CONSULTATIVE ENVIRONMENTAL REVIEW

MINING AN EXTENSION OF THE EXISTING OPERATIONS AT WONNERUP

prepared by

W G MARTINICK & ASSOCIATES PTY LTD

for

CABLE SANDS (WA) PTY LTD

SEPTEMBER 1991

INVITATION

The Environmental Protection Authority (EPA) invites people to make a submission on this proposal.

The Consultative Environmental Review (CER) has been prepared in accordance with the Government of Western Australia (Government) procedures. The report will be available for comment until 4 October 1991.

Comments from Government agencies and from the public will assist the EPA to prepare an Assessment Report in which it will make a recommendation to Government.

Following receipt of comments from Government agencies and the public, the EPA will discuss these comments with the proponent and may ask for further information. The EPA will then prepare an assessment report with recommendations to Government, taking into account issues raised in the public submissions.

WHY WRITE A SUBMISSION?

A submission is a way to provide information, express your opinion and put forward your suggested course of action including any alternative approach. It is helpful if you indicate any suggestions you may have to improve the proposal.

All submissions received will be acknowledged.

DEVELOPING A SUBMISSION

You may agree or disagree, or comment on, the general issues discussed in the CER or with specific proposals. It helps if you give reasons for your conclusions, supported by relevant data.

You may make an important contribution by suggesting ways to make the proposal environmentally more acceptable.

When making comments on specific proposals in the CER:

- clearly state your point of view;
- indicate the source of your information or argument if this is applicable; and
- suggest recommendations, safeguards or alternatives.

POINTS TO KEEP IN MIND

By keeping the following points in mind, you will make it easier for your submission to be analysed.

Attempt to list points so that the issues raised are clear. A summary of your submission is helpful. Refer each point to the appropriate section, chapter or recommendation in the CER. If you discuss different sections of the CER keep them distinct and separate, so there is no confusion as to which section you are considering.

Attach any factual information you wish to provide and give details of the source. Make sure your information is correct.

Please indicate whether your submission can be quoted, in part or in full by the EPA in its Assessment Report.

REMEMBER TO INCLUDE YOUR NAME, ADDRESS AND THE DATE

THE CLOSING DATE FOR SUBMISSIONS IS 4 SEPTEMBER 1991

SUBMISSION SHOULD BE ADDRESSED TO:

The Chairman
Environmental Protection Authority
1 Mount Street
PERTH WA 6000

Attention: Ms Jane Aberdeen

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SUMMARY

Cable Sands (WA) Pty Ltd is currently mining an orebody at Wonnerup which contains heavy mineral sands and tailings from a previous ilmenite mining operation. Mining within the existing leases will be completed by February 1992.

Cable Sands herewith requests approval to continue immediately with mining on an adjoining extension of the Wonnerup orebody. This will extend the mine life up 10 to 12 months to about March/April 1993, with land restoration and revegetation of the site being completed by September/October 1993.

Mining methods will be identical to those employed on the existing Wonnerup mine site. The extraction of ore will be by front-end loader. The undersized mineral fraction will be separated from the oversized material by a rotary screening unit, with heavy minerals concentrate being removed from the undersized fraction in an on-site primary treatment plant. All of the plant and equipment required for the proposed extension is already required for the existing Wonnerup mine. The transport of heavy minerals concentrate to Bunbury for secondary treatment will be via the existing approved route.

The potential environmental impacts of the project have been identified and their management is discussed. An environmental monitoring programme has been prepared for the operation and it is concluded that on completion of rehabilitation the proposed mine extension will have no detrimental long term environmental impacts. On the contrary, following mining the radiation levels associated with the orebody will have been reduced to regional background levels.

No Aboriginal or European heritage sites have been identified on the proposed mine site.

Rehabilitation involves the restoration of acceptable landforms which resemble the pre-mining terrain, the construction of a wetland and the stabilisation of the restored landforms with pastures and peppermint trees. A wetland complete with fringing wetland vegetation which is typical of the native vegetation of the region will replace an existing waterhole which is the remnant of an old dragline mining operation.

A public consultation programme was undertaken to inform nearby residents and landowners of the proposed extension. With the exception of one owner/occupier none of the nearby residents or landowners objected to the proposed extension subject to a number of conditions which can be readily met by Cable Sands.

1.0 INTRODUCTION

1.1 Objective

The objectives of this Consultative Environmental Review are to:

- outline the proposed extension of the existing mining operations of Wonnerup,
- assess the potential environmental impacts,
- outline an environmental management program which minimises or avoids potential environmental damage,
- secure approval from the Authorities to commence the proposed extension, thereby extending the total mine life by up to 12 months, and
- obtain an export license from the Federal Government for the proposed extension.

1.2 Location and schedule

The existing and proposed mining operations are sited south of the mouth of the Wonnerup Inlet. The site is approximately 7km north east of Busselton and is located in the Shire of Busselton. The location of the existing mine site and the proposed extension thereof is shown in Figure 1 while Plate 1 provides an aerial view of the sites. The schedule for the development, mining and rehabilitation of the proposed extension is detailed in Figure 2.

Mining will occur on Wonnerup Suburban Freehold Lots 32, 33, 34 and 35. Associated access roads and power supply, the plant and workshop site, and a storage area for heavy minerals concentrate will be located on Lot 34.

1.3 The proponent

The proponent is Cable Sands (WA) Pty Ltd of North Shore, Bunbury, Western Australia 6230.

Since 1990 Cable Sands is a wholly owned subsidiary of Nissho Iwai Australia Ltd. Prior to 1990 the Company was owned equally by Picon Exploration Pty Ltd and Ampol Mining Pty and these Companies were wholly owned subsidiaries of Pioneer International Ltd and Ampol Ltd. Prior to Cable Sands' incorporation in Western Australia in 1986, the Company operated as Cable Sands Pty Ltd and commenced operations at Koombana Beach in Bunbury in 1956. This was the first year that heavy minerals were exported from Western Australia.

Cable Sands has more than 30 years of experience in the mining and separation of heavy minerals. The Company has mined in the

Shires of Busselton and Capel in the late 1960's and 1970's, currently mines near Waroona and Wonnerup, and will shortly commence mining at Jangardup. A mine at Minninup Beach was decommissioned in 1990 and the operations have been relocated to the Busselton East mine. The Company operates a secondary treatment plant at North Shore in Bunbury and maintains an active exploration programme.

Cable Sands is well established and is proficient in all phases of the heavy minerals industry from exploration, mining, secondary separation to marketing, and the Company has established a reputation for operating in a professional and responsible manner.

Cable Sands' experience in environmental management, especially rehabilitation, is extensive, with the Company having successfully restored all of its mined areas to their long-term land use and developed new technologies in land rehabilitation. This is widely acknowledged and has resulted in Cable Sands having received a number of awards for its land rehabilitation programmes. The latest award is the John Tonkin Tree Award in 1988 from the Greening Australia Campaign for the Company's performance in rehabilitating hind dunes at Minninup and agricultural land in the Shire of Capel. The Company was also a finalist in 1990 of the 'Best Regional Exporter Award' of the Western Australian Export Achievement Award.

1.4 Land ownership

The proposed extension is on lots which are freehold complete with ownership of the minerals and they are owned by Port Geographe Development Pty Ltd and Optel Pty Ltd on behalf of Interstruct Holdings Limited (Interstruct), the company which is proposing the Port Geographe development. Cable Sands is finalising a compensation agreement with Interstruct. Details of this agreement are confidential but they will be provided to the Department of Mines. In the interim it is requested that the approval process for this extension is not delayed by the finalisation of the compensation agreement.

In addition to the Interstruct controlled lots, the proposed extension is surrounded by a number of other properties. All of these properties, including the Interstruct properties, are shown in Figure 8 complete with their lot numbers. Properties controlled by Interstruct have their lot numbers circled to distinguish them from other privately owned properties. Similarly, lots with residences are distinguished by a line under their lot number from lots without residences.

1.5 Land use

In the 1880's the land was cleared and developed to grazing by European settlers and has been used for cattle and sheep grazing since then. The grazing value of the land is marginal because of

the low fertility and moisture retention capacity of the sandy soils. In recent years the land has been rezoned from rural to rural-residential and this use is continuing.

The deposit is in a region which is noted for its strandlines of heavy minerals. The mining of these commenced in the mid 1950's, and is ongoing. The proposed mining operation is on a strandline which was mined partially in the 1960's.

2.0 EXISTING ENVIRONMENT

2.1 Physiography

The proposed mine extension is located towards the southern end of the Swan Coastal Plain between Busselton and Capel. An extensive series of wide lagoons and wetlands exist at the interface between the Plain and Geographe Bay. Extensive seasonal inundation occurs due to poor drainage and to the soils which are generally shallow sands overlying clay.

The proposed mine extension is inland of the beach and its associated dune system and consists of aeolian sand which is typical of the coast of Geographe Bay.

2.2 Hydrology

2.2.1 Surface water

The Vasse wetland receives water from the Vasse, Sabina and Abba rivers. A floodgate on the channel which connects the Vasse Estuary with the Wonnerup Inlet prevents tidal inflows and saltwater inundation of inland pasture lands. Due to evaporation, salinity in the wetland increases over summer and the water is often hypersaline by autumn.

South east of the floodgate is a waterhole which is a remnant of an earlier dragline mining operation.

The proposed extension to the current Wonnerup mine is situated to the east of the channel and to the south west of the floodgate.

Water from the Vasse Estuary and the dam on the existing mine site have been monitored for electrical conductivity, pH and total suspended solids on a weekly basis to ensure that no discharge occurs as a result of the current and the pending operation. The results are presented in Appendix 1 in full and show that the conductivity in the dam ranges between 0.5 and 32 mS/cm and in the estuary between 1.0 and 78 mS/cm. The pH of the dam ranges between 5.6 and 8.8 and in the estuary from 5.7 to 8.6. The total suspended solids of the dam vary from 9 to 160mg/l and in the estuary from 5 to 100 mg/l.

There have been no adverse effects detected as a result of the current mining operation. The variations of the monitored parameters are due entirely to seasonal changes and to the opening and closing of the floodgates at the mouth of the Estuary.

2.2.2 Groundwater

The Yarragadee Formation supplies most of the water needs of the towns of Busselton, Dunsborough and Quindalup. Recharge of this

groundwater aquifer occurs through the direct infiltration of rainfall on the Blackwood Plateau and on the Coastal Plain with some recharge from run-off from the Darling Plateau and the Leeuwin-Naturaliste Ridge. Groundwater flow is generally in a northerly direction and it discharges into Geographe Bay.

Groundwater from the artesian bore at the existing Wonnerup operation has been monitored for pH and electrical conductivity on a monthly basis and the results are given in full in Appendix 2. Electrical Conductivity ranges between 400 and 560 µ/cm and pH between 5.2 and 7.0. The mining operation has had no adverse effect on groundwater quality and only a temporary lowering of the groundwater table has been detected.

2.3 Vegetation, flora and fauna

2.3.1 Vegetation and flora

The vegetation of the proposed mine extension consists of pasture with six semi-mature to mature peppermint trees (Agonis flexuosa). The pasture is dominated by couch grasses (Cynodon Spp.) with subterranean clovers and annual grasses also being common. The southern and eastern boundaries of the mine extension are delineated by an open woodland of peppermint trees with an understorey of pasture. All native understorey vegetation within this woodland has been cleared by earlier occupation and pastoral use. The site does not contain any gazetted rare or priority listed flora species.

2.3.2 Fauna

The vegetation of the proposed mine extension has little habitat value for native fauna and consequently it is concluded that it is extremely unlikely that the area supports any gazetted rare or endangered species. The adjoining open woodland of peppermint trees has evidence of being inhabitated by the Western Ringtail Possum (Pseudocheirus occidentalis).

2.4 Noise

A daytime noise survey was conducted on 22 May 1991 adjacent to the closest residences to the proposed operation and the results are shown in Figure 3 and Table 1. The existing Wonnerup operation was faintly audible at all monitoring points with noise levels ranging between 41 and 47 dB(A). A further survey was conducted at the same monitoring locations on 31 May 1991 when the existing Wonnerup mine site was not operational. Background noise levels ranged between 41 and 43 dB(A).

