SAND TRANSPORTATION

10.1 Vehicle Access

Access to the site is via the unmade road described in Section 2.2. Portion 63 shares a common entry onto Old Northern Road with Portion 66 to the south and Portion 59 to the north. Sight lines are 200m. and 300m. for the southern and northern approaches respectively.

The road is constructed of road making base which lowers the potential for dust generation.

10.2 Traffic generation and hours of operation

The average load of sand transported from the site weighs 15 tonnes. Mr. Daniel reported that about 10 trucks per day visit the site thus generating 20 truck movements per day. As Mr. Daniel is the only person working at the site only two private vehicle movements per day are generated.

Sand extraction takes place from about 7:00 a.m. until 3.30 p.m. during weekdays only. It is during these hours that machinery is in operation.

SECTION 11 EMPLOYMENT

Mr. Daniel is the sole operator and worker on the site and does not intend employing any assistants. The transport of sand to market provides work for truck drivers although this employment would not be solely related to Mr. Daniel's operation.

SECTION 12 ENERGY REQUIREMENTS

With the exception of his personal transport all the vehicles and equipment used by Mr. Daniel are diesel powered and the current rate of diesel consumption is approximately 750 litres per week.

SUMMARY OF PART 3 - PROPOSAL DESCRIPTION

There is within the property a pronounced knoll lying sufficiently far from Old Northern Road as to preclude its ready visibility from that road. It is from within this knoll that the sand extraction operation will occur. In order to add to the sight and sound attenuation already afforded by distance from the road and other properties, sand removal will take place from the eastern side of the knoll and will progress steadily towards the barrier afforded by the retained western face. The sand is soft and friable and needs little preparation prior to its transport to Sydney markets via trucking contractors. Rehabilitation of the site will be undertaken by recontouring the land, deep ripping and spreading of topsoil, planting of grasses and the cultivation of crops.

PART 4 THE PHYSICAL AND BIOLOGICAL ENVIRONMENTS AND
IMPACT POTENTIAL

SECTION 13 GEOLOGY OF THE MAROOTA DISTRICT

13.1 Description

The Maroota district lies within the Sydney Region in an area dominated by the presence of two major consolidated lithologies, i.e., the Hawkesbury Sandstones and the Ashfield Shales. At Maroota these units are overlain, on the ridge crests, by a series of sedimentary deposits (refer stratigraphic sequence in table 13.1).

Table 13.1 Stratigraphic Units

<u>AGE</u>	<u>UNIT</u>	<u>LITHOLOGY</u>
Quaternary	Soils	Variable
Tertiary	Unnamed Maroota Sand	Basalt Sand, gravel, clayey sand, and clay
Triassic	Ashfield Shale Hawkesbury Sandstone	Shale and laminite Quartzose sandstone with shale lenses

The Maroota Sands have been systematically investigated by the Geological Survey of the N.S.W. Department of Mineral Resources (Uren 1993, Gobert

1975 and Etheridge 1980). However, little investigation of other important sand sources in the area, including those being worked on Portion 63, has been undertaken.

Portion 63 appears to cover an area of highly weathered Hawkesbury sandstone similar to that occurring further south towards Maroota (see Figure 5). Raw Hawkesbury Sandstone is generally massive with well developed cross bedding and intercalations of shale and siltstone. Bulk grain size is generally in the range of fine to medium sand but sorting is generally poor with some silt and pebble grains being present. The poor sorting is termed well graded in the sand industry and is highly desirable in fine aggregate sand. The weathered rock is white to red-brown in colour. Easy extraction is facilitated by its soft and friable composition. Where the weathered zone has occurred consistently above the water table it is leached, thus being a loose white sandy soil, known as eluvial sand (Etheridge 1980)

13.2 Impact Potential





The Hawkesbury Sandstones are extremely common in the Sydney region and the loss of the amount proposed will have an insignificant effect on this geologic unit.

SECTION 14 TOPOGRAPHY, DRAINAGE AND LAND SYSTEMS

14.1 Topography and drainage

The topography of the Maroota district is one of undulating hills with incised valleys draining small tributaries into the Hawkesbury River. However, on the Maroota Ridge where unconsolidated sands and heavily weathered sandstones occur this rugged topography gives way to more gently sloping terrain. On the eastern side of Old Northern Road, in the vicinity of Portion 63, Coopers Creek drains several properties (Portions 48, 59, and 66 for example) in the area before entering the National Park.

LEGEND


-  MAROOKA SAND
-  Weathered Hawkesbury Sandstone (Eluvial sands)
-  ASHFIELD SHALE
-  HAWKESBURY SANDSTONE

38147 ♀ Licensed Bore

A — A' Line of Section (Fig.3)

(Geology modified after ETHRIDGE 1980)

MAP GRID = One Kilometer

 Weathered Hawkesbury Sandstone (under present investigation)

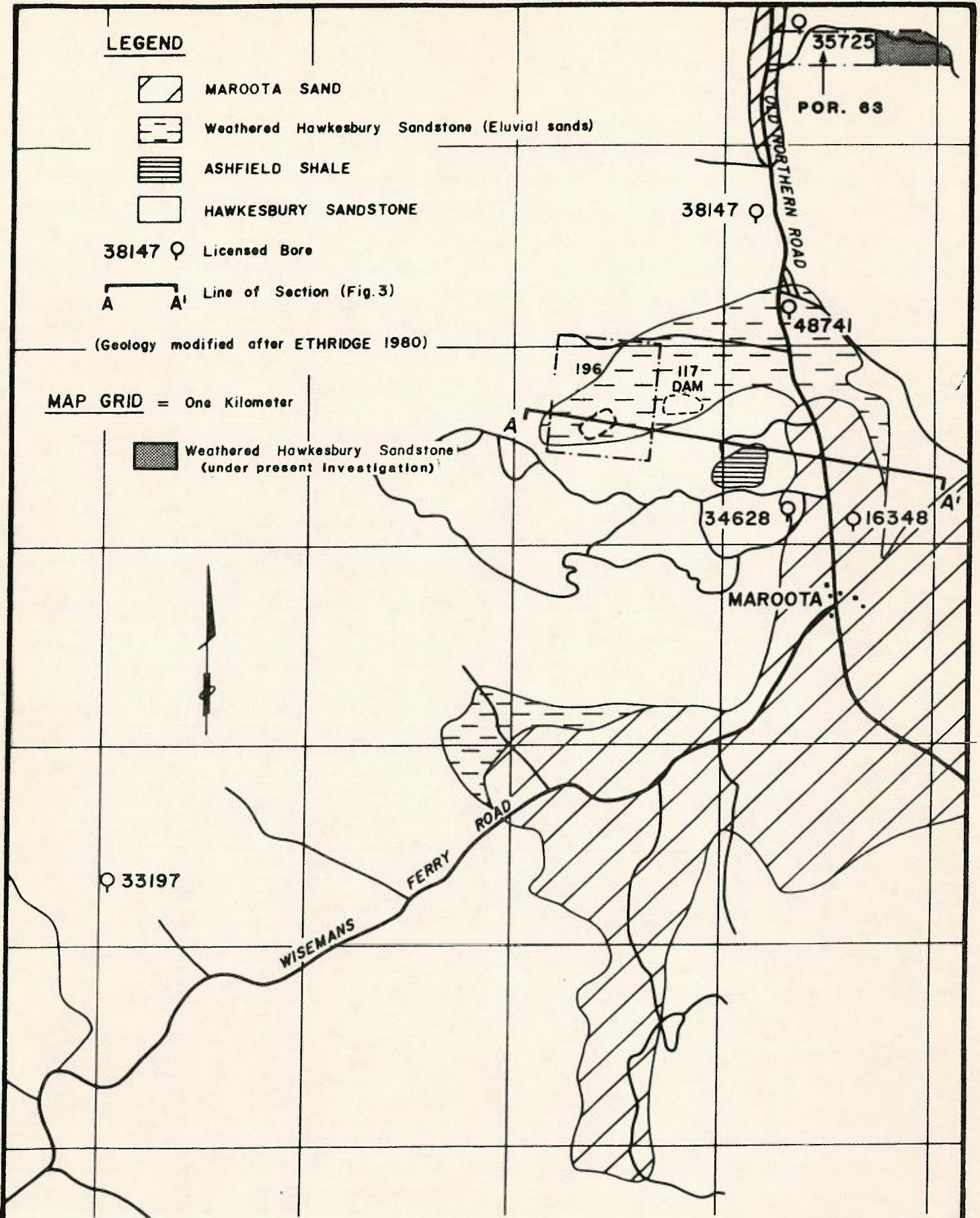


FIGURE 5
Local Geology

The land surface within Portion 63 slopes on a 1:10 gradient eastward from Old Northern Road towards the northern drainage channel of Coopers Creek. In the northern half of the property the land rises up again to form a small knoll comprised of the weathered sandstone subject of this application. South and east of the knoll the land surface falls away and forms part of the headwaters of Coopers Creek.

Runoff from the extraction site is directed into Coopers Creek although there are no well defined tributaries present. The drainage pattern in the area east of the knoll has been heavily disturbed by the extraction activities and the construction of three settling ponds. Runoff from the knoll area is interrupted by a ridge, between Portion 63 and the adjacent property to the south, which directs water to the lowermost settling pond. All dirty water runoff from the extraction site passes through the settling ponds and consequently does not enter Coopers Creek.

Drainage into the site is negligible as the extraction area occupies a small enclosed catchment on the highest ground in the eastern section of the property. (see Figure 3)

Following the cessation of extractive activities and the completion of land rehabilitation there will be little change in the direction of drainage as the flows will be directed towards Coopers Creek (Figure 4). Contouring will ensure that no poorly drained areas or sites prone to erosion will be created.

14.2 Land systems on Portion 63

Portion 63 represents a totally man-dominated land system, the natural landscape having been modified to facilitate agricultural activities. This modification process is continuing.

The major land subsystems present on the site include:-

1. Cultivated land - market garden and orchards rely on water pumped from the existing dams on the property. The plots are contour ploughed to reduce erosion and the orchard plot is planted with grass between the trees to stabilise the soil, (refer Photos 1 and 2).
2. Settling ponds and extraction site - the settling ponds are an integral part of the extraction process. Mr. Daniels' series of three ponds is a very efficient way of reducing the probability of fines reaching Coopers Creek. This entire subsystem is highly disturbed and supports very little vegetation but this is to be expected for the type of activity being undertaken, (refer Photos 5, 6 & 7).
3. Tributary channels of Coopers Creek - these channels, including that marked on the 1:25000 map "Lower Portland" have been heavily modified and are almost obscured by agricultural activities. However, it is likely that drainage tends to follow similar pathways to the undisturbed parts of Coopers Creek.

