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EXPLORATION LICENCE 24/86 - DOCTORS ROCKS

OPEN FILE

ANNUAL REPORT : YEAR 1

(27 March 1987 - 26 March 1988)

88-2782
MINES
EL24/86
1 MAR 1988
LETTER
25.2.88
REFERS

[Faint rectangular stamp]

K.C. MORRISON

V. HOPTO

J.K. DAVIDSON

February 1988

AMG REFERENCE POINTS ADDED

CONTENTS

	PAGE
TENEMENT INFORMATION	1
EXPLORATION PHILOSOPHY AND OBJECTIVES	1
SUMMARY OF WORK COMPLETED IN YEAR 1	1
SPECIFIC SURVEYS	3
CONCLUSIONS & RECOMMENDATIONS	6
PROPOSED FUTURE EXPLORATION	6
REFERENCES	6

LIST OF FIGURES

	PAGE
Figure 1. Location Map, EL 24/86	2
Figure 2. Geologist & divers preparing to collect seabed samples.	4
Figure 3. Seabed samples of 5 to 7.5 litres recovered by trowel.	4
Figure 4. Upper Carboniferous Wynyard Tillite comprising bedrock of the wave-cut platform.	5
Figure 5. Wynyard Tillite bedrock and tillite-derived clasts prior to panning.	5

LIST OF APPENDICES

Appendix 1. EL 24/86 and adjoining Prospectors Claims.	
Appendix 2. Location & results of sediment sampling, June 1987.	
Appendix 3. Proposal by Dawson Offshore for exploration programme - Doctors Rocks.	

TENEMENT INFORMATION

Exploration Licence 24/86 (Doctors Rocks) comprises an area of 26km² and extends offshore in a northeasterly direction into Bass Strait from the coast between the towns of Somerset and Seabrook in northwest Tasmania (Figure 1 & Appendix 1).

On 6th January 1987, Placeco entered an agreement with Bass Strait Oil & Gas (Holdings) N.L., whereby Bass acquired from Placeco a first right of refusal to enter into a joint venture to explore EL 24/86. On 9th April this option was exercised. Bass can earn a 20% interest in the Licence by expending \$50,000 on exploration prior to 26 March 1988 and can earn an additional 30% interest in the Licence by expending a further \$150,000 on exploration within the licence area before 26th March, 1990.

EXPLORATION PHILOSOPHY AND OBJECTIVES

EL 24/86 was applied for principally as a placer deposit within the present day and older sediments in the near & off-shore Bass Strait waters in the region of Doctors Rocks. There is a long history of gold occurrences on the beaches on either side of Doctors Rocks. The palaeo-beach sediments are targeted as an offshore extension of this known placer gold mineralisation.

A primary objective of the first year programme was to carry out sea-floor sediment sampling in order to establish the presence or absence of visible gold and to determine the nature of the source rock.

Three major lithologies were considered as possible sources of the gold:

- (a) Upper Carboniferous - Permian glacial and fluvio-glacial sediments.
- (b) Tertiary alluvial channel deposits extending offshore from near Doctors Rocks.
- (c) Quartz-veined Precambrian meta-sediments.