A reading of 45dB(A) was recorded at House 6, which is the closest residence to the existing operation. This reading is 2dB(A) above the maximum recorded background noise level. It can be reasonably expected that noise levels at Houses 1, 2, 3, 4 and

5, which are located adjacent to or on the proposed mine extension, will increase marginally as the mining operation moves towards them. It is not expected that noise levels will increase significantly above 47 dB(A) and especially not above 50dB(A) which is the level established by the Environmental Protection Authority for the nearby Busselton East Operation.

House 1, which is located on Lot 34 and which will be closest to the proposed mine, is separated from the proposed mining operation by a sand ridge which in parts is up to 5m high. This ridge will provide House 1 with a substantial sound barrier which will ensure that this house will not be affected adversely by noise generated by the proposed mine extension.

2.5 Radiation

A survey of gamma dose rates, one metre above ground level, was undertaken in the area of the proposed mine site on 14 and 15 March 1991. The area surveyed included the proposed mine site and adjacent pastures and dunes. Dose rates were measured at 110 locations on a 25 x 25m survey grid and the results are given in Figure 4.

The mean gamma dose rate across the entire area was 0.24 µGy/hr with a standard deviation of 0.08 µGy/hr. Readings ranged from 0.14 to 0.59 µGy/hr with most readings being comparable to natural background gamma levels of 0.20 to 0.35 µGy/hr.

The radiation rates relate directly to the presence of the orebody which in places has no overburden above the mineral fraction which is the source of the radiation. Several readings are in excess of the derived public safety level of 0.42 µGy/hr which equates to an annual effective dose limit of 1 mSv as tabled in Schedule 3 of the 1987 Code of Practice on Radiation Protection in the Mining and Milling of Radioactive Ores. These sites of higher radiation are all located in the south-west corner of the orebody and close to the Vasse channel.

2.6 Pre-mining contours and topography

A pre-mining topographical survey was conducted and the contours are given in Figure 5(a) with three cross sections being shown in Figure 5(b). In Figure 5(a) pre-mining contours are shown along with fence lines, tree belts, houses and sheds.

2.7 Aboriginal and European heritage

The register of aboriginal sites at the Department of Aboriginal Sites of the Western Australian Museum was consulted. The area has been included in previous surveys and two registered sites are known to be in the vicinity of the project. Site S0259 is classified as a burial site and was first identified in the 1830's near Wonnerup. The exact location of this site is not

known to the Western Australian Museum. Site S065 occurs on Wonnerup Beach. Neither of these sites are located on the project area.

An archaeological survey was conducted to search for any unrecorded Aboriginal sites occurring on the proposed mine extension. None were found.

The area covered by the proposed extension has no known European heritage values.

3.0 PROJECT DESCRIPTION

3.1 Ore reserves

The location of the orebody is given in Figure 1. This will be mined to an average depth of about 3m, with a 10m wide stand-off strip being retained to separate the mining operations from the Vasse Channel. Topsoil will not be mined as it will be retained for land rehabilitation except in instances where its natural radiation levels are substantially in excess of regional background levels and mining is required to lower these levels.

3.2 Layout of proposed operations

The layout for the proposed operation is illustrated in Figure 6. The proposed extension requires the establishment of a new plant and workshop site, a new storage area for heavy minerals concentrate, associated access roads and power on lot 34.

Development of the mine site will involve the construction of a water holding dam within the orebody, relocation of the rotary screening unit and a new bore and pump station.

A bore will be sunk in the vicinity of the water holding dam to replace the bore which is currently being used on the Wonnerup mine site. This will permit the completion of rehabilitation of the existing operational area. A license application for a new bore has been submitted to the Water Authority of Western Australia and as soon as the license is granted a copy thereof will be forwarded to the Department of Mines. Since the new license will replace an existing one, and since the water requirement of the extension will be similar to the current operations, it is assumed that license approval will not be a problem.

Topsoil will be stripped and stockpiled for use in the rehabilitation programme from all areas where access roads, plant, workshops and other infrastructure are placed, giving due consideration to radiation levels.

3.3 Mining Sequence

Mining will involve the following sequence:

- Bunding off with sand of the dragline pond which is a remnant of previous mining operations, and construction of a water holding dam within the confines of the orebody. Ore will then be removed from the water holding dam and stockpiled on the eastern end of the orebody. This work will be done prior to any processing. It is estimated that 12,000 bank cubic metres of material will be excavated from this dam.

- Mining will then commence at the western end of the orebody.

- Mining operations will progressively move to the eastern end of the orebody and the previously stockpiled material which was extracted for the construction of the water holding dam will be processed.

Prior to mining all topsoil with radiation levels acceptable to the relevant authorities will be stockpiled off the orebody for later use in rehabilitation. Any topsoil with an unacceptably high radiation level will be mined and treated to remove the mineralisation and associated radiation levels.

The orebody is approximately 2 to 3 metres deep. Ore will be dry mined from a shallow open cut by a front-end loader and dumped directly into a rotary screening unit. This unit separates the undersized mineral fraction from the oversized waste rocks and sticks, with the undersized fraction being pulped in water and pumped to the primary treatment plant. The oversized waste will be returned to the floor of the excavation. The primary treatment plant is a steel framed structure containing several stages of spiral concentrators, pulping hoppers, launders and distributors for the physical separation of the various minerals by gravity separation. The separation process will require no chemicals or reagents. All of the plant is mobile or demountable and all of it is being used on the existing mining operation.

The separation of the ore in the primary treatment plant into tailings (clean sand) and heavy minerals concentrate and the hydraulic transport of these fractions requires water. This water will be obtained from the water holding dam. Water will be recycled efficiently with the water holding dam receiving water from the dewatering of the heavy minerals concentrate and the tailings and from the bore.

The stockpiled heavy minerals concentrate will be trucked periodically to Cable Sands' secondary treatment plant in Bunbury for final fractionisation.

Mining will occur Mondays to Fridays between the hours of 0700 and 1900. Weekend operations will be infrequent and they will be directed by the needs of the secondary treatment plant in Bunbury.

3.4 Tailings operation

Initially, tailings will be stockpiled in the water holding dam but after approximately two months of mining the mine pit will be sufficiently large enough for tailings to be deposited directly into the pit. At this stage the reshaping of the landforms to approximately their original contour levels will commence and thereafter landform restoration will continue progressively behind the mine face.

3.5 Timing of project

The current operation at Wonnerup is scheduled to be completed by February/March 1992 and by this time it will be necessary to have a suitable site prepared for the relocation of plant and equipment on the Wonnerup extension. It will be necessary to gain access to the site late in 1991 to allow site development of power, water supply and other infrastructure prior to the relocation of the plant. A proposed project schedule is shown in Figure 2.

Mining will take up to 12 months and once mining is completed final shaping of the landforms will occur. It will not be until the end of the winter of 1993 that rehabilitation will be completed. The sand bund separating the water holding dam from the Vasse. Channel will be removed to allow for the development of a wetland.

3.6 Decommissioning

On completion of the operation all materials, structures, foundations, machinery, stockpiles and wastes will be removed and the site will be left in a clean condition. The replacement of fences, gates and access ways will be to the landowners satisfaction.

3.7 Post-mining ground levels and rehabilitation

A conceptual post-mining plan complete with tree belts, fences and access roads has been prepared and is shown in Figure 7. This plan outlines the final shape and position of the wetland and the portion of the access road to Lot 34 that will remain.

Approximately 5000 bank cubic metres of heavy minerals concentrate will be removed from the site. This loss of material represents an average lowering of 0.25 metres over the entire orebody. The plan for the final position and size of the wetland has been prepared so that all of the volume loss will be incorporated into this area with the result that levels over the rest of the orebody will be similar to pre-mining levels. There will be minor local variations in levels since it is not practical to end up with exactly the same contours that prevailed prior to mining. The floor of the wetland will be the same level as the floor of the Vasse channel thus maintaining water circulation and preventing the buildup of anoxic water in the wetland basin. Batters surrounding the wetland will be shallow and they will be stabilized with wetland vegetation, including sedges, shrubs, thickets and trees which are typical and native to wetlands in the region. A conceptual illustration of this is given in Sketch 1.

A post mining profile through the rehabilitated wetland area is shown in Figure 5(b), Section BB 800 East. Pre mining profiles

outside the wetland area are also shown in Figure 5(b), namely Sections AA and CC, and these can be considered as typical of the post mining sections.

Rehabilitation commences with the return of tailings into the mine pit. Once a sufficient quantity of these tailings is available and their free water has drained away, terrain shaping will commence. The fine clays which precipitate in the water settling pond will be spread on top of the reshaped tailings and ploughed into their surface profile. This will enhance the moisture retention of the surface horizon of the restored landform. Topsoil will be replaced during the autumn and the winter periods, and it will be seeded and fertilized to establish a clover based pasture.

To compensate for the loss of nutrients through leaching during mining and separation processes it is proposed that an application of 400 kg of superphosphate and 200 kg of a complete NPK fertiliser will be applied per hectare together with a suitable trace element mix. The final quantities will be determined on the basis of soil analysis.

Mining will result in the removal of a small number of peppermint trees which are on the orebody. As part of the rehabilitation programme substantially more trees will be planted from nursery raised seedlings than were removed for the purpose of mining.

Planting will be undertaken in May 1993 so that trees will become established during the following wet winter season.

3.8 Transportation

The trucking of heavy minerals concentrate to North Shore, Bunbury, will be along the route for which approval is in place for the existing operation. An extension of this approval is being negotiated with the Shire of Busselton.

4.0 ENVIRONMENTAL IMPACT AND MANAGEMENT

4.1 Hydrology

Based on the data that exists from the current mining operation at Wonnerup, it is anticipated that there will be no adverse effects on the Vasse Estuary as a result of the proposed mining of the Wonnerup extension.

The proposed operation will require the establishment of a new bore which will draw water from the same aquifer as the bore which is currently operating at the Wonnerup mine site but which will be decommissioned once the new bore is operational. Drawing water from this bore will have no adverse effect on the regional hydrology. The only effect that is anticipated is a short term and localised lowering of the groundwater table which will return to pre-mining levels upon completion of mining.

On completion of mining the bund separating the reconstructed wetland from the Vasse Channel will be removed, and the wetland will return to estuarine conditions within a few tidal cycles.

4.2 Vegetation, flora and fauna

The proposed mining operations will destroy six semi mature to mature peppermint trees. This tree removal is unavoidable and it will be kept to an absolute minimum. It is proposed to plant substantially more trees during the rehabilitation programme than were removed for the purpose of mining. The open woodland on the southern and eastern boundaries of the mine extension will not be affected by mining operations.

The lack of suitable native habitats means it is extremely unlikely that the area will contain any rare or endangered species of fauna and the proposed mining operation will hence not devalue the conservation value of the area. The existing woodlands of peppermint trees will not be destroyed and their habitat value for the Western Ringtail Possum will be retained.

4.3 Noise

Noise levels measured from the current operation are marginally above the expected noise levels of a typical rural environment.

Noise will be derived from the plant and a front-end loader used in the dry mining process. The work force will be protected from operational noise by the wearing of appropriate protective equipment and by operating enclosed equipment where applicable. No operations, apart from emergencies, will be undertaken on Sundays or between the hours of 1900 and 0700. Consequently, no noise due to the operation will be experienced during these times. Weekend operations will occur on an infrequent basis, as

directed by the ongoing requirements of the secondary treatment plant in Bunbury.

Noise surveys will be conducted regularly to ensure that operational noise levels will continue to remain low and that they do not cause annoyance to nearby residents.

4.4 Radiation

On completion of mining the radiation levels of the rehabilitated landforms will approximate the regional background levels which are well below the derived public safety level of 0.42 µGy/hr. A benefit of the proposed mining is that on completion of rehabilitation the long term land use will not be restricted by radiation considerations. On the basis of surveys conducted on the adjacent areas on which mining has been completed the radiation levels are likely to be in the range of 0.2 to 0.35 µGy/hr.

4.5 Dust

Dust levels on the proposed Wonnerup extension are expected to be extremely low. Dust has not been an issue of concern at the existing Wonnerup operation due to the small size of the operation, high rainfall, particularly during the Winter months, and strict management which ensures that the size of the actively exposed areas which are potential dust sources are kept to an absolute minimum. The proposed Wonnerup extension will be a similarly small operation. Dust may be generated during the summer months from areas stripped of vegetation, but as these areas will be kept to a minimum, dust generated from the proposed operation is not expected to be a problem. Vegetation will be re-established on restored areas and this will assist in keeping dust to a minimum. Should the need arise, dust levels will be controlled through spraying the site with water or by other stabilisation methods such as hydromulching or haymulching.