Thus Portion 63 is a representative example of many properties in the Maroota District and does not comprise any outstanding or unusual landscape or ecologic attributes. The proximity of the National Park and in particular the presence of Coopers Creek dictates that the effects of the extraction are confined totally to the property.

14.3 Impact Potential

One of the end products of the sand extraction operation is the attainment of a land form more suited to the growing of vegetable crops. The removal of the knoll will constitute a major change to the topography of the area but negative effects of such removal will be minimal. The drainage pattern will remain relatively unchanged with runoff still eventually entering Coopers Creek.



PHOTOGRAPH

6

Drainage from excavation site entering the southwestern corner (L.H.S. of photo) of Dam 3. Note the small delta formed where sediment is deposited as water enters the dam.

Drainage from surface layers of Dam 1 into Dam 2.



PHOTOGRAPH

7

SECTION 15 SOILS

15.1 Soil Description

The soil associations of the Maroota district have been poorly studied but are similar to the Somersby soils to the north-east (Murphy et al, in prep.). The generalised soil profile typical of this area is described below.

1. A loose brown acidic sandy loam which occurs as a topsoil. Rock fragments and ironstone nodules may also be present.
2. A yellow earthy sandy clay loam which occurs as a subsoil.
3. A white sandy clay loam which is strongly weathered sandstone bedrock. This is the sand which is being marketed.

The depth of the top two layers varies according to the slope gradient but is generally 10-30 cm. The underlying weathered sandstone may be up to 10m. thick.

15.2 Impact Potential

The Soil Conservation Services notes that this soil type is highly erodable with poor water retention properties and a low nutrient status. However, with suitable fertilisers and lime application they can be quite productive. The major impact on the soil of Portion 63 will be caused during its grooming to a more productive status.

SECTION 16 FLORA AND FAUNA

16.1 Brief Description of Communities

Due to the extent of past cultivation and extractive activities there is very little native vegetation on the site. A small patch of native vegetation of

about 200 sq. m. in area remains at the top of the knoll but it is heavily disturbed by track marks and weeds (Photos 8 and 9). This vegetation has regenerated following clearing of the site about 5 years ago. The remnant vegetation indicates that it was probably similar in its original form to that comprising much of the sandstone country in Marra Marra National Park. Common trees in the park include scribbly gum (Eucalyptus haemastoma), red bloodwood (e. gummifera), Sydney peppermint (e. piperita), smooth barked apple (Angophora costata) and several Banksia and Casuarina species. This association is termed the Hawkesbury Sandstone Complex by Benson (1980).

It is unlikely that any native marsupials inhabit Portion 63. Native vertebrate fauna is likely to be restricted to a few species of birds and possibly some reptiles.

16.2 Impact Potential

The loss of the remaining patch of native vegetation is highly unlikely to have any impact on native flora and fauna in the district as the area is too small to be a viable habitat for a representative sample of the district's biota.

SECTION 17 HYDROGEOLOGIC SYSTEM

17.1 Groundwater in the Maroota District

The Department of Mineral Resources has not identified any groundwater sources near Portion 63 and it is unlikely that the Maroota aquifer persists in this vicinity. Certainly, the excavations undertaken to date have not encountered groundwater and Mr. Daniel does not intend digging any deeper.

According to Etheridge (1980) sand mining can have detrimental impacts on groundwater sources if adequate precautions are not taken. The aquifer in the Maroota district is located to the south of Portion 63 and occurs primarily in the Maroota sand beds. Although the weathered Hawkesbury sandstone is permeable, most groundwater is confined to the Maroota Sands.



PHOTOGRAPH 8 The vegetated area on top of the knoll. Note the vehicle tracks and piles of soil.



PHOTOGRAPH 9 Highly disturbed nature of the vegetated area.

17.2 Impact Potential

The impact of extraction and rehabilitation on the hydrogeologic system does not appear to be markedly different from those generated by the cultivation activities on the site, i.e. minor alteration of drainage patterns and percolation.

SECTION 18 ACOUSTIC ENVIRONMENT

18.1 Introduction

This section provides the results and findings of studies of the acoustic environment in the immediate vicinity of Portion 63.

The object of the study was to ascertain what impact, if any, the dam construction/extraction activities have on the local acoustic environment.

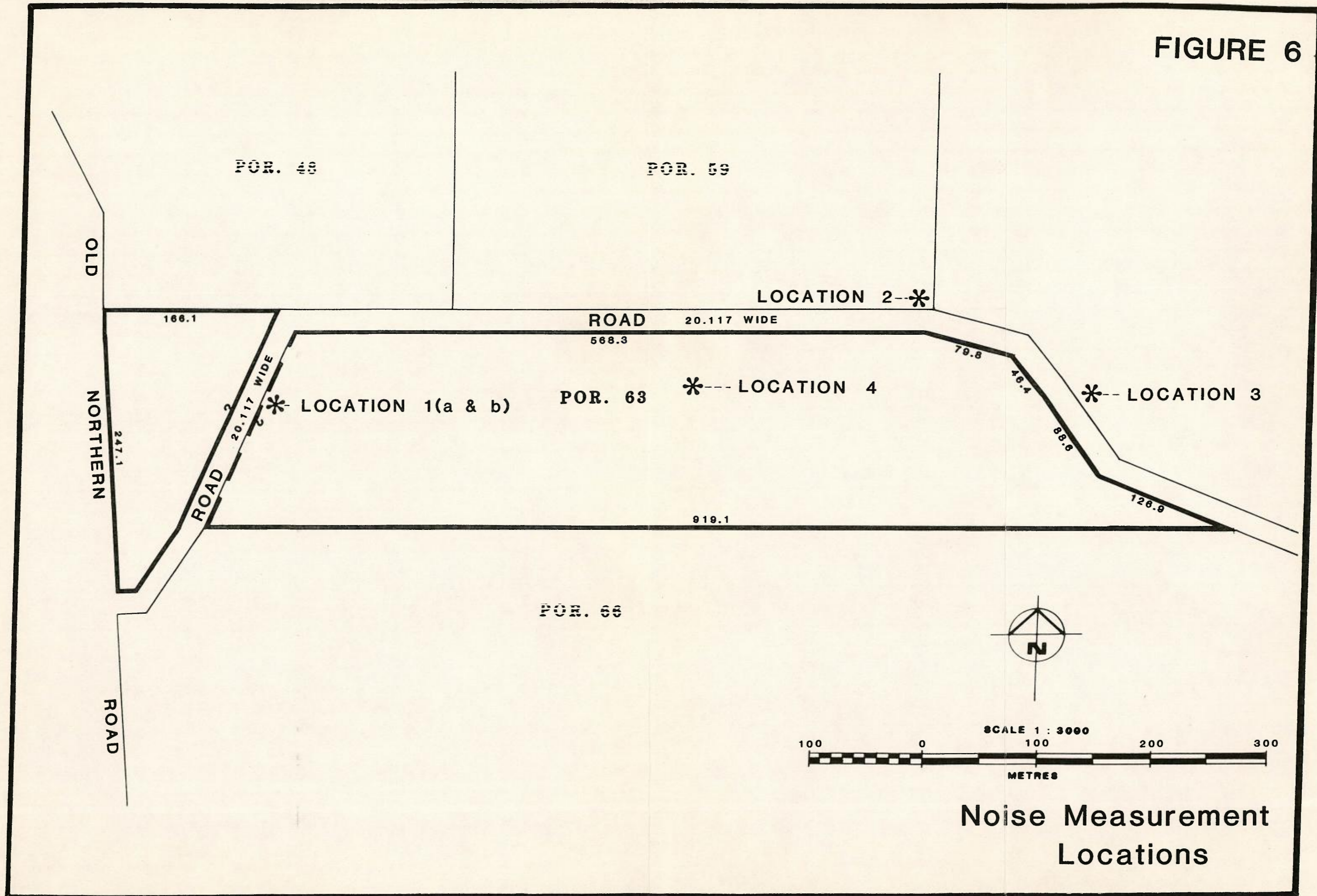
18.2 Methodology

All measurements of sound pressure levels were carried out in accordance with Australian Standards AS1055, 1978 "Noise Assessment in Residential Areas" and the requirements of the State Pollution Control Commission - Noise Control Guide, N1014 "Application for Approval of New Work - Requirements".

Equipment used for sound pressure levels measurements consisted of Bruel & Kjaer Integrating Impulse Sound Level Meter Type 2226. The instruments were calibrated prior to and after measures using a Sound Level Calibrator Type 4230.

Measurements were taken at four locations (Refer Figure 6). Each set of measurements was of 20 minute duration using commulative 60s Leq and then converting this to a 20 minute Leq using standard conversion indices.

FIGURE 6



Noise Measurement Locations

At location 1 (near residence on Old Northern Road) ambient sound pressure levels were monitored during a cessation of operations in the dam pit. The recorded ambient noise levels were frequently punctuated by traffic noise along Old Northern Road.

Sound Pressure Levels (SPL) were also measured at Locations 2, 3, 4 and at Location 1 while dam construction operations were in progress.

By then comparing the SPL's at the four locations and comparing the ambient versus plant-in-operation measurements at Location 1, a direct assessment of the impact which the dam construction contributes to the overall acoustic environment was possible.

18.3 Results

Results of 20 Min Leq Sound Pressure Level Measurements at Four Reference Measuring Locations are presented below in Table 18.1.

Location	Time	20 Min Leq S.P.L. dB(A)	Comments
1A. 500 m. west of excavation site	0940	46.5	All plant off. Plant on neighbouring property operating. Cars on Old Northern Road.
1B.	1230	48.5	All plant operating, including that on neighbouring property. Cars on Old Northern Road.
2. 70 m. north of excavation site	1100	57.5	All plant operating.
3. 130 m. east of excavation site	1130	60.0	All plant operating.
4. 200 m. west of excavation site	1200	49.5	All plant operating.

It should be noted that the measurements obtained probably represent the maximum levels. Although machinery operates throughout most of the day, the period when all plant is operating is restricted to about 2-2½ hours in the middle of the day.

Three trucks passed within 10 m. of the recording instrument during two of the recording periods. Peak SPL's of 80+ dB(A) were recorded but this level declined rapidly as the distance between the truck and the instrument increased.

18.4 Outline of Acoustic Effects and Possible Impact

The 20 minute Leq sound pressure level (SPL) monitored at Site 1 while extractive operations were in process are approximately 4.5 dB(A) above the measured background level (refer Figure 3.4 of Model No. 2226 Handbook for conversion curve). This is a relatively minor increase in the comparative loudness of the sound and indicates that permanent residents in the area could expect nil to very little noise disturbance associated with the extractive activities on Portion 63. Australian Standard 1055-1978 (Page 14) notes that excesses of 5dB(A) or less may be of marginal significance.