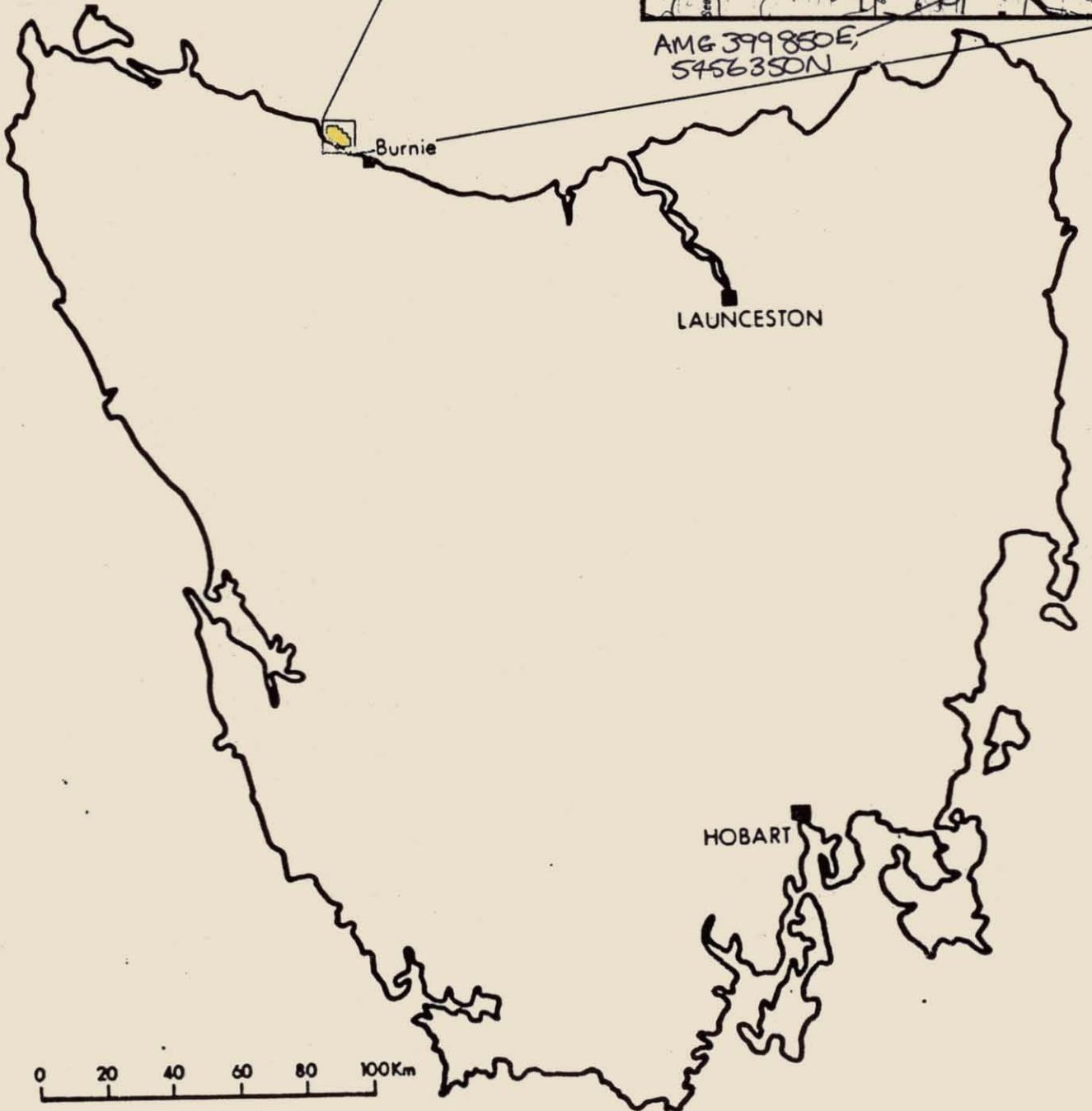
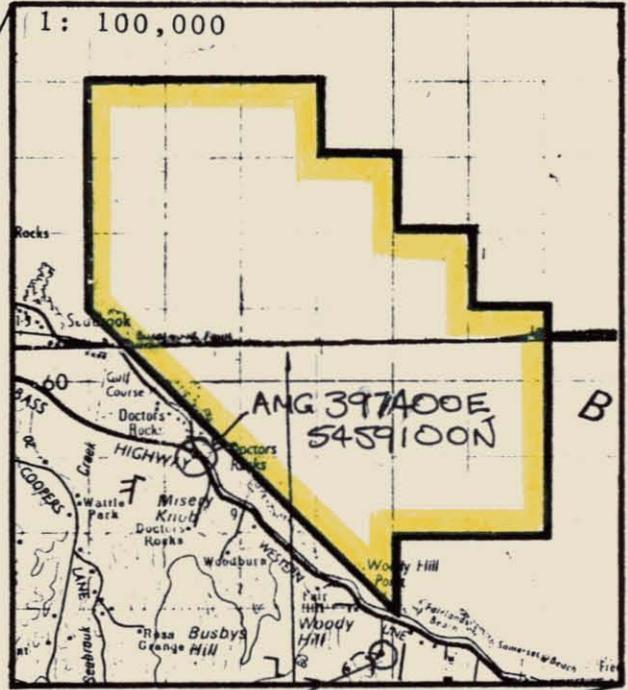
SUMMARY OF WORK COMPLETED IN YEAR 1 (27 March, 1987 - 26 March 1988)

An offshore sediment sampling programme was conducted and revealed a close relationship between the presence of detrital gold and host sediments derived from Permo-Carboniferous strata.