4.6 Environmental monitoring programme

Cable Sands proposes to continue to monitor the mine extension as required for the current operation, namely:

a) Noise: Noise surveys will be undertaken at the 6 locations given in Figure 3 at three monthly intervals or as otherwise determined by the Pollution Control Division of the Environmental Protection Authority.

b) Radiation: Regular operational checks will be made on radiation levels. On completion of mining a radiation survey will be conducted on the rehabilitated landforms to demonstrate that there is no restricted use for the site.

c) Water quality: Water from the Vasse channel and the water holding dam will be monitored for electrical conductivity, pH and total suspended solids on a weekly basis to ensure that no discharge occurs as a result of the operation. Groundwater from the bore will be monitored monthly for pH and electrical conductivity.

d) Rehabilitation: Once mining has ceased site inspection will be undertaken at the end of the first winter and summer to monitor the establishment of pastures and peppermint trees. If required, additional plantings will be undertaken.

e) Reporting: All monitoring results will be collated and these will be open for inspection by officers of the Department of Mines. The results will be submitted as part of an annual mine site report which will be submitted to the Department of Mines.

5.0 PUBLIC CONSULTATION AND SOCIAL IMPACT

5.1 Local residents and landowners

Local residents and landowners are considered to represent those members of the community who will be affected most by the proposed extension. Consequently, an effort was made to consult all of the landowners of the lots which are numbered in Figure 8.

Every residence was visited individually by a representative from WG Martinick and Associates, and visits varied from about 20 minutes to 2 hours, with the average duration being about 1 hour. Residents were informed in detail about the proposed operations and they were shown the draft Consultative Environmental Review. Questions and concerns were discussed and answered. The owners of unoccupied lots were contacted by a combination of visits, correspondence and phone calls.

On conclusion of a visit a brief summary was prepared and read to the respective residents to ensure that the summary accurately reflected the meeting. Residents were encouraged to assist in the preparation of this summary. Following the visit a letter was forwarded to each residence thanking the respective residents for the opportunity of having outlined and discussed the proposal. Also enclosed in the letter was a copy of the summary prepared during the visit to a particular residence. Residents were also invited to contact WG Martinick and Associates if the summary did not reflect their views or if they had changed their views.

Residents were informed during the visit that their views would remain confidential but that they would be made available to the Environmental Protection Authority.

The results of the consultative programme are summarised below:

Of the thirty eight lots shown in Figure 8, twenty one are controlled by Interstruct and seventeen are privately owned, with ten being owner occupied, including a holiday house which is infrequently occupied. Five of the Interstruct lots have residences but of these only three are occupied. Of the thirteen occupied lots the residents of one, an owner occupied lot, were not consulted because they were on vacation. The residents of one of the lots were opposed to the existing operation and to the proposed extension for the following reasons:

- safety to children due to the trucking,
- noise from trucking and the operation,
- exhaust fumes from the operation,
- dust,
- unhappy with present rehabilitation,

- concerned about the likely impact on the ecology of the channels, and
- mining should not take place in a rural environment such as this one at Wonnerup.

The residents of the remaining eleven occupied lots were all in support of the proposed extension and they voiced no major concerns about the present operations. Their support ranged from a simple: no objections to the existing operation and the proposed extension to being in favour of the project.

A number of conditions were listed subject to their approval for the proposed extension, these included:

- not removing a group of trees on Lot 16 (these will not be removed),
- trucking remaining as organised at the moment whereas trucking is confined to two to three days within a two to three weeks period,
- no substantial increase in the size of the existing operations,
- damage to the road surface at the corner of Layman and Lochville Roads being repaired regularly and empty trucks being requested to drive around this corner at a slower speed,
- no environmental damage to the channel and the wetland systems in general, and
- the existing high standard of rehabilitation being maintained.

Without exception all of the residents appreciated the opportunity of being informed of the proposed extension, to comment on the existing operation and to suggest improvements. Except for the previously referred to residents who were critical of the existing operations and objected to the proposed extension, none of the remaining residents had any serious complaints about the existing operation. Their comments varied from "it does not bother us", "no problems", "go for your life" to being complimentary with respect to rehabilitation, trucking arrangements and Cable Sands' willingness to discuss concerns. A common complaint was a request to reduce the loudness of the on-site telephone. This has since been attended to.

Six of the seven owners of non Interstruct controlled lots without any residences on them were contacted. The owners of the seventh lot are currently overseas on holiday. None of these objected to the proposed extension. Comments were either complimentary of the existing operation or non-committal, and in a number of instances approval was subject to conditions which were similar to those listed by approving residents.

It is concluded that whilst residents of one of the lots are opposed to the proposed extension, this extension has general

support from the local community subject to a number of conditions. These conditions will all be met by Cable Sands.

5.2 The wider community

The Shire of Busselton was informed of the proposed extension during two visits to their offices by a representative of WG Martinick and Associates. The existing operation and the proposed extension was outlined and discussed and a copy of the Consultative Environmental Review was subsequently forwarded to them. No objections were raised during the meetings.

Copies of the draft Consultative Environmental Review were also forwarded to the Conservation Council of Western Australia in Perth and to the Australian Conservation Foundation in Perth and in Bunbury together with a request to provide comments and to discuss the project. To date no reply has been received but it was indicated over the phone that the report was still being assessed.

6.0 REFERENCES

Code of Practice on Radiation. Protection in the Mining and Milling of Radioactive Ores Department of Mines. Western Australia, 1987.

PLATE 1: OBLIQUE AERIAL VIEW, LOOKING IN A NORTHEASTERLY DIRECTION, OF THE EXISTING AND PROPOSED OPERATIONS AT WONNERUP

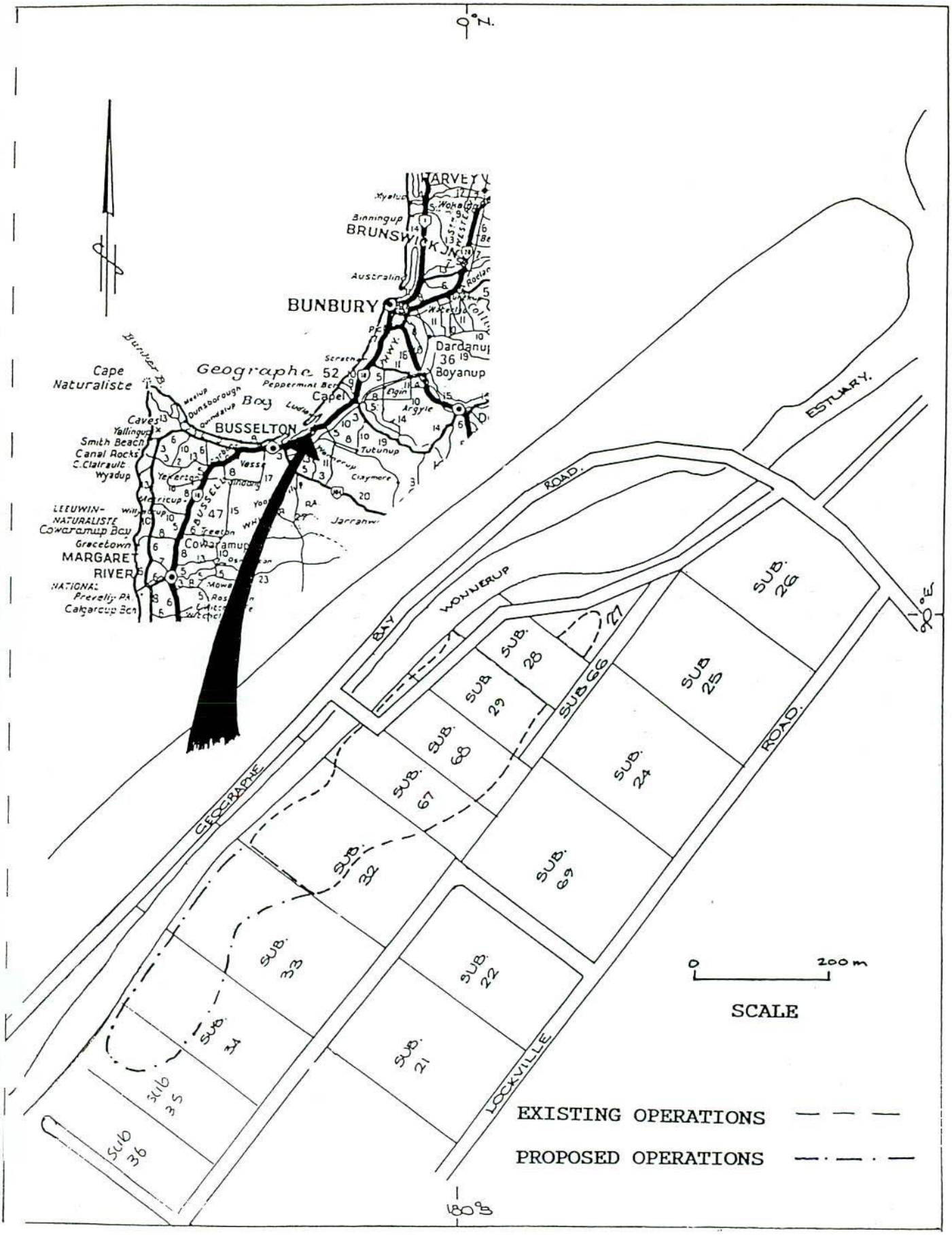
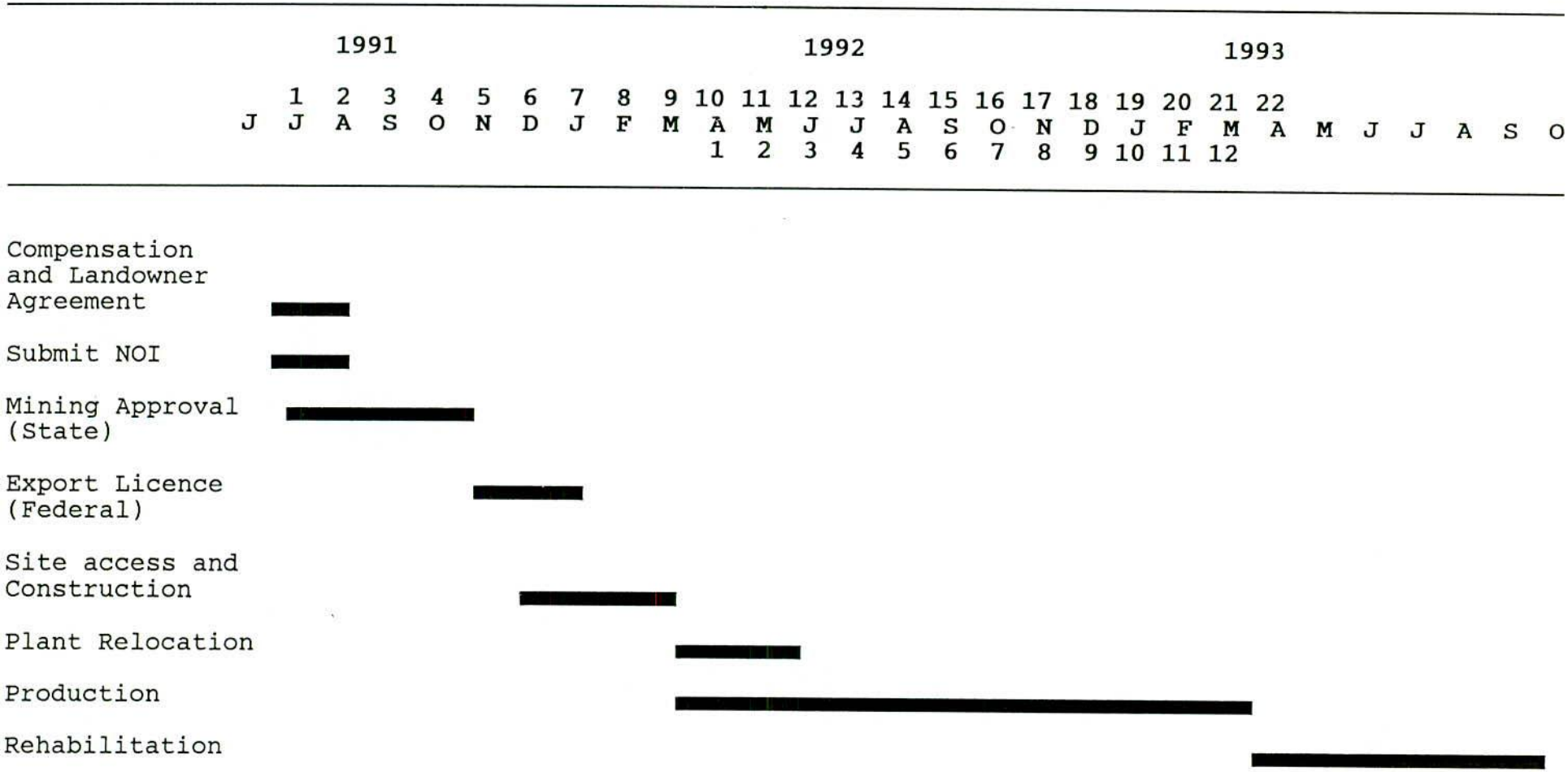