Mr. Daniel's assertion that the knoll is an effective sound barrier is well supported by the SPL figures obtained. There is a dramatic drop in 20 minute Leq SPL on the western side of the knoll where the extraction is screened compared to the eastern side where there is no screening effect.

SECTION 19 THE ATMOSPHERIC ENVIRONMENT

19.1 Potential Effects of Dust

As already stated, Maroota is a well renowned orchard area. The New South Wales Department of Agriculture considers that dust is of greater economic significance to State horticultural production than is any other form of air pollution.

There are three main areas in which substantial dust problems may affect fruit tree growth and cropping. In order of importance these are:-

1. The most severe effect of dust is on the general growth of plants. This is because of the shading effect of the dust on the foliage and the subsequent reduction in the rate of photosynthesis. The direct result of this reduction is firstly in the stunting of vegetative growth and secondly in the reduction of cropping potential in terms of both crop numbers and crop size.
2. The direct relationship between the amount of dust on the foliage and the incidence of significant numbers of plant sap-sucking insects is well recognised in production horticulture. This relationship, however, does not appear to have been quantified.

The dust has the effect of sheltering both the eggs and the nymphal stages of pests like plant mites and insects such as the aphids and scale insects. It also severely limits the ability of solutions of pesticides to wet the surface of the foliage, thus reducing the effectiveness of such solutions as pest controllers.

3. In the very competitive fresh fruit and vegetable market, it is quality produce which commands a premium. Less attractive crops often attract a price below cost of production.

19.2 Potential dust sources and mitigation procedures

Five main potential sources of dust have been identified for the dam construction project:-

- . access road
- . excavation site
- . sowing and grading area
- . stockpile area
- . on-site plant tracks and loading areas.

The access road is constructed of road making base and the potential for dust generation is slim. However, if the road deteriorates to the extent that dust becomes a problem, a water truck will be used to dampen the road and reduce the risk.

Excavation activities can generate a considerable quantity of dust if the activities are carried out on dry material. However, the texture of the parent resource, that is, very soft sandstone and coarse sand, results in little dust being raised and dispersed from the excavation area. In addition, the high permeability of the sandstone encourages water to percolate deep into the weathered profile and thus the extracted sand is quite commonly damp even after periods of low rainfall.

If left for long periods the exposed stockpile sand will tend to dry out and increase its dust generating potential. However, the nature of the marketing of the resource, with the amount of material being extracted depending on demand, results in stockpiled sand being transported off-site before having a chance to dry out. All trucks are required to have their loads covered with a tarpaulin before leaving the site.

At present the generation of a dust problem on Portion 63 does not appear to be evident. Mr. Daniel is aware of some of the techniques used to control dust if it becomes a problem and the stabilisation of dust prone

areas will be undertaken. The Soil Conservation Service (Quilty *et. al.*, 1978) suggest a variety of techniques, including vegetative cover, tillage, barriers and irrigation, all of which could be used on the subject site.

19.3 Climatic Considerations

When considering the dust generating potential of such an operation, it is important to consider the wind conditions, wind being the principal conveyor of dust.

Wind data is available from a gauging station operated by the Bureau of Meteorology at Glenorie Post Office. As Glenorie is located only 20 km. to the south and because the Dam site is situated on a ridge, it is expected that there would be minimal local divergence from conditions experienced at Glenorie.

Figures 7 & 8 displays wind probability roses for both 9 a.m. and 3 p.m. for the three periods, January to April, May to August and September to December and these were then combined to produce annual morning and evening probability roses. It can be seen, for morning breezes, that during the whole of the year the predominant wind direction occurs in a sector between north west and south west with by far the majority of movements rising from the north west arm. For evening breezes, although May to August movements occur generally from between the same north west to south west sectors, the predominant annual movement is from the north-east to south-east sector with the greatest percentage coming from the east.

Due to the size of the sand particles in the subject deposit the wind speed is important in determining the potential for dust to be transported off-site. Tables 19.1 and 19.2 list the average monthly morning and evening winds with average speeds, highest wind speeds and percentage occurrence and prevailing wind direction. This reveals that the winds which will have the most significant potential to transport any dust generated are the strong evening breezes blowing predominantly from the easterly sector.

MONTH	% CALM DAYS	AVE. SPEED WINDS (KM/HR.)	MAJOR WIND DIRECTION	HIGHEST WIND SPEED PER HR. % OCCURRENCE	PREVAILING WIND DIRECTION
JAN.	12	7.25	E	21-30 4%	SW-E
FEB.	14	6.63	SW	21-30 8%	S-SW
MARCH	9	6.65	W	21-30 4%	S-NW
APRIL	10	6.65	NW	31-40 2%	SW-NW
MAY	7	9.22	NW	31-40 1%	W-NW
JUNE	8	8.83	NW	31-40 3%	SW-NW
JULY	7	7.29	NW	21-30 10%	W-NW
AUG.	5	10.23	NW	31-40 6%	SW-NW
SEPT.	7	10.17	NW	31-40 3%	SW-NW
OCT.	7	12.22	NW	41-50 1%	S-NW
NOV.	11	9.85	NW	31-40 3%	S-NW
DEC.	11	10.22	E	41-50 1%	SW-E

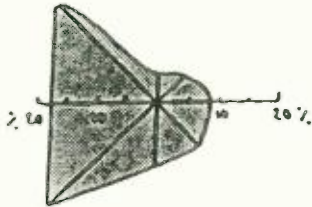
Table 19.1 - 9 a.m. Winds.

MONTH	% CALM DAYS	AVE. SPEED WINDS (KM/HR.)	MAJOR WIND DIRECTION	HIGHEST WIND SPEED PER HR. % OCCURRENCE	PREVAILING WIND DIRECTION
JAN.	-	19.35	E	31-40 9%	NE-SE
FEB.	2	14.10	E	31-40 8%	NE-S
MARCH	-	14.08	E	31-40 3%	E-SE
APRIL	2	10.52	E	31-40 3%	NE-SE & W-NW
MAY	-	11.96	NW	31-40 11%	SW-NW
JUNE	2	12.72	SW	41-50 3%	SW-NW
JULY	-	13.25	W-NW	41-50 1%	W-NW
AUG.	2	17.54	W	51 2%	W
SEPT.	2	17.34	E	41-50 4%	NE-E
OCT.	3	16.66	E	41-50 1%	E
NOV.	2	21.07	E	31-40 24%	E
DEC.	-	23.73	E	41-50 3%	E

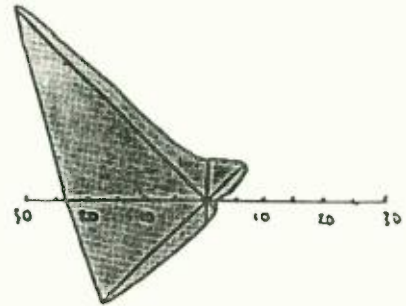
Table 19.2 - 3 p.m. Winds.

FIGURE 7

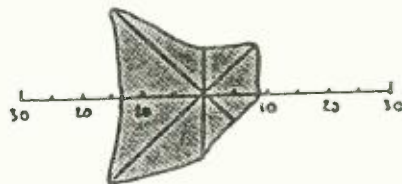
JANUARY TO APRIL



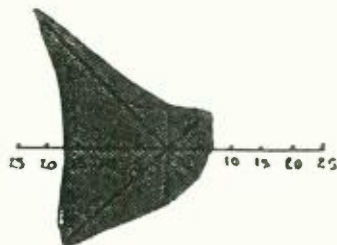
MAY TO AUGUST



SEPTEMBER TO DECEMBER



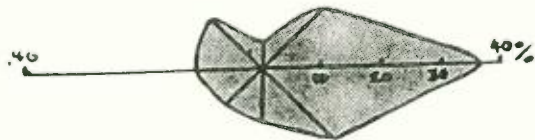
ANNUAL AVERAGE



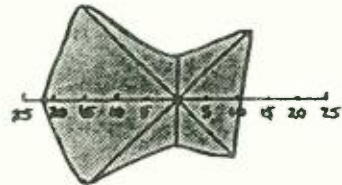
9A.M. WIND DIRECTION
PERCENTAGE PROBABILITY

FIGURE 8

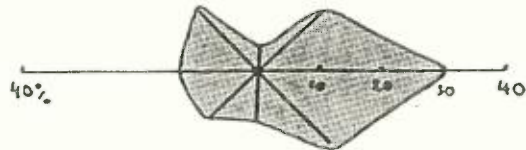
JANUARY TO APRIL



MAY TO AUGUST



SEPTEMBER TO DECEMBER



ANNUAL AVERAGE



3P.M. WIND DIRECTION

PERCENTAGE PROBABILITY

As most of the local agricultural holdings lie south and east of the site, (i.e. upwind of the strongest winds) and because of the relatively coarse-damp nature of the sand, it is anticipated that the project will not generate dust in volumes likely to have significant adverse impact on local land uses.

SECTION 20 ARCHAEOLOGIC INVESTIGATIONS

The long history of agricultural activity on Portion 63 has disturbed the topsoil to a considerable depth and because the extraction operation has already stripped and removed a large quantity of surface material there was little original surface left to inspect. Consequently, the possibility of any archaeological relics being present in the area is extremely low (refer Attachment 3 for a full description).

SECTION 21 SUMMARY OF THE ENVIRONMENTAL EFFECTS OF THE PROPOSED EXTRACTION

Table 21.1 summarises the activities which may have environmental effects of concern and the mitigating procedures currently in place or proposed. It should be noted that some 'impacts' such as topographic change are desired by the landowner and therefore no mitigating procedures are necessary. Other proposed mitigating procedures are conditional on the identification of a significant problem.

Table 21.1 Impact and Mitigative Procedures Summary

Perceived impact	Causes	Impact Magnitude	Current mitigation procedures	Mitigation procedures promised if needed
Loss of native flora & fauna habitats	Clearing of vegetation and disturbance of ground.	Minor	Nil - area of habitat	Not applicable as farming is to be the preferred land use
Topographic modification	Extraction	Major	Nil	Not applicable as topography is being deliberately modified.
Noise Pollution	Operation of machinery	Minor	Operation during daylight hours. Earth bank screen.	
Dust generation	Extraction, traffic	Minor but potentially major	Nil	Application of water to dust source areas
Siltation	Land opened to erosion by wind & water.	Minor but potentially major	All drainage directed into settling ponds	Revegetation, will be carried out before an erosion problem occurs.
Aesthetic (visual) disturbance	A subjective judgment that the visual characteristics are no longer appealing.	Minor but potentially major	Confinement of activity behind the knoll when viewed from Old Northern Road	Planting of vegetation screens

SUMMARY OF PART 4 -THE PHYSICAL AND BIOLOGICAL
ENVIRONMENT AND IMPACT POTENTIAL.