As a consequence of the above, the offshore engineering company Dawson Offshore was commissioned to prepare a proposal for a pilot plant scale offshore sampling programme.

5 cm

AMG REFERENCE POINTS ADDED



0 20 40 60 80 100km

Figure 1. Location Map - EL 24/86

SPECIFIC SURVEYS

In June 1987, a seafloor sediment sampling programme was undertaken to determine:

1. The presence or absence of visible gold.
2. The provenience of the host sediments.
3. If long-shore sediment mixing and hence-long shore drift is occurring.
4. Water depth and overburden thickness.
5. The submarine distribution of outcrop and sediment.

Survey Method & Results

Between 17 June and 20 June 1987, 25 samples were collected by divers from the sea floor between Burntwood Point and the western edge of Somerset. The samples were panned down and visible gold recorded. The divers (John and Scott Griffiths, Boat Harbour, Tasmania) worked from an inflatable Zodiac boat and samples were collected in a bucket, using a trowel to remove material from pot holes and crevices (Figures 2 & 3). The Wynyard Tillite wave cut platform was the source of the clastics and gold (Figures 4 & 5). The sample size ranged from 5 to 7.5 litres and were taken from water depths ranging from 5 to 11 metres (no correction from tide). The maximum distance from shore at high tide was approximately 1 kilometre. Fragments of bedrock were recovered at most sites.

The results of the programme are summarised below & in Appendix 2:

1. Traces of gold in the very fine sand to coarse sand range were recovered from 8 of the 25 samples (8/25).
2. All gold bearing samples were taken from gravels on Permo-Carboniferous tillite basement (8/14). No samples taken above Precambrian metasedimentary basement carried gold (0/8).
3. The composition of gravels recovered compared with the Wynyard Tillite bedrock, indicated very little long shore drift in either a westerly or easterly direction.
4. Much of the gravel is only 10-30 cm thick but in places it is covered by sand ranging from 20 cm to an unknown thickness.
5. Overall, sediment cover was approximately 40% over the area underlain by tillite basement.



Figure 2. Geologist and divers preparing to collect seabed samples.



Figure 3. Seabed samples of 5 to 7.5 litres recovered by trowel.



Figure 4. Upper Carboniferous Wynyard Tillite comprising bedrock of the wave-cut platform.



Figure 5. Wynyard Tillite bedrock and tillite-derived clasts prior to panning.

CONCLUSIONS AND RECOMMENDATIONS

Sediments derived from Permo-Carboniferous strata over 5km strike length of coast in the vicinity of Doctors Rocks, are gold mineralised at unknown grade and volume. As beach sediments on the north coast are not generally subject to longshore translocation (Davies & Hudson, 1987), these sediments are largely autochthonous, with little if any evidence of longshore mixing. The western and eastern margins of the prospect have been defined, but the offshore extension is unknown.

It is concluded that the next stage of exploration should be to assess the grade and volume of recoverable sediments through the removal of all sediment above bedrock within fixed areas.

On 14 August 1987, the offshore engineering company, Dawson Offshore, was approached to provide a budgetary proposal for an exploration programme whereby grades and sediment volumes could be quantified. The proposal was based on sampling from a 3km strip seaward from the beach, with on-board processing of the material recovered.