FIGURE 1

LOCALITY MAP OF EXISTING AND PROPOSED OPERATIONS AT WONNERUP

FIGURE 2 PROPOSED PROJECT SCHEDULE FOR THE WONNERUP EXTENSION



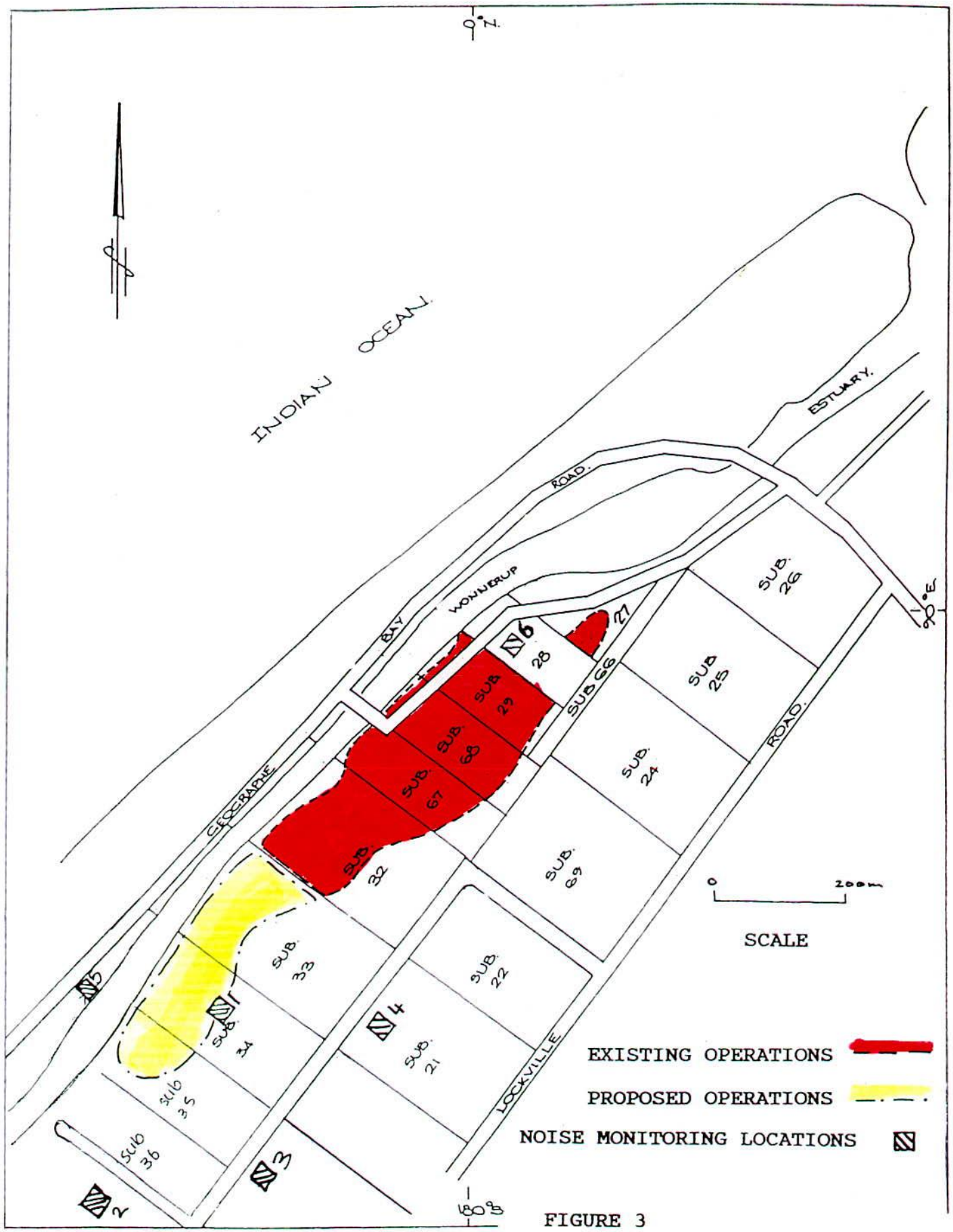
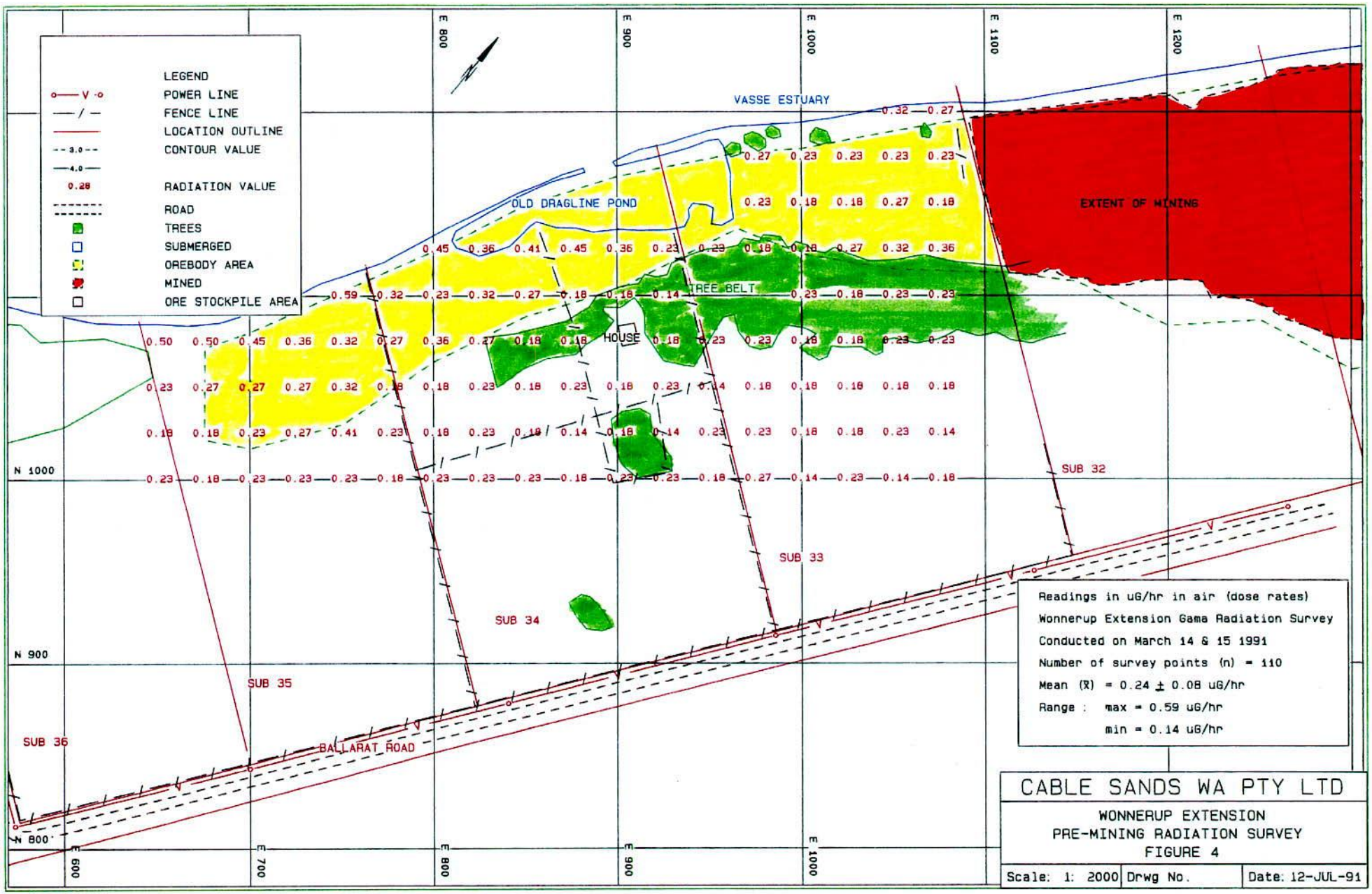


FIGURE 3

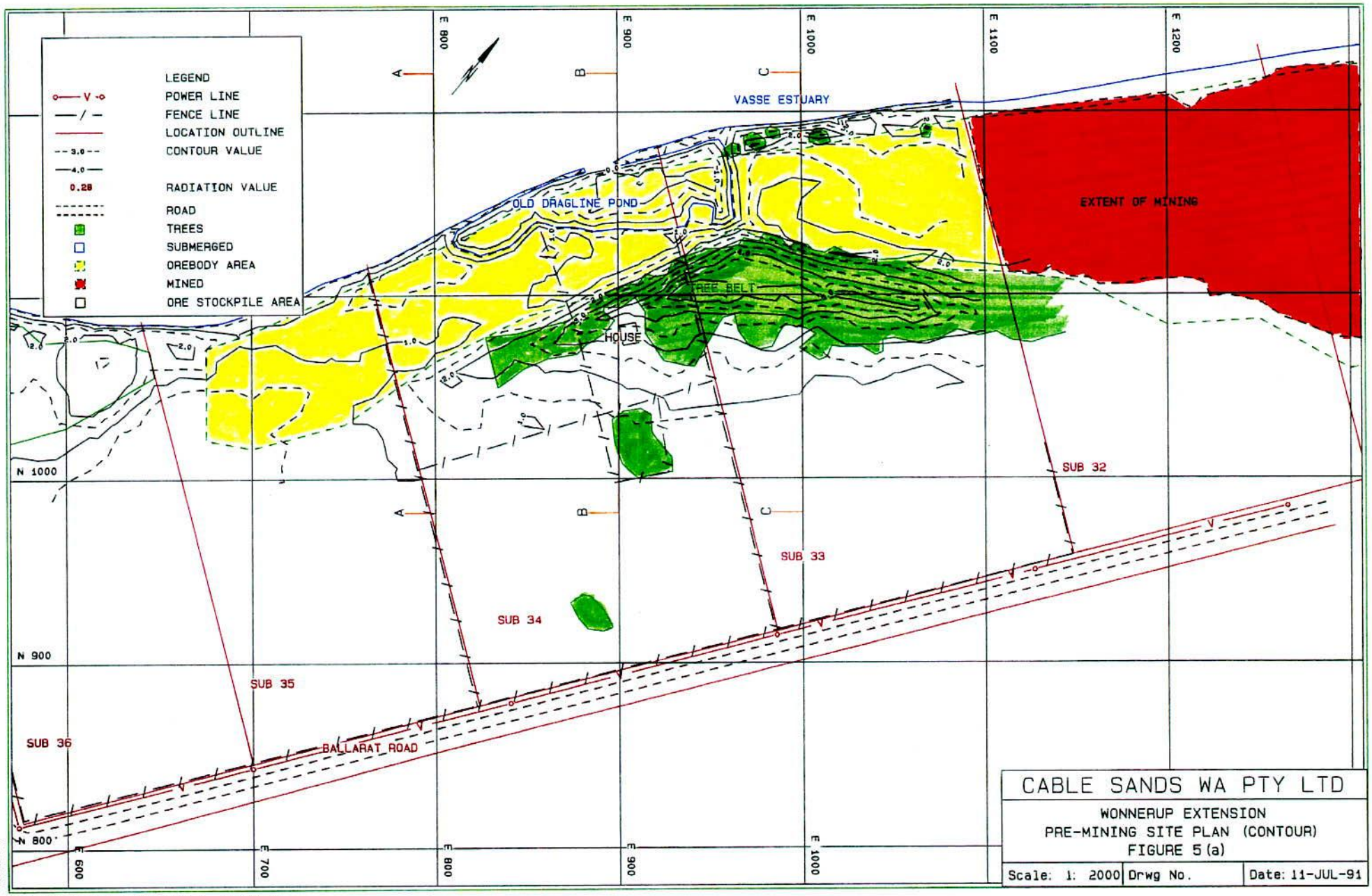
WONNERUP MINING AREA:

NOISE MONITORING LOCATIONS



WON2B.PF

SURPAC SOFTWARE INTERNATIONAL, AUSTRALIA



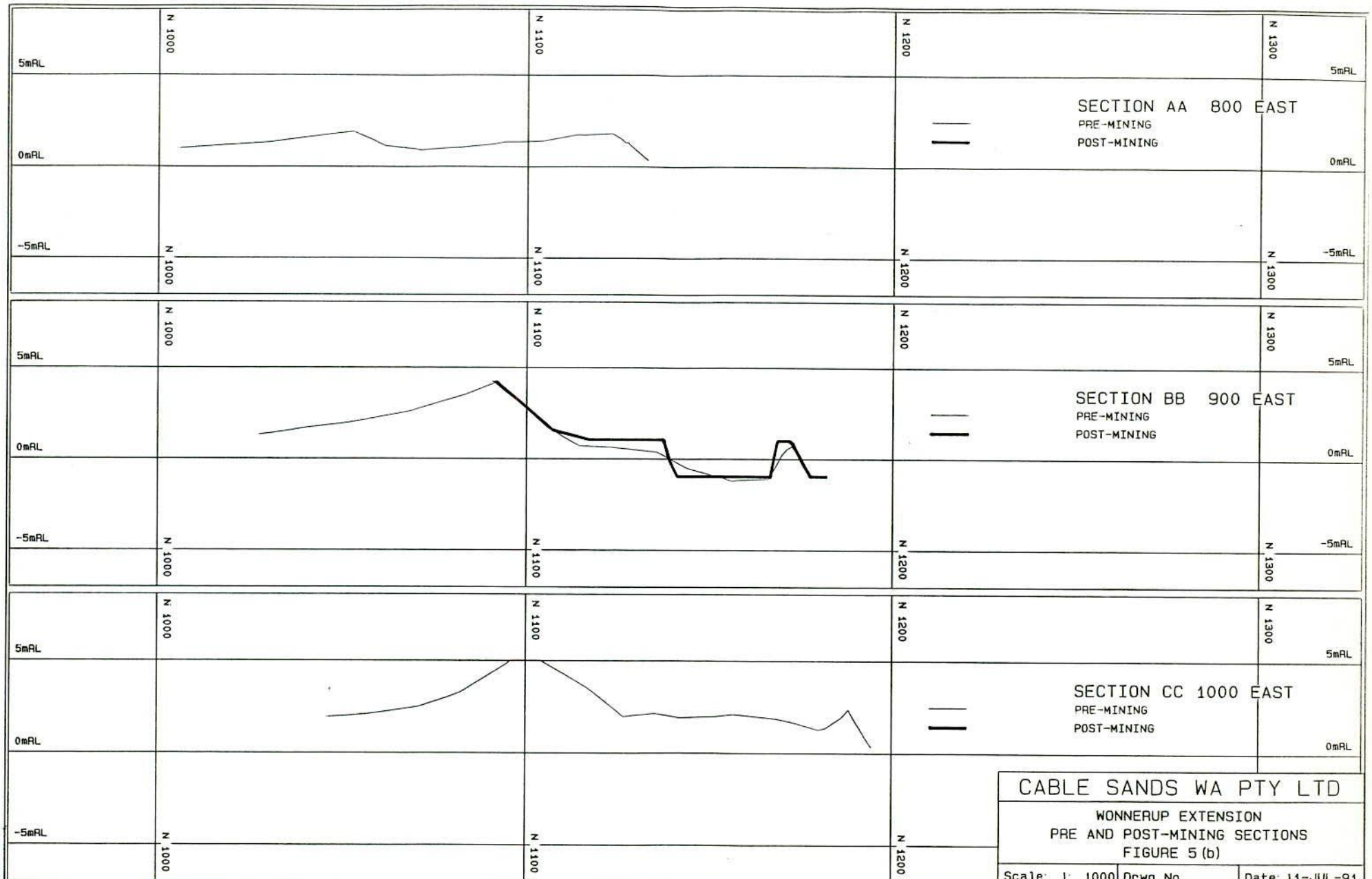
CABLE SANDS WA PTY LTD

WONNERUP EXTENSION
PRE-MINING SITE PLAN (CONTOUR)
FIGURE 5 (a)

Scale: 1: 2000	Drwg No.	Date: 11-JUL-91

WON1B.PF

SURPAC SOFTWARE INTERNATIONAL, AUSTRALIA

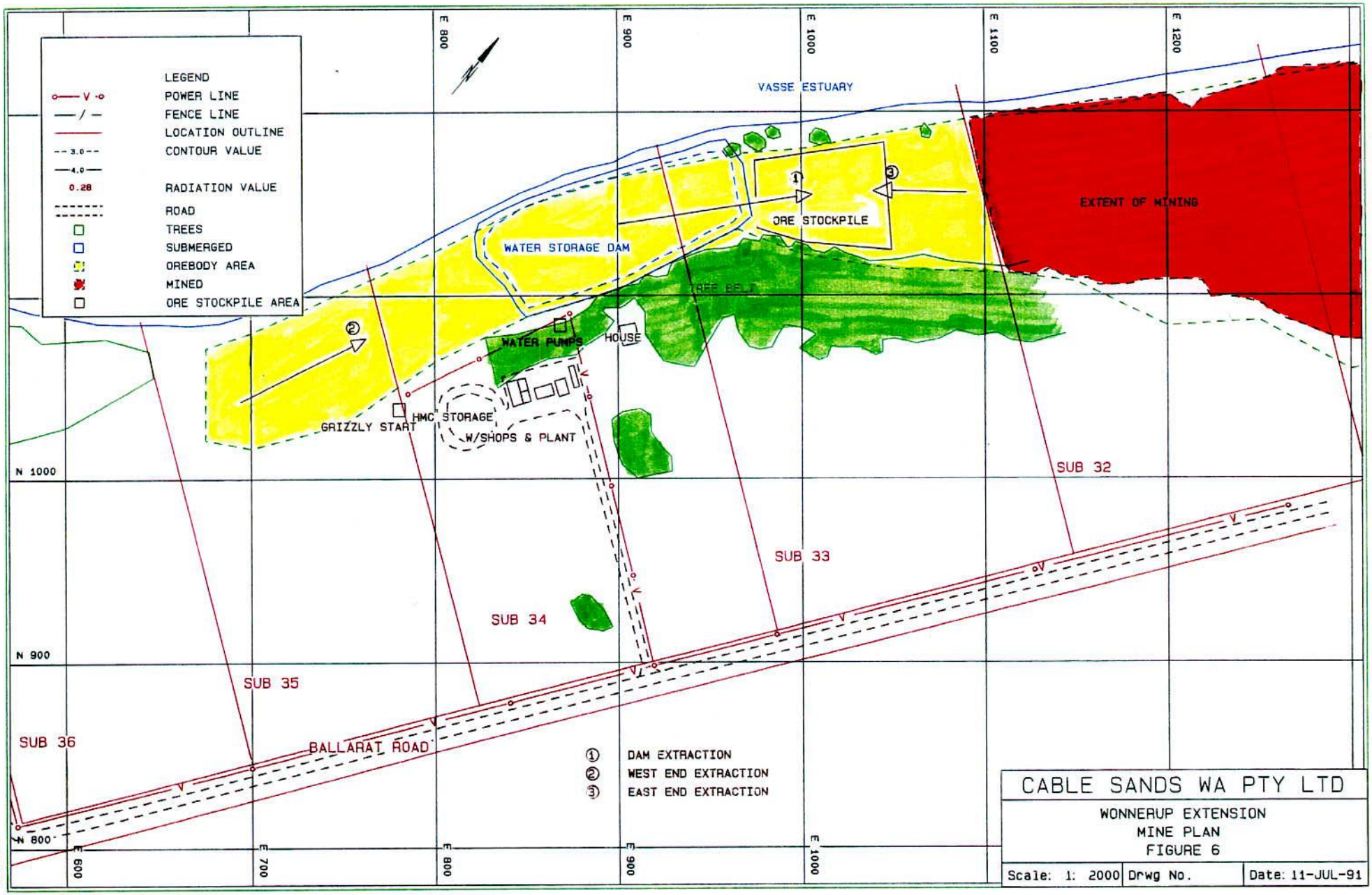


CABLE SANDS WA PTY LTD

WONNERUP EXTENSION
PRE AND POST-MINING SECTIONS
FIGURE 5 (b)