Hawkesbury Sandstone is the dominant lithology in the Maroota District. When weathered, the resultant sand is highly desirable in the building industry. The impact of the proposal on the geology of the District will be negligible.

The topography is controlled by the geology. Where the sandstone is heavily weathered, gently undulating hills are formed in contrast to the steep cliffs and valleys defined in the unweathered sandstone. The extraction area is located in the headwaters of Coopers Creek which drains into the Hawkesbury River after passing through Marra Marra National Park.

The major land system represented on Portion 63 is agricultural with minor areas devoted to extraction and dams. As such, Portion 63 is typical of many surrounding properties.

The combination of three settling ponds and progressive rehabilitation of extracted areas will ensure that the transport of fines into the National Park will be minimised.

Soils developed on Hawkesbury sandstone are generally poor and those at Maroota are no exception. However, with fertilizer application their fertility can be improved and thus will be the major impact of the extraction/rehabilitation project.

A small segment of highly disturbed native vegetation on the site represents the regrowth following clearing about five years ago. Its size and disturbed nature precludes the presence of any significant fauna and the biological value of the area as a whole is extremely low.

The Maroota Aquifer does not exist in the vicinity of Portion 63 and hence the impact of land disturbance on subsurface drainage will be comparable to that within other cultivated areas on the property.

Sound Pressure Levels recorded on the site demonstrated an expected decrease away from the extraction area. This decrease was enhanced by the location of machinery behind the knoll which screens residential dwellings from significant increases in noise levels.

Dust has detrimental effects on agricultural production. The two main dust source areas are the extraction/stockpile site and the access road. The construction materials within the road, coarse sand and road base, result in low probability of dust generation. If dust becomes a problem during prolonged dry periods, water trucks will be used to dampen dust sources.

The site was surveyed by an archaeologist, Dr. Laila Haglund, who reported that the site was so heavily disturbed that there was little probability of any archaeological relics being present in the area.

PART 5 LAND USE, SOCIAL AND ECONOMIC IMPLICATIONS

SECTION 22 LAND USE AND PLANNING

22.1 The Local District

The land in the local district is either in a natural condition or developed for agricultural, rural residential, and/or minor resource extraction purposes. This pattern of land use is expected to continue in the foreseeable future.

The Cattai - Maroota area is already the focus of small resource extraction operations which appear to be reasonably successful and acceptable in terms of environmental impact.

As discussed in Part 4 the works associated with construction of this isolated dam, and the land recontouring which will follow are not expected to have any significant negative impact upon, or compromise the economic viability of, existing or future land uses in the district.

22.2 Present and Future Land Use

In a report entitled "Extractive Industry in the Hawkesbury Region" the S.P.C.C. (1977) stated that

"... as far as possible sand and gravel extraction be confined to areas where optimum resource utilization can be achieved with least environmental impact. In these areas the operations should be coordinated so that they are planned, programmed and concluded to minimize overall environmental problems and create areas that can be put to useful purposes as quickly as possible".

This point is reiterated in the recent report by the SPCC, "Water Quality in the Hawkesbury-Nepean River". (1983)

This extraction project has all the qualities required to satisfy the above Government recommendations.

- . The extraction is being undertaken in an area of negligible ecological and archaeological significance and thus the potential for significant negative environmental impacts is low.
- . Dam construction and land re-contouring will dramatically increase the agricultural potential of this site by increasing the total water supply available to the entire property. In addition, the Department of Agriculture has recognised the importance of conserving quality agricultural land for future generations. However, these lands need to justify their economic existence in order to avert pressures for rezoning to alternate land uses.

22.3 Impact on the Local Area

Due to the isolation and nature of the extraction operation, and for reasons discussed in Part 4, it is not expected to significantly impact upon or compromise the viability or economics of existing or future land uses in the district.

The extraction project will not generate chemical or sedimentary pollutants capable of causing deterioration of water quality in Coopers Creek and Marra Marra National Park. Three settling ponds which are an integral part of the extraction process act as sediment detention basins which effectively reduce off-site movement of any material. (Photos 5, 6 and 7)

Acoustic, atmospheric and visual impacts will be minor and will not significantly affect the amenity of the local rural area or the lifestyle of its residents.

SECTION 23 TRANSPORTATION SYSTEM

23.1 Sight Lines and Safety Considerations

Although Old Northern Road is capable of carrying relatively large vehicles, its twisting and winding nature necessitates special consideration of the safety aspects affecting all road users.

The access road to Portion 63 leaves Old Northern Road to the right (as one faces north) towards the southern end of a straight stretch sagging about 10 metres in the middle. Both the northern and southern approaches are corners.

Sight distances to north and south were measured according to guidelines presented in NAASRA (1979, 1980) at 300 metres and 200 metres respectively.

These sight-lines were assessed according to the following criteria.

1. A truck turning across traffic or entering traffic needs at least ten seconds to move from rest to a position fully clear of any danger. A car travelling at 100 klm/hr. covers almost 280m. in ten seconds. Hence the safe sight distance almost 280m.
2. A car or truck following the truck decelerates according to the formula

$$D_s = \frac{RT}{3.6} + \frac{V^2}{254f.}$$

where D_s = stopping distance in metres
 f = equivalent uniform longitudinal stopping distance
(in gravities)
 R_T = driver reaction time (seconds)
 V = initial speed of vehicle (klm/hr.)

For the purposes of this calculation the variables given the values as follows:

f = 0.4 (refer Table 5.1, NAASRA 1980)
 R_T = 1.5 (an appropriate reaction time for a winding road)
 V = 100 km/hr (maximum car speed limit)

These values yield a stopping distance value of 140m., i.e. well within the 200m. sight distance.

For trucks with a laden weight of 9.5 tonnes or more, the maximum legal speed limit is 80km/hr. Assuming the truck decelerates at one third of the rate of a car travelling at the same velocity (that is 0.5g) the corresponding stopping distance is 185m.

At the intersection in question there are several important points which should be taken into account:

1. Sand trucks travel only south to the Sydney Metropolitan markets when fully laden and hence approach the intersection when unladen from the south;
2. The sand trucks only cross oncoming traffic when unladen and the 10 second/280 metre sight-line is therefore applicable.
3. If the sand truck has to wait for a gap in the oncoming traffic, cars and trucks following from the south need 140m. and 185m. respectively to stop in time.



PHOTOGRAPH 10 Old Northern Road looking south from access road on L.H.S. of photo.



PHOTOGRAPH 11 Old Northern Road looking north from access road on R.H.S. of photo.

The criteria and assumptions presented suggest that the sand trucks generated by this extractive operation will not provide a safety hazard to other motorists on Old Northern Road.

23.2 Traffic Generation

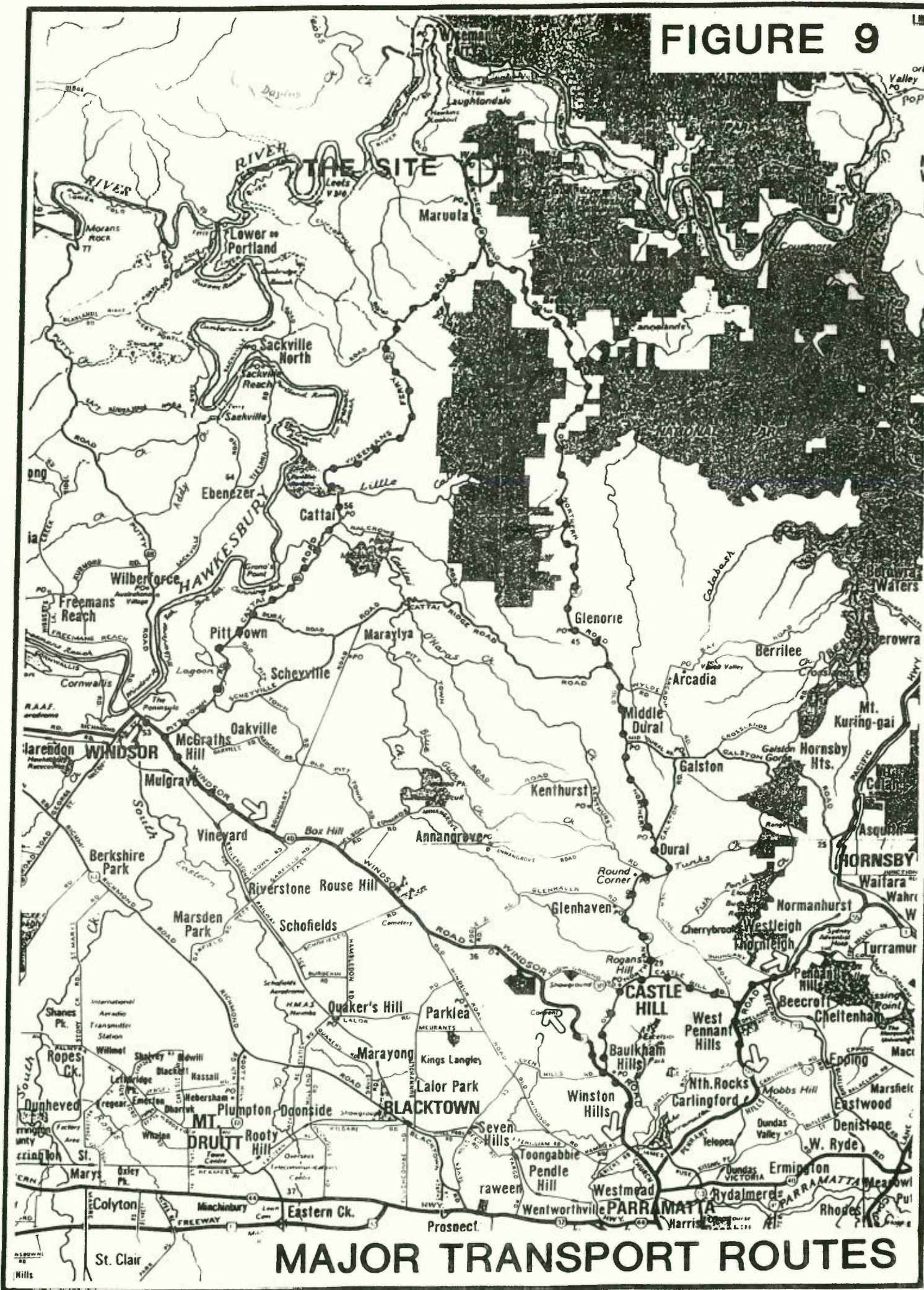
Using present extraction rates as a base line for traffic generation it is expected that loaded trucks will be injected into the Old Northern Road traffic flow at an average rate of 10 trucks per day. Most heavy vehicle movements to and from the site will occur during the period of 7.30 a.m. to 3.30 p.m. on normal working days.