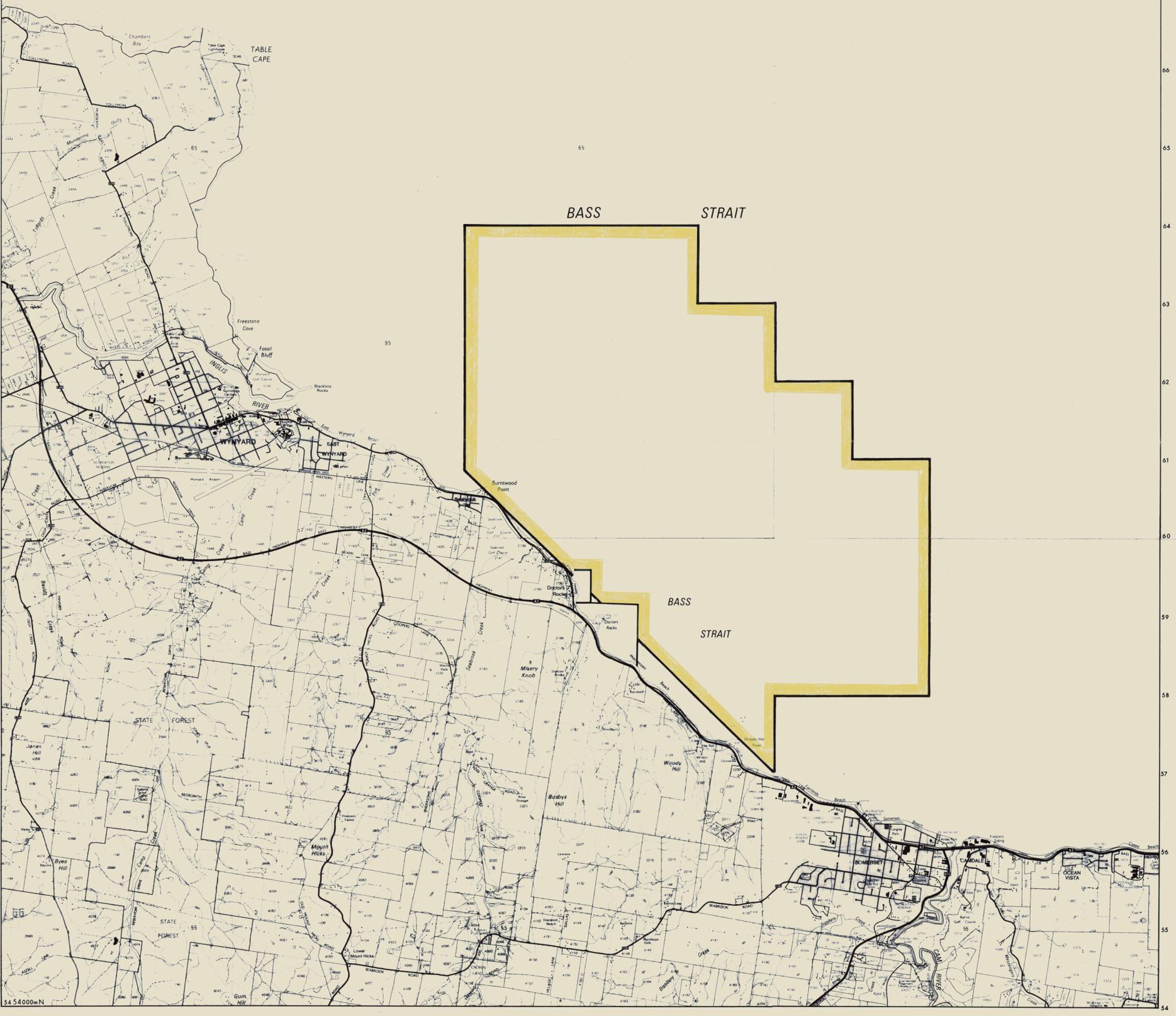
The subsequent proposal (Appendix 3) is considered inappropriate at this time. An intermediate phase of exploration is required.

PROPOSED FUTURE EXPLORATION

Placeco proposes to undertake a "Second Stage" sampling programme intermediate to the initial rudimentary approach and that proposed by Dawson Offshore. This would involve the recovery of several bulk samples taken at regular intervals. These data would provide quantitative estimates of grade and more detailed estimates of the extent of the resource.

REFERENCES

- DAVIES, J.L. & HUDSON, J.P., 1987: Sources of shore sediment on the north coast of Tasmania. *Pap. Proc. R. Soc. Tasm.*, 121: 137 - 151.



LEGEND

1:50,000
1:50,000
1:50,000
1:50,000

SCALE 1:25,000
1:25,000

Caravan park, Camping ground
Rubbish disposal area Cemetery
Trigonometric station Spot elevation
Contour with water Depression contour
Quarry or open cut mine
Broken rock surface
Dunes forest Medium forest
Low dense vegetation Distinctive grass
Orchard Pine plantation

Windmill
Swamp Land subject to flooding
Waterfall Rapids
Inhabited area or floodbank Lower
Tidal rocks or ledge Offshore rock
Lighthouse Exposed wreck
Sand Tidal reef
Saline coastal flat Tidal flats
Jetty Launching ramp

Build up area with commercial centre
Primary road
Roads maintained for continuous public use
Minor road
Other roads
Road of restricted use or access
Walking track Bridge
Railway Station
Power transmission line and pylon positions
Building feature of special interest: Run Mine Post office Public square Fire station School

Secondary road Bridge
Minor road
Other roads
Vehicular track Gate

BOUNDARIES shown on this map are NOT authoritative. For full particulars please consult the Registrar General's Department or the Lands Department. Property and land parcel boundaries are shown as at September 1981. Areas within proclaimed towns or less than two hectares are not depicted. To give a land parcel reference call the parcel number with municipal number.