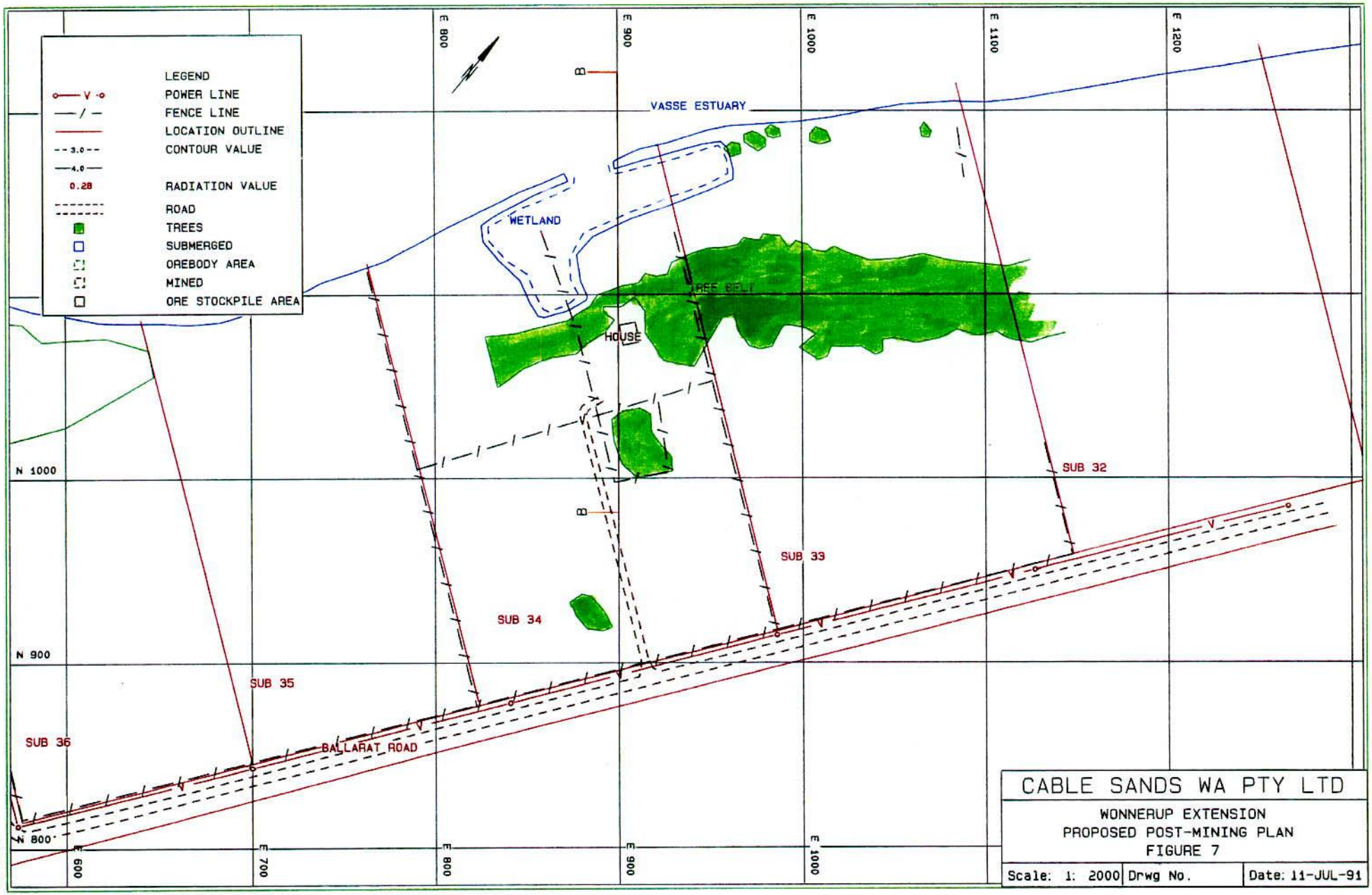
Scale: 1: 1000	Drwg No.	Date: 11-JUL-91

WONSEF.PF



WON3F.PF

SURPAC SOFTWARE INTERNATIONAL, AUSTRALIA



CABLE SANDS WA PTY LTD

WONNERUP EXTENSION
PROPOSED POST-MINING PLAN
FIGURE 7

Scale: 1: 2000 | Drwg No. | Date: 11-JUL-91

WON4E.PF

SURPAC SOFTWARE INTERNATIONAL, AUSTRALIA

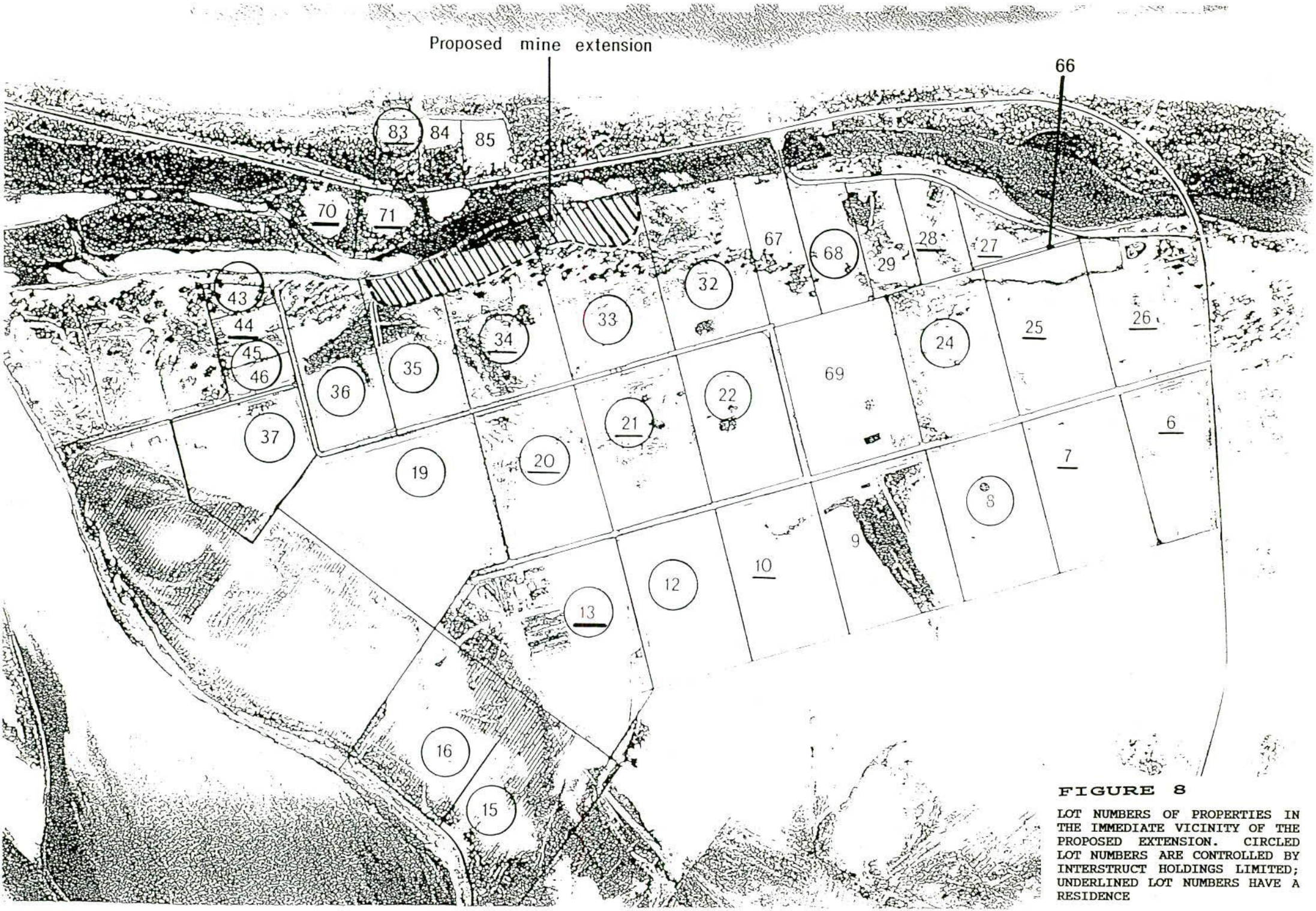
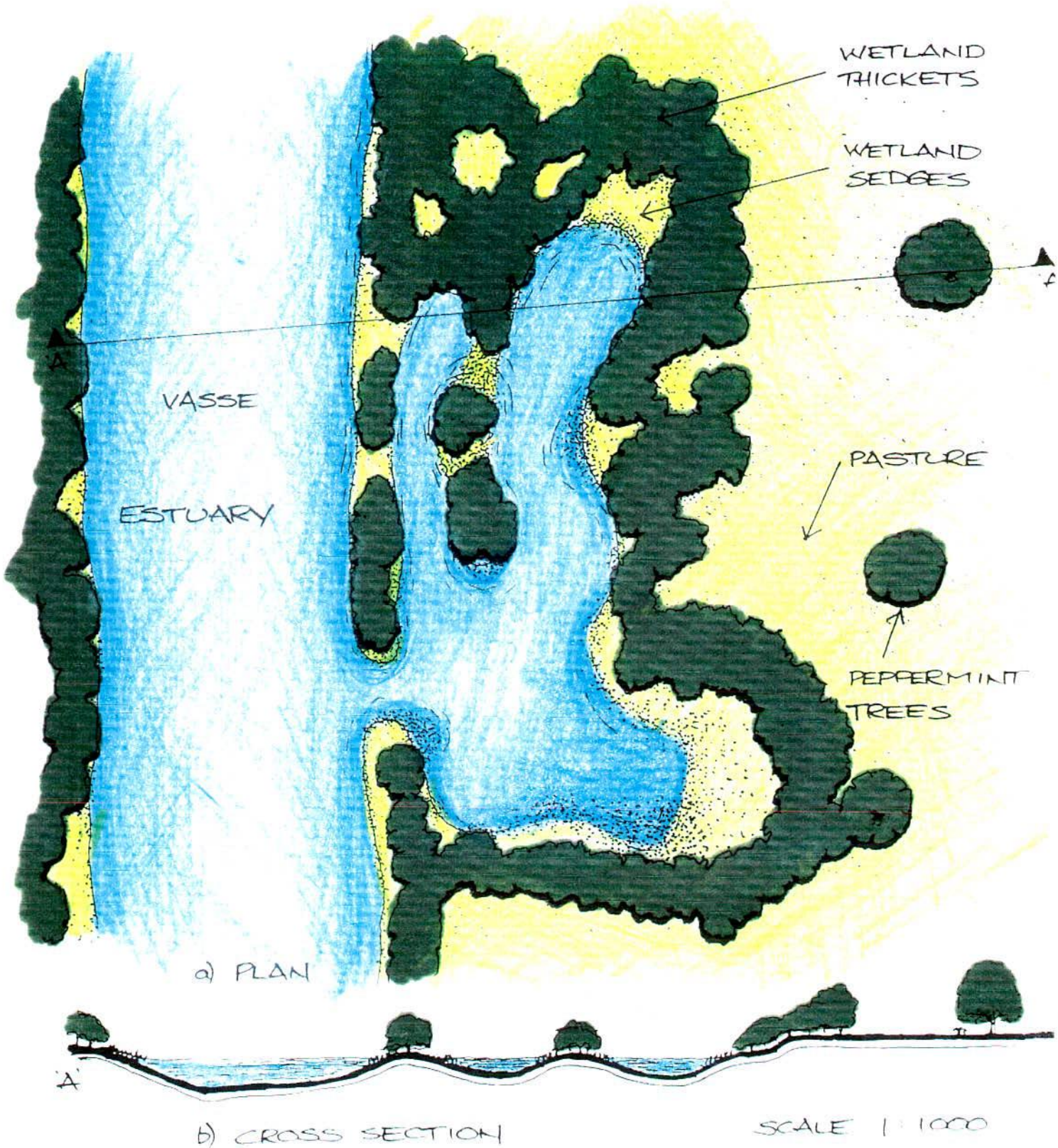


FIGURE 8

LOT NUMBERS OF PROPERTIES IN THE IMMEDIATE VICINITY OF THE PROPOSED EXTENSION. CIRCLED LOT NUMBERS ARE CONTROLLED BY INTERSTRUCT HOLDINGS LIMITED; UNDERLINED LOT NUMBERS HAVE A RESIDENCE



SKETCH 1. CONCEPTUAL LANDSCAPE DESIGN OF REHABILITATED WETLAND; A REMNANT WATERHOLE OF PREVIOUS MINING BY DRAGLINE.

W.G. MARTINICK & ASSOC. '91

TABLE 1 RESULTS OF DAYTIME NOISE SURVEYS CONDUCTED ON THE EXISTING WONNERUP MINE SITE

LOCATION	MEASURED NOISE LEVEL dB(A)*	
	22 MAY 1991 MINE IN OPERATION	31 MAY 1991 MINE NOT IN OPERATION
1	41	41
2	42	41
3	43	42
4	47	43
5	43	42
6	45	42

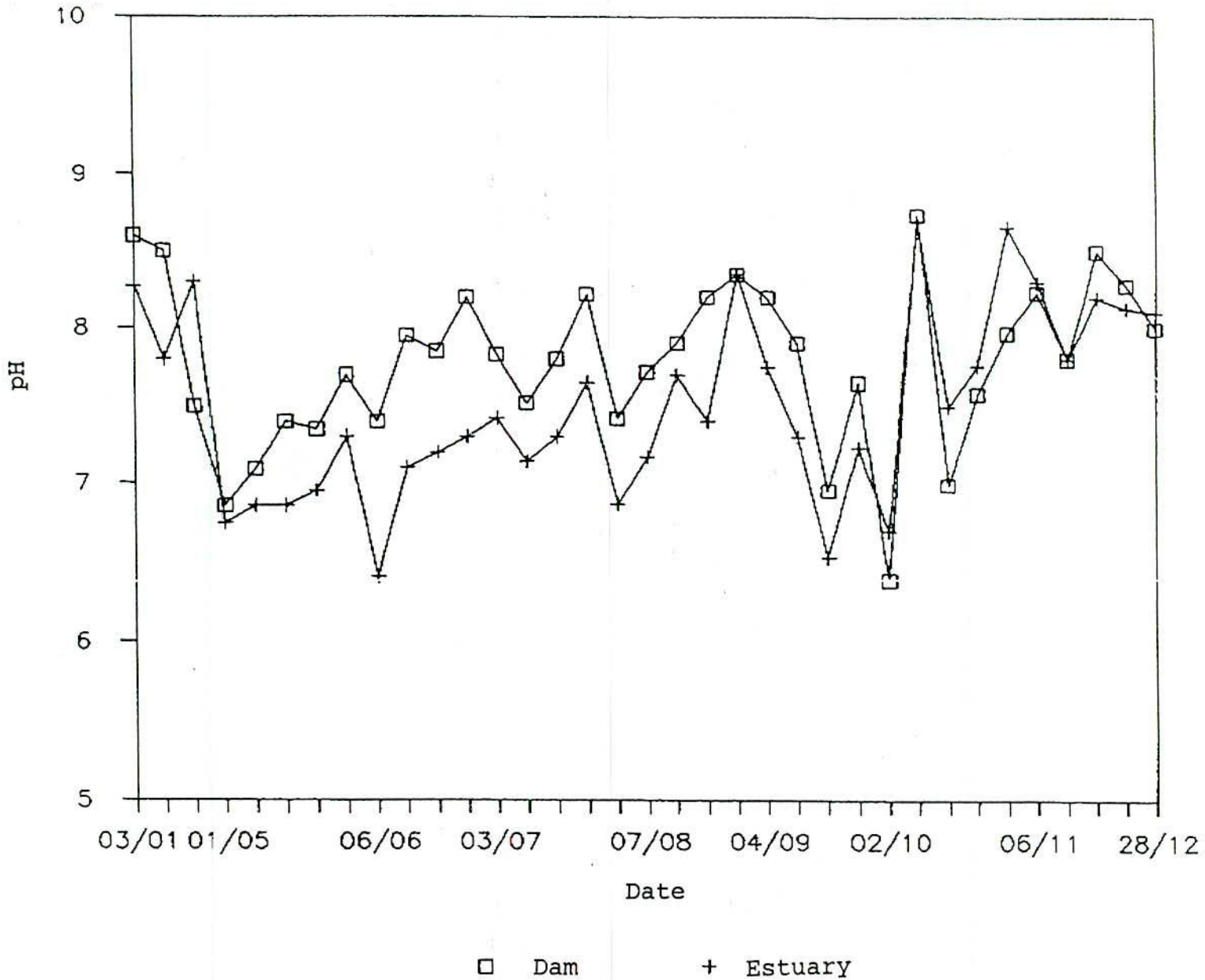
* Measurements taken with a Bruel and Kjaer Sound level meter Type 2230 Calibration date 29 January 1991. All noise procedures as per Australia Standards.