As this section of Old Northern Road already accommodates a relatively low (abt 1800 pd.) volume of traffic the movements generated by this proposal will not significantly increase local traffic volumes (see Table 23.3 at page 36). The Sydney Region transport system, and those responsible for its management, must accept that traffic volumes and truck movements will continue, and probably rise, as the development of urban areas requires resources which often can only be located and supplied from rural areas beyond the suburban periphery. Increases in traffic volumes should not be viewed as undesirable - it is a major function of roads to provide efficient connections between different land uses and between places where natural resources are extracted and used.

Phil Daniels supplies sand to users throughout the Sydney Region and further afield. Trucks transporting this sand use arterial roads and avoid the quieter residential streets of Sydney. (Refer Figure 9)

The operation is not expected to have adverse impact on the local, subregional or regional transport systems. Nor is it likely to cause significant increases in traffic congestion or unsafe traffic movements along Old Northern Road.

FIGURE 9



MAJOR TRANSPORT ROUTES

SECTION 24 MARKET AND ECONOMIC IMPLICATIONS

24.1 Value of the Sand Resource

Taking an average value per tonne of \$8.50 and a recoverable deposit of 188,000 tonnes the value of the resource, at today's prices, is about \$1.6 million. However, this value is a minimum as changes in the price of the sand will occur over the working life of the extraction site. Such changes are unpredictable in such a volatile market.

24.2 Extraction of Sand Resources in the Sydney Region

According to a report compiled by the Department of Mineral Resources in 1980 entitled "Construction Sand Resources for Sydney 1981-2020" (Wallace 1980), the Sydney region faces a potential shortage of some types of construction sand between now and the year 2000 unless a management program is put into practice with appropriate planning controls.

The Sydney region in 1978/79 produced and consumed about 5.1 million tonnes of construction sand, the breakdown being:-

	<u>Tonnes</u>	<u>%</u>
River sand	2.74 mil	54
Dune estuary sand	1.58 mil	31
Mortar bricklayer's sand	0.76 mil	15
	<hr/>	
	5.08 mil	
	<hr/>	

Future demand from the region for the 1981-2020 A.D. period is estimated at:-

	<u>Tonnes</u>
River sand	169 mil
Dune estuary sand	92 mil
Mortar bricklayer's sand	46 mil
	<hr/>
	307 mil
	<hr/>

According to the Department of Mineral Resources' report, the Maroota sand is a mixed deposit containing a very well graded mixture of coarse, medium and fine grained sand. Table 24.1 reveals the identified sources of coarse - medium and fine grained sand in the Sydney Region.

not the adj. Hawthorn SS

Although on paper there appear to be adequate reserves, it is emphasised that most of this sand is not presently available for extraction and is emphasised in a quote taken from the Department of Mineral Resources' report:-

"It would appear that for the medium to long term, one or both of the major potential sources, namely Richmond Lowlands or St. Albans, will have to be made available. Alternatively several of the smaller to moderate sized sources such as Maroota, marine aggregate, or dredging the Macdonald River could be made available. Each of these sources has its problems but if nothing is done soon to release one or more of these sources, Sydney could face a severe shortage of this type of sand".

In addition the Department states:-

"Key sources are Penrith Lakes Scheme, Kurnell Peninsula, Richmond

Lowlands and either (or both) Maroota and marine aggregate. These sources, ideally, should be made available for extraction in the future".

Even though the extraction operation which is the subject of this proposal is of a relatively minor scale, the proponent company has established a significant market, consisting of some 30 regular customers. The operation does not appear to conflict with the Department's Regional extraction strategy.

TABLE 23.3 CURRENT ANNUAL AVERAGE DAILY TRAFFIC VOLUMES ON OLD NORTHERN ROAD

LOCATION	AADT
Wiseman's Ferry	1450
Maroota (north of Bay Road)	1800
Maroota (south of Bay Road)	1650
Forest Glen	1540
Glenorie	2660
Middle Dural	6760
Dural (north of Galston Road)	7840
Dural (south of Galston Road)	15920
Dural (west of New Line Road)	12350

Source: DMR 'Traffic Volumes and Supplementary Data - 1983'.

Table 24.1 Sand Resources in the Sydney Region
(Source - Wallace 1980)

PART A SOURCES OF COARSE - MEDIUM GRAINED SAND

SOURCE	ESTIMATED QUANTITY (million tonnes)	CLASSIFICATION	AVAILABILITY
Penrith Lakes Scheme	50	indicated reserves	available
Richmond Lowlands	86	indicated reserves	unavailable
* Maroota	15	indicated resources	unavailable
Nepean River - dredging above Wallacia	5	indicated resources	mostly available
Hawkesbury River - dredging N.Richmond- Wisemans Ferry	(max.)60	indicated resources	mostly available
Colo River - dredging	(max.)20	indicates resources	unavailable
Berowra Creek - dredging	(max.) 3	indicated resources	unavailable
Georges River/ Woronora River	(min.)11	indicated reserves	mostly unavailable
River-dredging Marine aggregate	10	indicated resources	unavailable
Total	260	mostly indicated	mostly unavailable

TABLE 24.1 Sand Resources in the Sydney Region (Contd.)

PART B SOURCES OF FINE - MEDIUM GRAINED SAND

SOURCE	ESTIMATED QUANTITY (million tonnes)	CLASSIFICATION	AVAILABILITY
Kurnell Peninsula	15	indicated reserves	mostly available
Pagewood-Eastlakes area	5	indicated resources	mostly unavailable
Narrabeen Lake/ Middle Harbour	5	indicated resources	mostly unavailable
Richmond Lowlands Macdonald River - dredging and flood over bank deposits	112	indicated reserves	unavailable
St. Albans area	20	indicated resources	unavailable
Marine aggregate	30	indicated resources	unavailable
* Maroota	12	indicated resources	unavailable
Pittwater -	15	indicated resources	unavailable
Port Hacking	(max) 100	estimate only	unavailable
Other sources	unknown	not yet investigated	mostly unavailable

24.3 Agricultural Benefits

As was pointed out in Section 22.2 the Department of Agriculture has recognised the importance of preserving better agricultural land for future generations. However, these agricultural lands need to justify their existence economically to avoid pressure for re-zoning to alternate land uses.

Through the construction of the dam and recontouring of the land on Portion 63, the agricultural potential of the land will be significantly enhanced. Once completed, the dam will ensure that the agricultural pursuits of the Trovartos will become, and remain, economically profitable even during long periods of low rainfall.

SECTION 25 ALTERNATIVES TO THE PROPOSAL

Several alternatives to both the proposal and various aspects thereof have been considered. These include:-

- . 1. Alternative transport routes - these are considered to either cause equivalent problems or to be less efficient than the present routes;
- . 2. Recontouring the land without removing the sand - prohibitively expensive;
- . 3. The "do nothing" option - is, in the opinion of the consultant, equivalent to ignoring the economic potential of the sand resource. In addition the "do nothing" option denies the proprietor of Portion 63 of the opportunity to upgrade the agricultural potential of the property, effectively denying its economic potential.

The fact that the agricultural potential of this property will be significantly upgraded while simultaneously supplying a valuable and necessary raw

material to the Sydney region creates a situation whereby resources are used efficiently with minimal environmental impact. This, in the opinion of the consultant, justifies the extraction and marketing of this resource.

SUMMARY OF PART 5 - LAND USE, SOCIAL AND ECONOMIC
IMPLICATIONS

The Maroota District is primarily a rural area with several small extraction projects currently operating. The N.S.W. State Government has identified this general area as being an important source of construction sand for the Sydney region. The future of such extraction projects seems assured.

The small scale of the Portion 63 operation and the attention being given to both minimising negative environmental impacts and promoting rehabilitation, suggests that the benefits of improved agricultural land, water supply and increased financial return outweigh the minor environmental costs.

Careful consideration of the traffic related aspects of the proposal has concluded that the number of extra vehicle movements generated will not be significant. The safety of motorists using Old Northern Road in the vicinity of Portion 63 will not be compromised by trucks entering or leaving the access road.

The increasing scarcity of suitable and accessible fine aggregate sand for the Sydney Metropolitan Area has emphasised the importance of deposits at Maroota and related, accessible areas. The production/non-production of sand from the Maroota District (including Portion 63) has regional as well as local ramifications.

A consideration of alternatives to the proposal suggests that there are no viable counter proposals in which the objectives of the landowner and the applicant are achieved.

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ATTACHMENT 1

Clause 35 consultation with the
Department of Environment and Planning.



Department of Environment and Planning



Colin Donges,
Colin Donges & Associates,
P.O. Box 244,
DURAL. N.S.W. 2158

Remington Centre
175 Liverpool Street, Sydney 2000
Box 3927 G.P.O. Sydney 2001
DX. 15 Sydney

Telephone: (02) 266 7111 Ext. 7234

Contact: S. Jones

Our reference: 86/1680

Your reference: B623 CCD:LS

Dear Sir,

PROPOSED EXTRACTIVE INDUSTRY
PORTION 63, PARISH OF FREDERICK, OLD NORTHERN ROAD, MAROOTA

Reference is made to your letter of 7 August, 1986 with regard to the above mentioned proposal. It would now appear that extractive industries are permissible under the provisions of Hornsby LEP 10. Please accept our apologies for any inconvenience or delay our earlier advice may have caused.

2. As development consent is required for the proposal and it is a designated development within the meaning of Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, as amended, an EIS must accompany the development application to the Hornsby Shire Council. The EIS shall be prepared in accordance with clause 34 of the Regulation and shall bear a certificate required by clause 26(1)(b) of the Regulation (see Attachment No.1).

3. In addition, pursuant to clause 35 of the Regulation, the Director requires that the following matters be specifically addressed in the EIS:

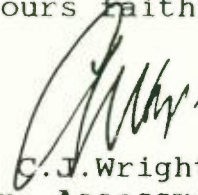
- . any possible effects on the nearby Marra Marra National Park eg. depending on location of the extractive industry within Portion 63, visual aspects may be a concern and careful consideration should also be given to proposed soil erosion controls.

4. Attachment No.2 is a guide to the type of information most likely to be relevant to the development you propose; not all of the matters raised therein may be appropriate for consideration in the EIS for your proposal; equally, the guide is not exhaustive.

5. In preparing your EIS you should approach Hornsby Shire Council and take into account any comments Council considers may apply to its determination of the proposal.

6. Should you require any further information regarding this matter please do not hesitate to contact us again.

Yours faithfully,



1/4/86

C.J. Wright
Manager, Assessments Branch
Delegate for the Director

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.1

STATUTORY REQUIREMENTS FOR ENVIRONMENTAL IMPACT STATEMENTS.