Municipality name
Municipality number
Municipality boundary
Ward name
Ward boundary
Town boundary
Property boundary
Property boundary Land parcel boundary and number

PROSPECTORS CLAIMS - EL 24/86

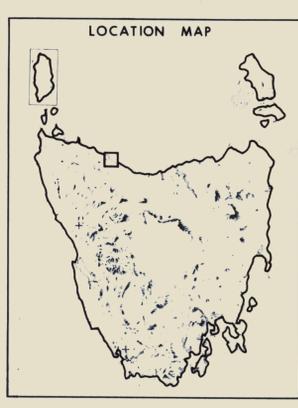
PC No.	OWNER	ADDRESS	MINERAL	AREA(ha)
	K. RADFORD		ALLUVIAL GOLD	7
	H. J. GRIFFITHS		ALLUVIAL GOLD	25



PROJECTION Universal Transverse Mercator UTM
HORIZONTAL DATUM Australian Geoid Datum 1986
VERTICAL DATUM Australian Height Datum (Tasmania) excepting offshore islands whose datum is mean sea level
GRID 1000 metre intervals of the Universal Transverse Mercator Grid Zone 55 (Australian Map Grid). Australian National Spheroid Grid values are shown at full of the south west corner of the map
CONTOUR INTERVAL 10 metres with 50 metre index contours

WORLD GEODETIC SYSTEM 1972 is adopted to determine true north-south distances from the system to Australian Geoid Datum 1986. However, the value of latitude is 1.1 and decrease in value of longitude by 7. 10 station heights decrease satellite heights by 3 metres

MAGNETIC VARIATION True Grid and Magnetic North are shown approximately by the centre of this map. Magnetic North is correct for 1981 and moves easterly about 0.1 every three years.



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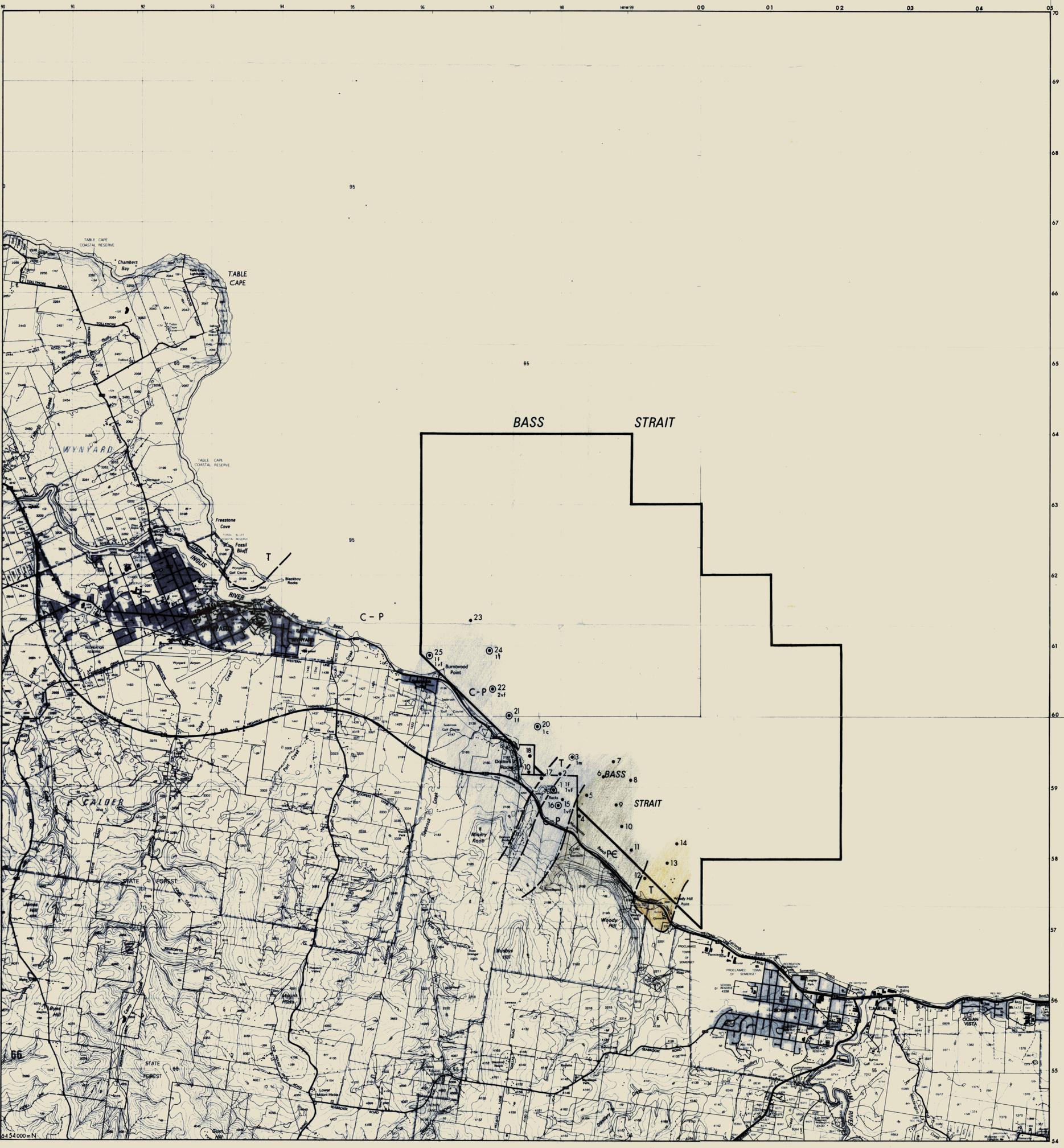
PETRECON AUSTRALIA PTY. LTD.