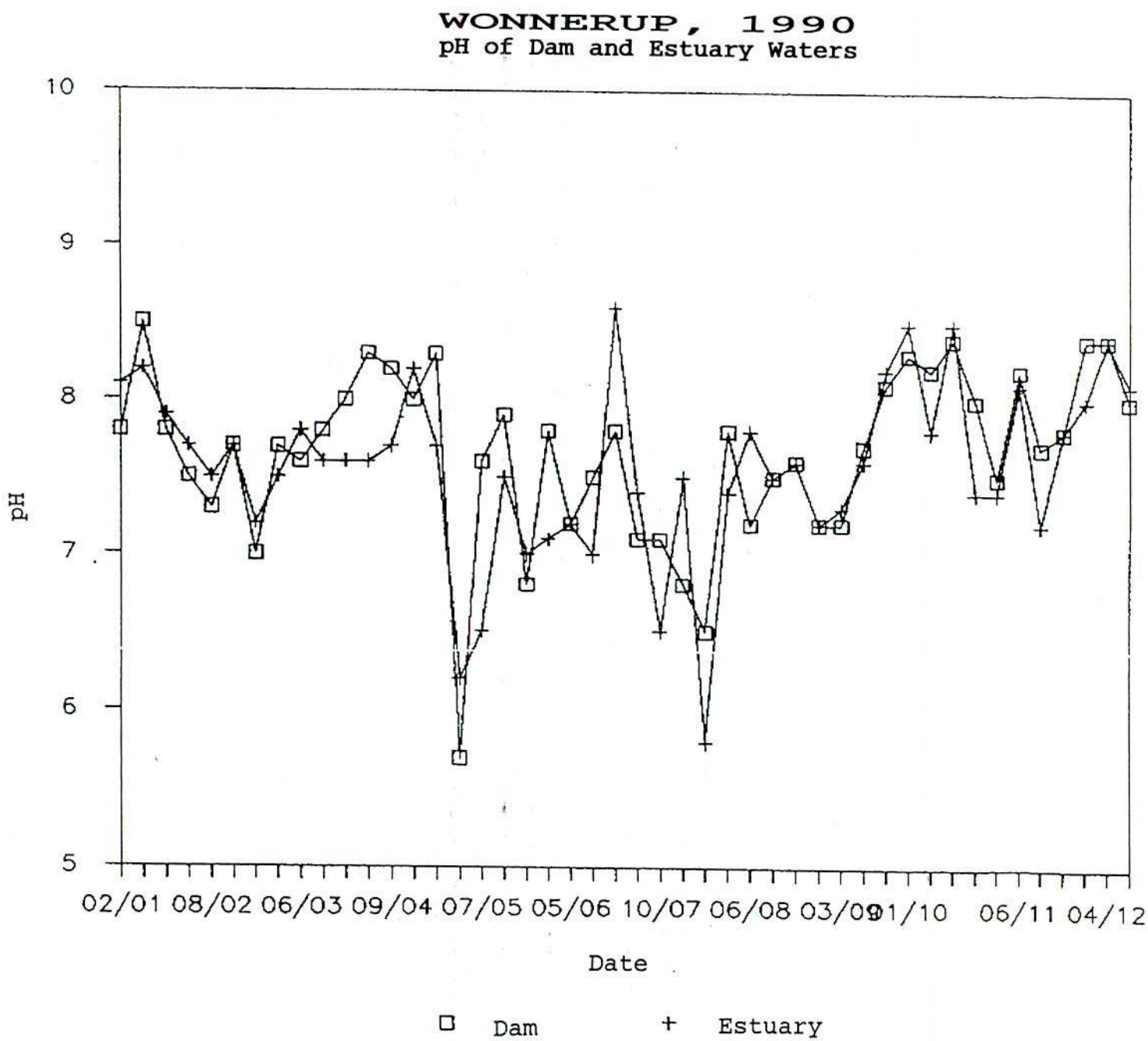
APPENDIX 1

ELECTRICAL CONDUCTIVITY, pH AND TOTAL SUSPENDED SOLIDS OF DAM AND ESTUARY WATERS

WONNERUP, 1989

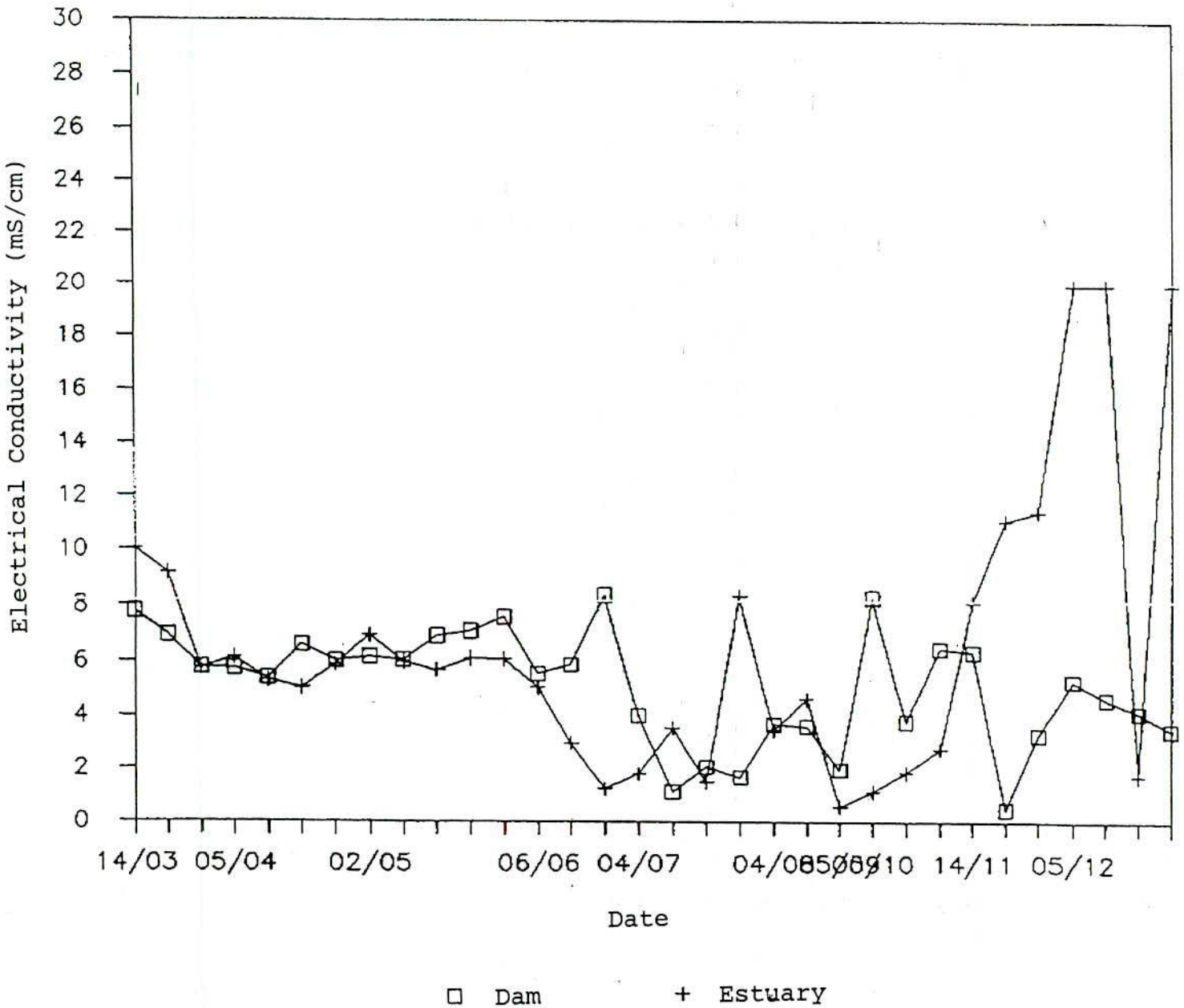
pH of Dam and Estuary Waters




WONNERUP, 1990
pH of Dam and Estuary Waters
10
9
8
7
6
5
pH
02/01 08/02 06/03 09/04 07/05 05/06 10/07 06/08 03/09 01/10 06/11 04/12
Date
Dam
Estuary