In accordance with Part IV of the Environmental Planning and Assessment Act, 1979, an environmental impact statement (EIS) must meet the following requirements:

Pursuant to clause 34 of the Environmental Planning and Assessment Regulation, 1980, as amended, the contents of an EIS shall include the following matters:

- (a) full description of the designated development proposed by the development application;
- (b) a statement of the objectives of the proposed designated development;
- (c) a full description of the existing environment likely to be affected by the proposed designated development, if carried out;
- (d) identification and analysis of the likely environmental interactions between the proposed designated development and the environment;
- (e) analysis of the likely environmental impacts or consequences of carrying out the proposed designated development (including implications for use and conservation of energy);
- (f) justification of the proposed designated development in terms of environmental, economic and social considerations,
- (g) measures to be taken in conjunction with the proposed designated development to protect the environment and an assessment of the likely effectiveness of those measures;
- (g1) details of energy requirements of the proposed development and measures to be taken to conserve energy;
- (h) any feasible alternatives to the carrying out of the proposed designated development and reasons for choosing the latter; and
- (i) consequences of not carrying out the proposed development.

The EIS must also take into account any matters required by the Director of Environment and Planning pursuant to clause 35 of the Regulation, which may be included in the attached letter.

The EIS must bear a certificate as required by clause 26(1)(b) of the Regulation.

DEPARTMENT OF ENVIRONMENT AND PLANNING
ATTACHMENT No.2

ADVICE ON THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR AN EXTRACTIVE INDUSTRY.

A definition of extractive industry may be found in paragraph (n) to Schedule 3 of the Environmental Planning and Assessment Regulation, 1980, (as amended). These industries are operations undertaken for the purpose of winning sand, gravel, clay, turf, soil, rock, stone or similar substances. The definition of extractive industry specifically excludes coal, petroleum or minerals which are prescribed under the Mining Act, 1973. Extractive industries may take the form of dredging operations, quarrying operations, turf farms or various forms of land excavation etc. Processing of extracted material on the same site as the winning of the material may also constitute an extractive industry.

Extractive industries have prompted considerable public controversy in the past since, among other things, they affect visual amenity, generate heavy vehicle movements, raise dust and cause disturbance through noise and blasting. This is the prime reason for designation of extractive industries under the Environmental Planning and Assessment Act, 1979.

The purpose of this paper is to outline various issues relevant to the preparation and consideration of an EIS for extractive industries. It is intended to assist the preparation of the EIS. However, it is the applicant's responsibility to identify and address as fully as possible the matters relevant to the specific development proposal in complying with the requirements for EIS preparation (see Attachment No.1).

The matters nominated in this paper are not intended as a comprehensive identification of all issues which may arise in respect of an extractive industry. Some of the issues nominated may not be relevant to a specific proposal. On the other hand, there may be other issues, not included, that are appropriate for consideration in the EIS.

Information provided should be clear, succinct and objective and where appropriate be supported by maps, plans, diagrams or other descriptive detail. The purpose of the EIS is to enable members of the public, the consent authority (usually the Council) and the Department of Environment and Planning to properly understand the environmental consequences of the proposed development.

1. Description of the proposal.

The description of the proposal should provide general background information on the location and extent of the works proposed, an indication of adjacent developments, and details of the site, land tenure, zonings and relevant forward planning proposals and any other land use constraints.

The EIS should address the compatibility of the proposal with any regional strategy for extractive industries in the area and with the provisions of the Local Environmental Plans for existing and proposed development.

This section should provide specific information on the nature, intent and form of the development. It should, as far as possible, include such details as the processes involved (highlighting any proposed crushing or blasting), disposal of wastes, landscaping and site rehabilitation. A description should also be provided of associated operations such as the transport of materials and use of the end product if likely to have environmental implications.

Particular details that may be relevant include:

- . Characteristics and economic significance of the resource ✓
- . Possible availability of alternative resources.
- . Quantity of materials to be extracted. ✓
- . Methods of extraction / plans of operations. ✓
- . Details of any blasting and/or crushing.
- . Effects of vibrations.
- . Type of machinery and equipment to be used. ✓
- . Expected life of the operation. ✓
- . Number of persons to be employed. ✓
- . Hours of operation. ✓
- . Details of necessary stockpiling. ✓
- . Access arrangements - truck routes, truck numbers etc. ✓
- . Site drainage and erosion controls. ✓
- . Proposals for rehabilitation. ✓

2. Description of the Environment.

This should provide details of the environment in the vicinity of the development site and also of aspects of the environment likely to be affected by any facet of the proposal. In this regard, physical, natural, social, archaeological and economic aspects of the environment should be described to the extent necessary for assessment of the environmental impact of the proposed development.

3. Analysis of Environmental Impacts.

Environmental impacts usually associated with extractive industries are listed below. Where relevant to the specific proposal, these should be addressed in the EIS, taking into account the adequacy of safeguards proposed to minimise them.

- . The flow of any affected rivers or watercourses.
- . The effect of the extraction on the sediment transport rate of any affected rivers or watercourses.
- . The bed and bank stability of any affected rivers during and after completion of the operations.
- . Any possible siltation, sedimentation or downstream effects of the operation.
- . Any likely cumulative effects of the proposed operation when considered together with other operations in the vicinity.
- . Details of floods and any likely effects of the operation on flood liability of surrounding lands.
- . The possible effects of flooding on the operation.
- . Effects on flora and fauna.
- . The agricultural viability of the landholding.
- . Likely noise/vibration disturbance caused by the operations, including transport operations, on nearby residences.
- . Other impacts of trucking movements, including access over railways and onto highways.
- . Dust nuisance likely to be caused.
- . Effects on water quality of nearby watercourses.
- . Disposal of waste material.
- . Effects on the visual environment.
- . Any likely affectation of sites of Aboriginal archaeological or European heritage value if located in the vicinity of operations.

In addition, any potential for hazard or risks to public safety and any proposals to monitor and reduce environmental impacts should be included.

4. Contact with relevant Government Authorities.

In preparing the EIS, it is suggested that authorities, such as those listed below, should be consulted and their comments taken into account in the EIS.

- . The State Pollution Control Commission in regard to air, water and noise impacts and relevant pollution control legislation requirements;
- . The Soil Conservation Service regarding appropriate erosion control and rehabilitation procedures;
- . The Department of Agriculture if prime agricultural land may be affected by the proposal; and
- . The Heritage Council of NSW if the proposal is likely to affect any place or building having heritage significance for the State; the National Parks and Wildlife Service if aboriginal places or relics are likely to be affected.

It is the responsibility of the person preparing the EIS to determine those Departments relevant to the proposed development.

ATTACHMENT 2

Councils response to enquiries
eliciting their comments.



THE COUNCIL OF THE SHIRE OF HORNSBY

296 Pacific Highway

HORNSBY

Postal Address: BOX No. 37 P.O. HORNSBY 2077
(OX 965 HORNSBY)

Colin Donges & Associates Pty Ltd
P O Box 244
DURAL NSW 2158

Dear Sir,


Proposed Extractive Industry, Portion 63, Old Northern Road, Maroota.
Your ref: B623 CCD:LS.

Unfortunately, it appears that a reply has not been made to your request for any details of specific matters to be investigated in the Study for the above proposal. Please accept my apology for the oversight.

However, the matters which the Department has set out appear to cover the matter fully. Council, of course, has on record your letter B618JN:DP of 30th May, which was sent as a result of the meeting on site on 20th May, 1986.

No further matters beyond those set out in the Departments letter, ref:86/1680 received by Council on 5th September, appear to require investigation.

Yours faithfully,
D.F. BRIDGES,
Deputy Shire Clerk.

Per: 
Chief Town Planner.

27th October, 1986

Council ref: T/P 6800/M.P.63
KW:NS

ATTACHMENT 3

Archaeological report

HAGLUND AND ASSOCIATES

Archaeological consultants

1 Cameron St
Balmain NSW 2041
tel 02-8184541

Sydney 21.10.1986

Collin C.Donges, Director,
Collin C.Donges & Associates Pty.Ltd.
P.O. Box 244
Dural, N.S.W.2158

Attention: Duncan Leadbeater

Our ref.: LH/M18

Dear Mr.Donges,

I include a report on my inspection of proposed extractive industry dam construction operation, Portion 63, Parish of Frederick, Maroota. As part of the area has a still relatively undisturbed surface it was necessary to inspect this. It would however be normal - and more useful - to carry out an archaeological inspection before any earthmoving activities take place!

I include two extra prints of each photograph used to illustrate my report and will lend you the negatives if you require further prints. The National Parks and Wildlife Service will need a report with a full set of original prints.

Yours sincerely



Laila Haglund

REPORT ON INSPECTION OF AREA PROPOSED FOR DAM CONSTRUCTION/EXTRACTIVE INDUSTRY, PORTION 63, PARISH OF FREDERICK, OLD NORTHERN ROAD, MAROOTA.

This inspection was commissioned by Collin C. Donges & Associates Pty. Ltd. on behalf of Mr. P. Daniel, who will arrange the dam construction and extraction within the study area which is owned by Mr. Trovarto.

The inspection was carried out 15th October 1986 in good weather and light conditions.

The purpose of the inspection was to assess whether any part or parts of the area proposed for development is likely to contain Aboriginal archaeological material, and to determine whether there is a need for further archaeological investigation. It was understood that little, if any, of the land surface remains undisturbed by recent development.

The study area is situated north of Maroota, off the east side of the Old Northern Road about 1.2km south of its junction with Laughtondale Gully Rd. at Weavers (see map). The access road forms the northern and eastern boundaries of the area, a drainage line to Coopers Creek the western. The southern boundary is defined by a fence line parallel to the northern extent of the access road, and south of this, on the valley floor, there is a belt of natural vegetation with Eucalypts and Casuarina species. To the east there is a sandstone ridge with rock outcrops, some of these forming shelters, and natural, fairly open, bushland.

The study area consists of the major (southern) part of the crest and slopes of a flat-topped, low knoll, parts of the adjoining valley floor and the western foot-slopes of the ridge to the east.

Most of the surface of the study area has been modified in the course of construction of the series of farm dams already present and the levelling to create fields for cultivation. A small area at the top of the knoll has not yet been cut into. This would be included in the future extraction area.

The proposed extraction will involve lowering the knoll by removal of the soft sandstone from the knoll; this and sand from the proposed additional dam area will be removed. The soil will be stock-piled to be spread on the levelled area.

The photographs appended show the modified areas, the small vegetated and unmodified area on the top and examples of rock surfaces within this.

There are several reasonably flat and horizontal rock exposures within the vegetated area, the sort of exposure on which one could expect Aboriginal rock engravings. It was, however, obvious that most of these rocks have been exposed in recent years; they are fairly pale in colour, carry shallow depressions indicating recent root activity and appear to be somewhat unstable. Some are clearly weathering actively. There are a few darker patches which appear to have been exposed for a long period of time.

This interpretation was confirmed by the information that the area was

cleared about five years ago. The present vegetation is therefore mainly re-growth on a reduced soil cover. Two extensive rock ledges on the southern rim of the crest of the knoll, bordering onto the modified area, appear to have been exposed also prior to the clearing. These both have extremely rough surfaces, too rough to be at all likely to carry engravings. In addition, most parts appear unstable.

However, all rock surfaces in this area were inspected in detail for traces of engravings. Each was approached from different angles so that any shadow cast by depressions in the rock would be noted. Nothing was found but for natural features and a profusion of scratch marks (from the clearing?) and track marks due to heavy earth moving equipment. There are several bulldozed tracks through this part. There are also several recent inscriptions cut into a rock surface adjoining the access track on the crest.

In addition, I searched several surfaces that had suffered only shallow disturbance (the northeastern part of the access track and a track along the south border of the area) but found no evidence of past Aboriginal presence.

I concluded that there is no visible archaeological material within the study area, that there is virtually no likelihood of such material being present below the surface and that the area does not warrant further archaeological inspection.

The study area appears fairly unlikely to have had archaeological potential. However, an inspection for Aboriginal sites should be carried out prior to clearing and surface modification, while there is some possibility that archaeological material may be retained, if present. The ridge to the east of the study area appears likely to have archaeological potential and should not be interfered with without prior investigation.

Sydney 16th October 1986



Laila Haglund

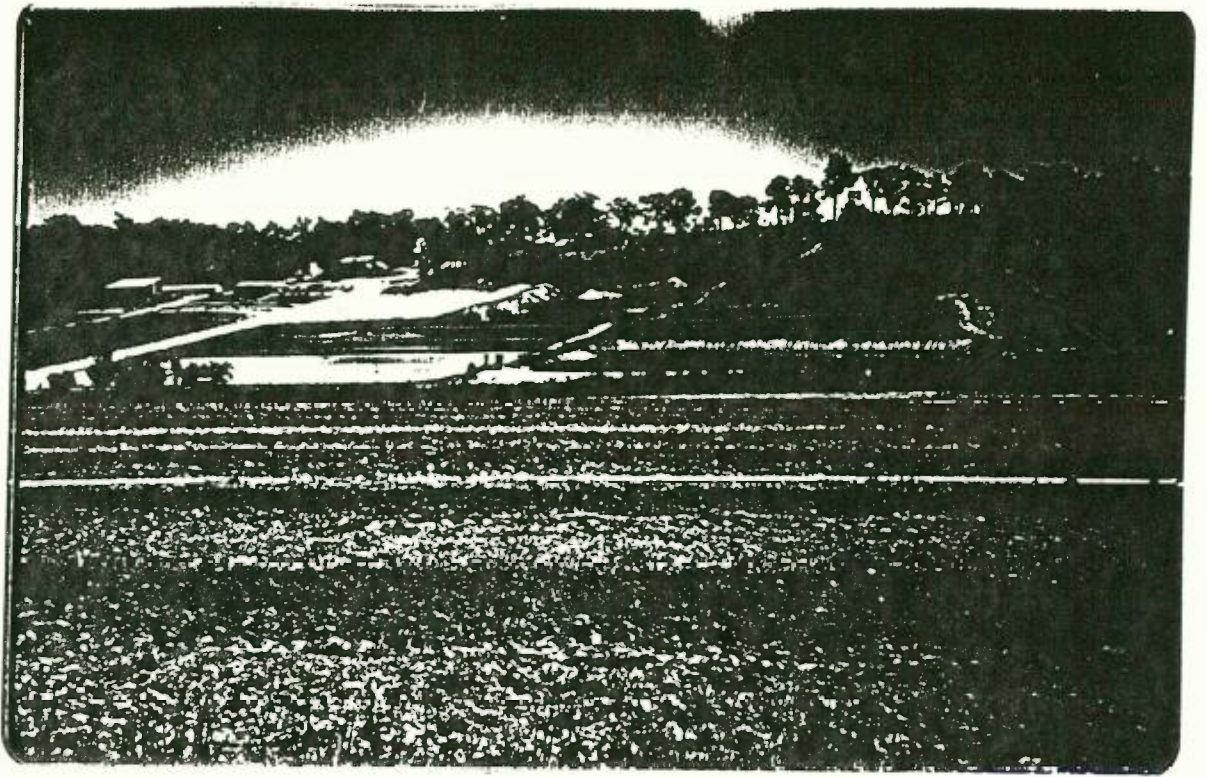


Fig.1 The cultivated area west of the proposed extraction area.
Camera facing south of west.

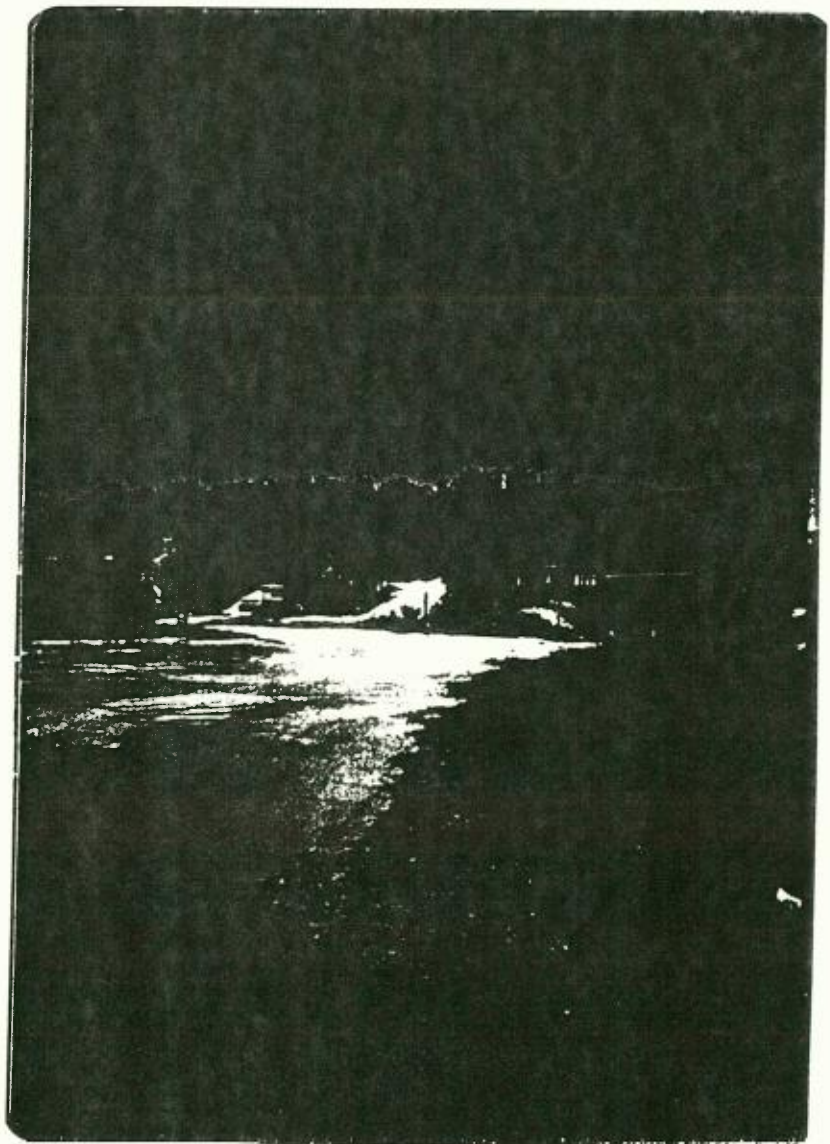


Fig.2 Eastern part of the track forming the northern boundary of
the study area. Looking towards the eastern sandstone ridge.

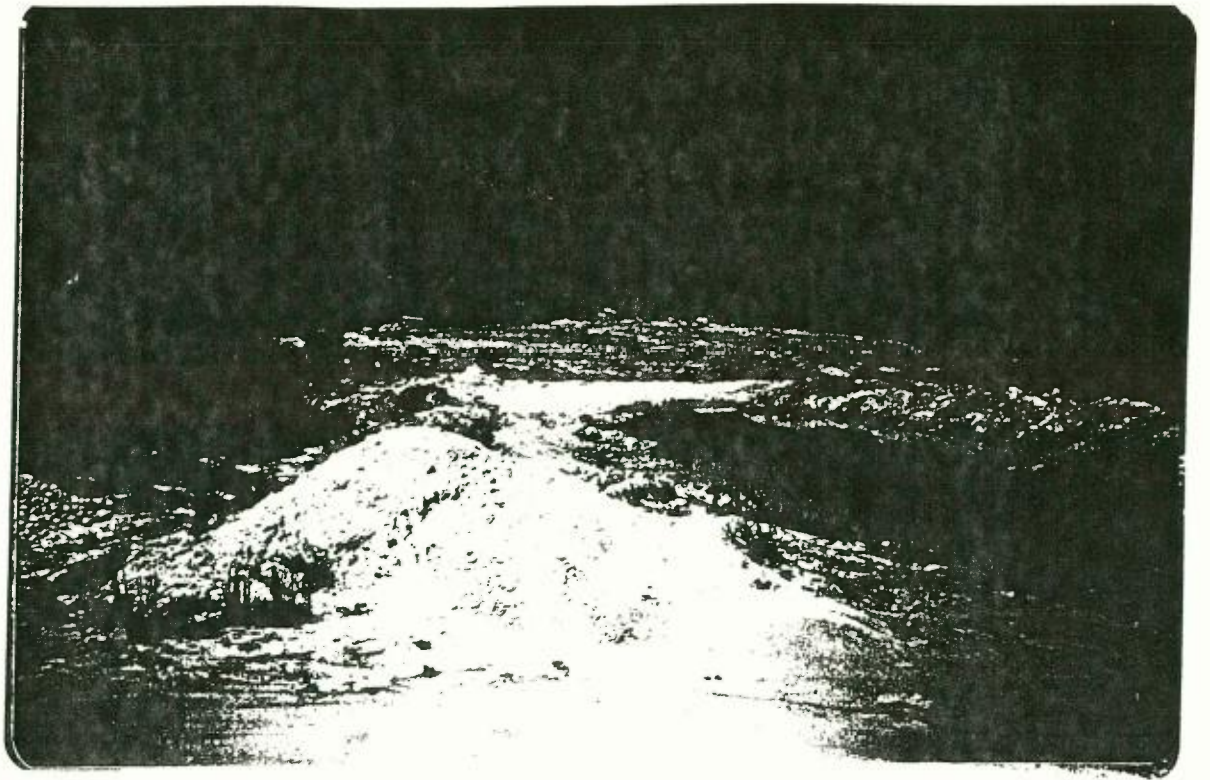


Fig.3 View over upper part of present extraction area and top dam.
Camera facing east.