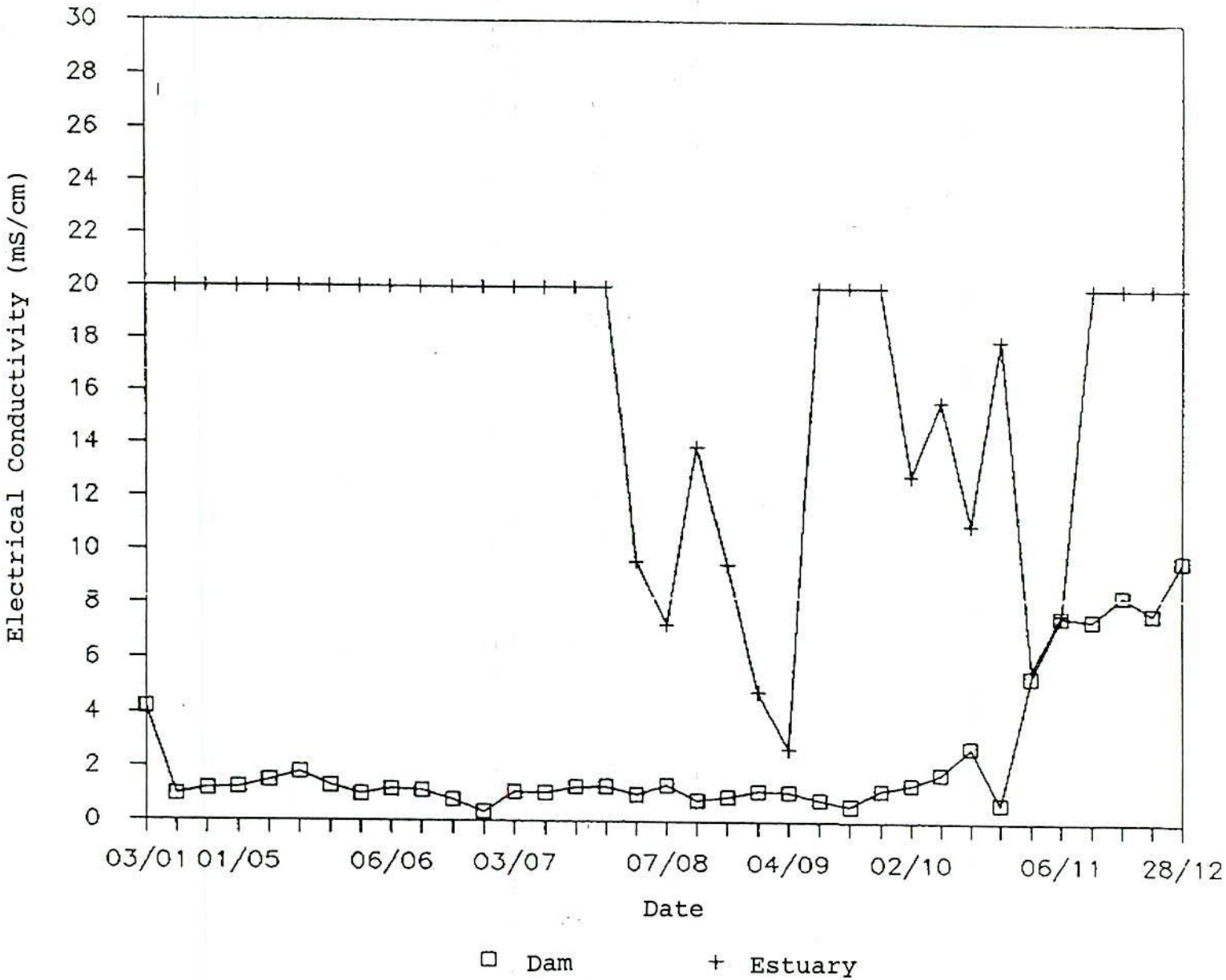
WONNERUP, 1988

Conductivity of Dam and Estuary Waters



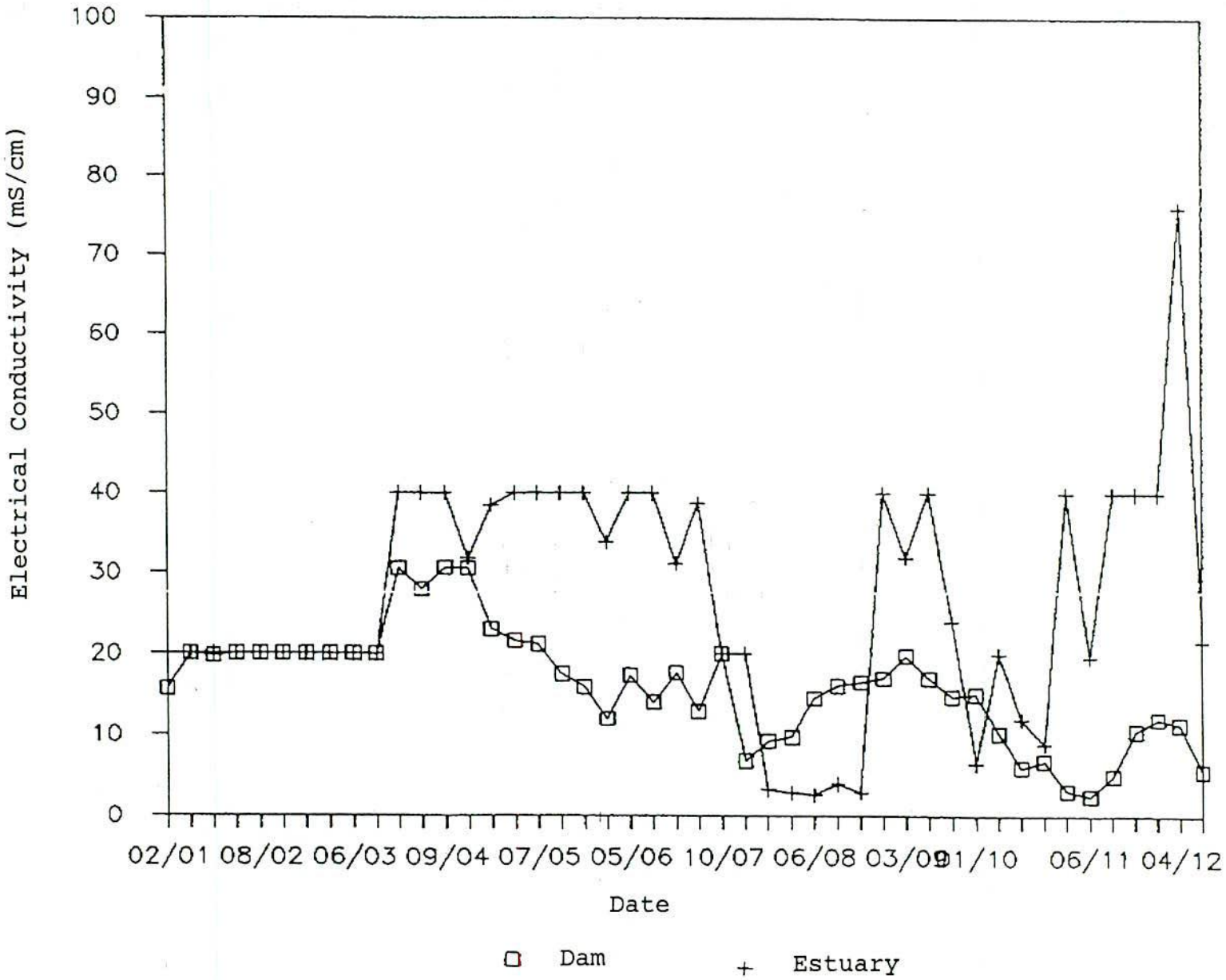
WONNERUP, 1989

Conductivity of Dam and Estuary Waters



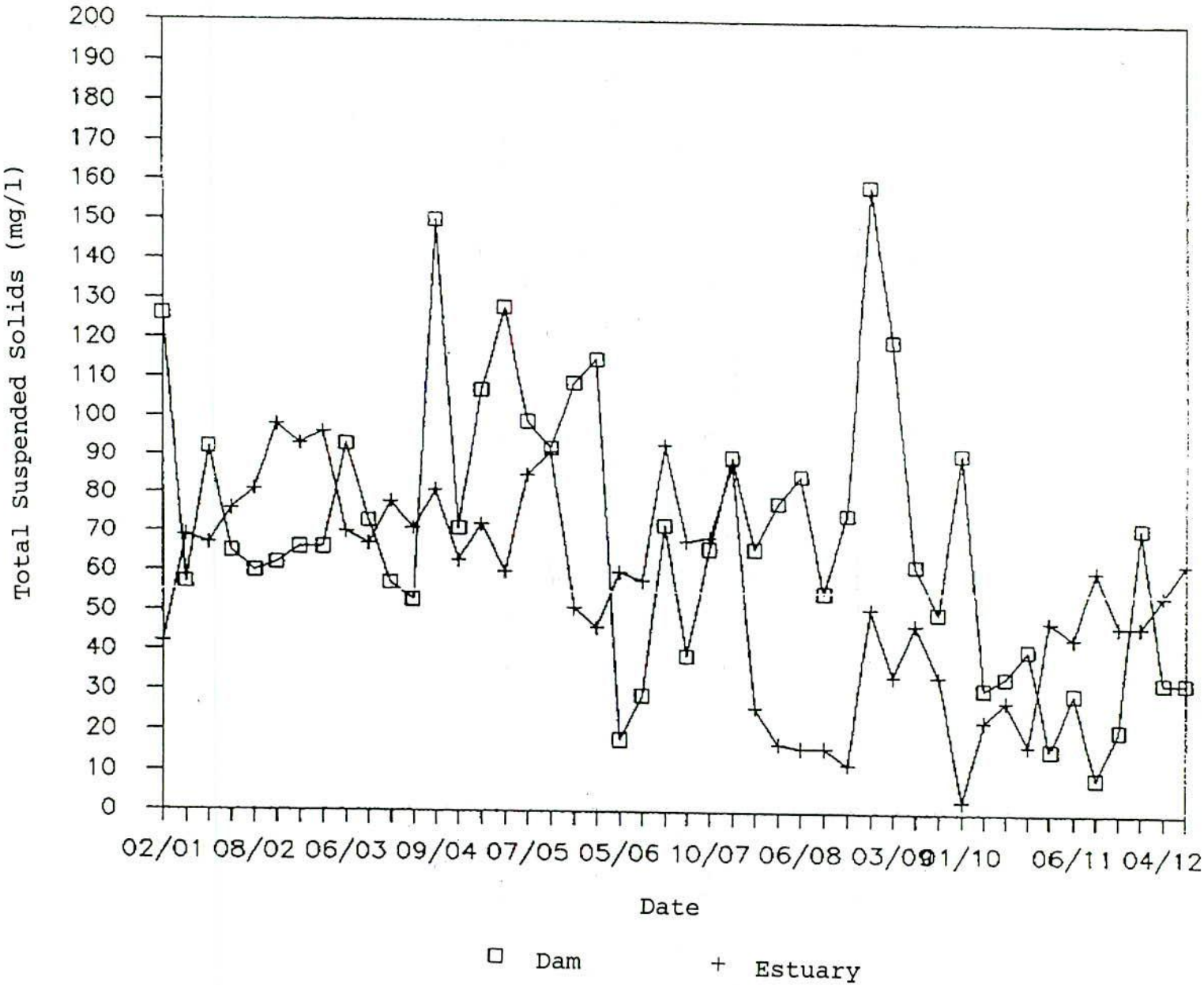
WONNERUP, 1990

Conductivity of Dam and Estuary Waters



WONNERUP, 1990

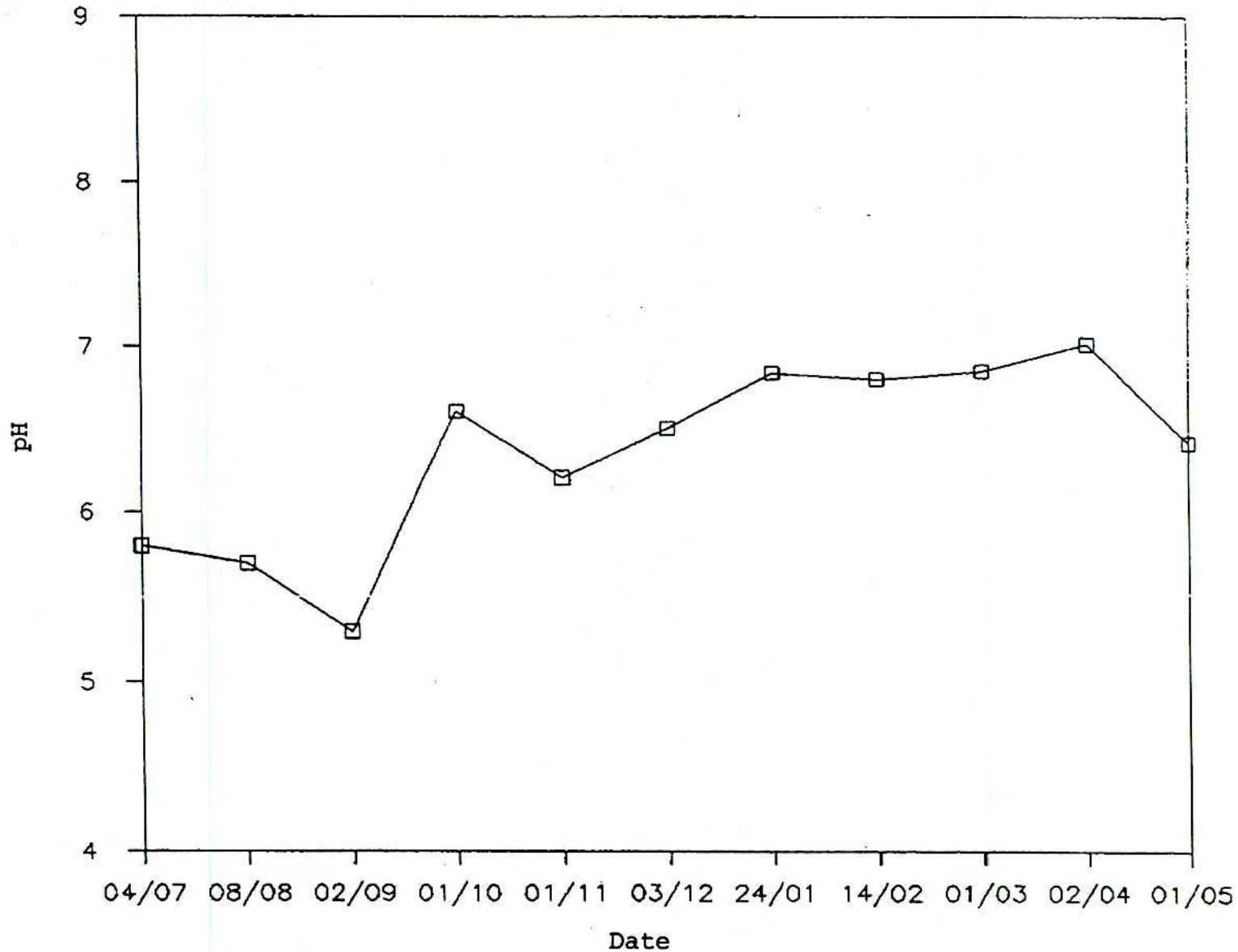
Dam and Estuary Waters - Solids



APPENDIX 2

pH AND ELECTRICAL CONDUCTIVITY OF THE WONNERUP ARTESIAN BORE

WONNERUP ARTESIAN BORE - pH



WONNERUP ARTESIAN BORE - EC