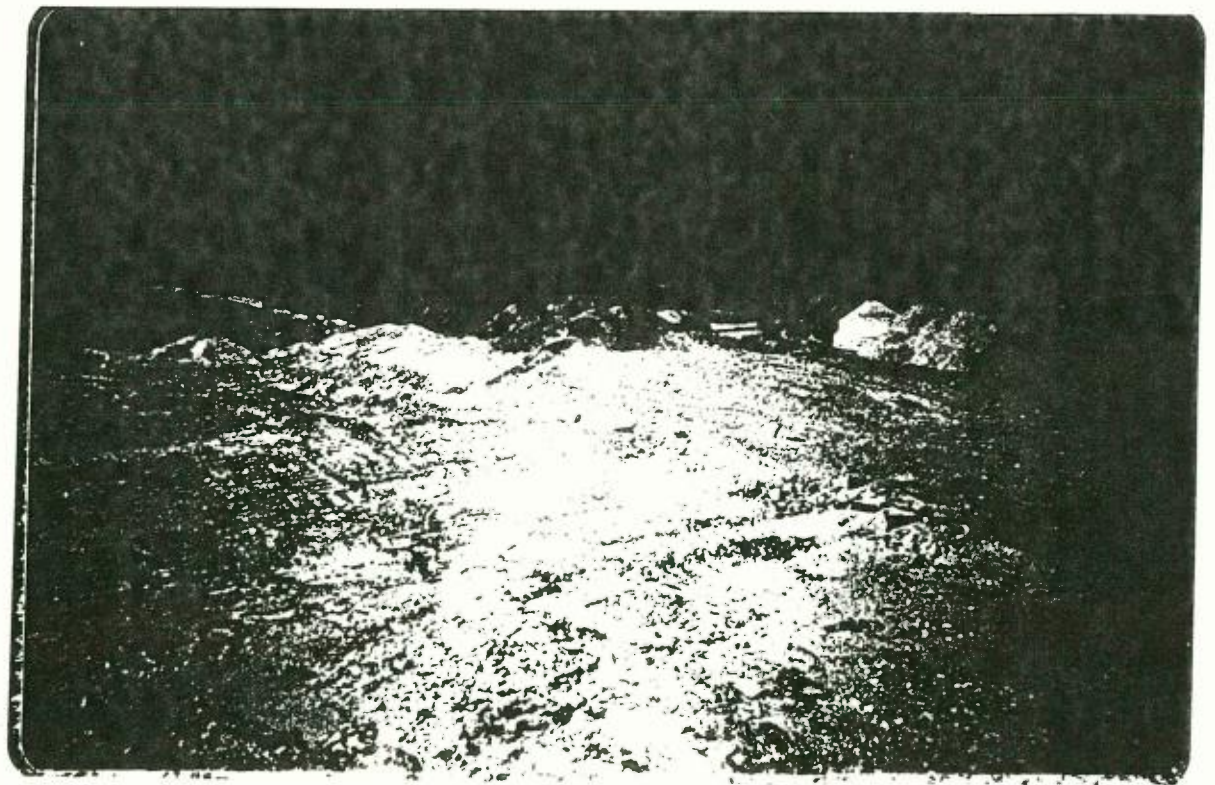


Fig.4 View over lower part of present extraction area and dam.
Camera facing southeast.



Fig.5 View over rockledge on border between present and proposed extraction area (at south end of top of knoll). Note dark colour of ledge. Camera facing northeast.



Fig.6 Closer view of ledge shown in Figure 5. Camera facing southwest.

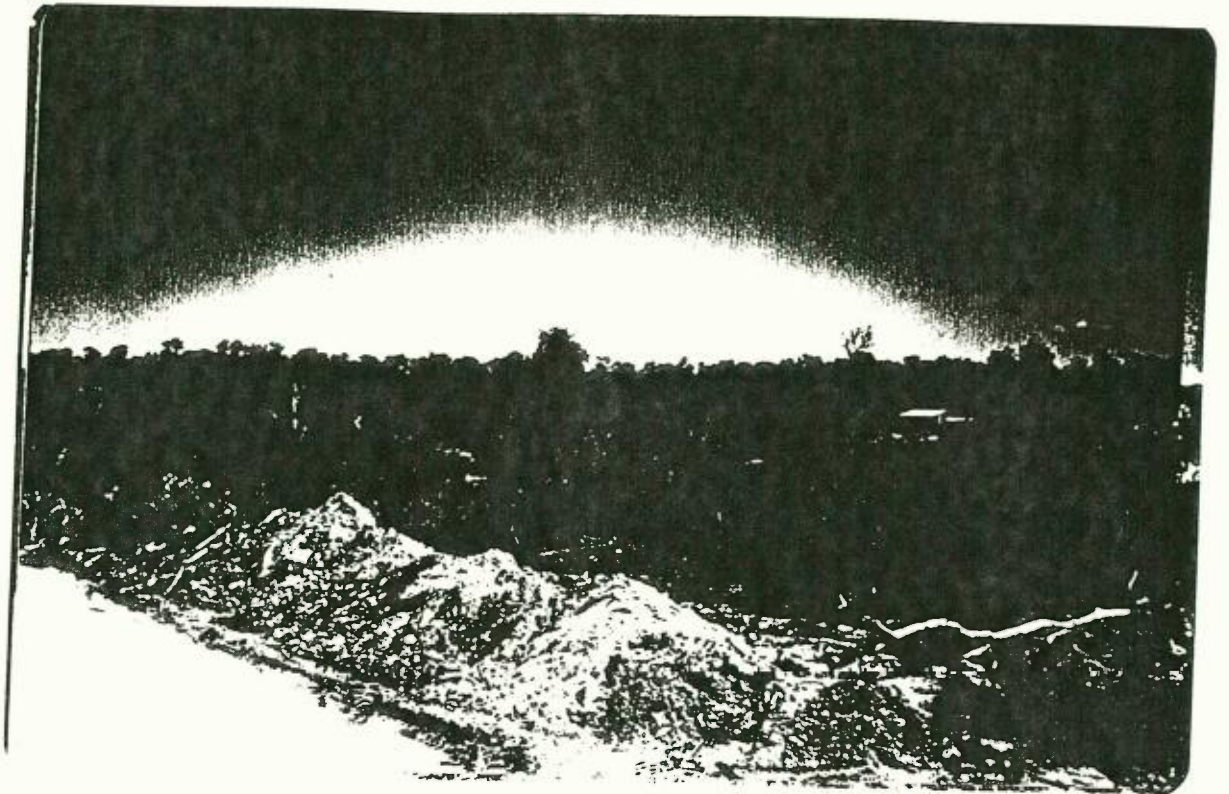


Fig.7 View over proposed extraction area. Note scrubby regrowth after clearing. Camera facing west of south.

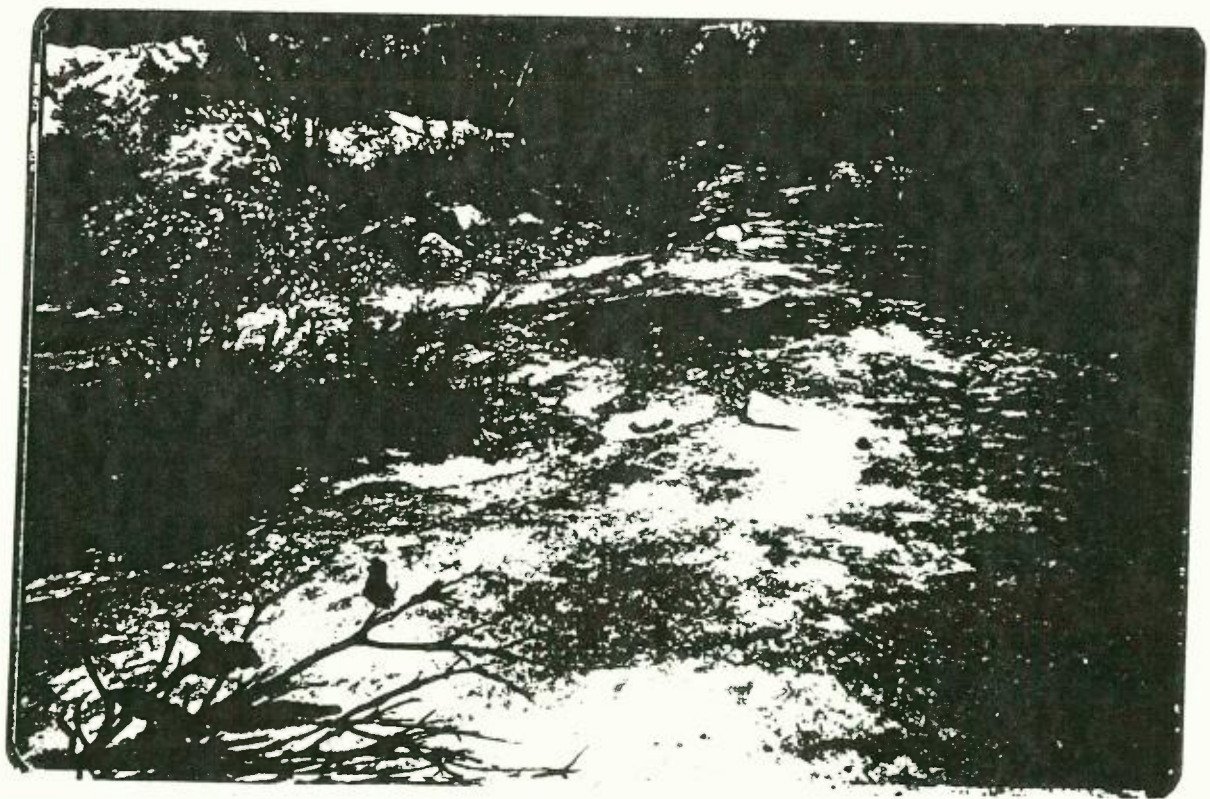


Fig.8 Closer view of rock exposure within proposed extraction area. Note pale colour of rock exposed by clearing and small patch of darker rock, probably exposed before this. Camera facing east of south.

ATTACHMENT 4

Contributors

CONTRIBUTORS TO THE ENVIRONMENTAL IMPACT STATEMENT

Project Management

Collin C. Donges
M.I.S. Aust., Dip. T.C.P.,
M.R.T.P.I., F.R.I.C.S., M.R.A.P.I.,
Dip. Enc. Stud., L.G.T.C.P.

Research Compilation

Duncan Leadbitter
B. Sc. (Hons.)

Archaeological Survey

Laila Haglund
Dip. Prehist. (London),
Ph.D. (Stockholm), F.R.A.I.,
M.A.A.C.A.

Graphics

John Nisted

DANIEL, P.

EIS
401

Extractive industry, Portion 63,
Parish of Frederick, County of
Cumberland