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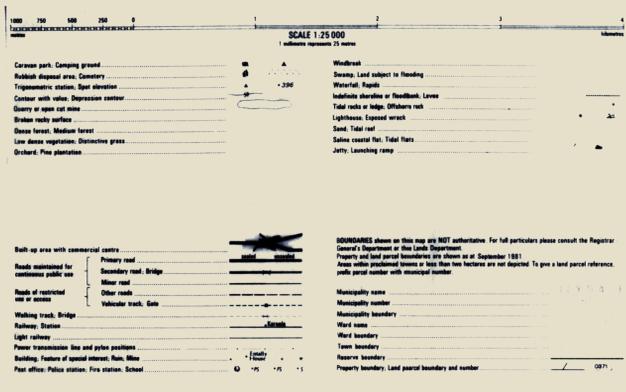
88-2782

EL 24/86 AND ADJOINING PROSPECTORS CLAIMS (COMPETITOR)	No.	24/86-1
	DATE	SEPT. '87
	COMPILED	J.D., K.M.
	DRAWN	J.M.T.

TO ACCOMPANY: YEAR 1 ANNUAL REPORT - APPENDIX 1



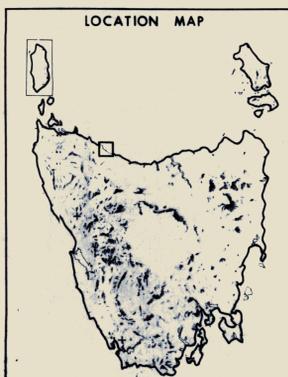
LEGEND



- T** Tertiary volcanics, pyroclastics and sediments
- C-P** Upper Carboniferous - Permian glacio-fluvio-glacial sedimentary rock
- PE** Precambrian metasedimentary rock

- 6 • Sample site
- 21 ⊙ Sample with visible gold
- 1f One fine sand grain
- vf = very fine sand grain
- m = medium " "
- c = coarse " "

PROJECTION: Universal Transverse Mercator (UTM)
HORIZONTAL DATUM: Australian Geodesic Datum 1984
VERTICAL DATUM: Australian Height Datum (Tasmania) excepting offshore depths which relate to mean sea level
GRID: 1000 metre intervals of the Universal Transverse Mercator Grid, Zone 53 (International Meridian Datum). Australian National Standard Grid values are shown to full or the fourth decimal part of the metre.
CONTOUR INTERVALS: 10 metres with 50 metres below contours
WORLD GEODETIC SYSTEM 1972: To convert co-ordinates from this datum to World Geodetic System 1984, add 50 metres to the northings and subtract 5.3" and decrease the value of longitudes by 4.2". If values are negative, the sign should be reversed.
MAGNETIC VARIATION: True, Grid and Magnetic North are shown respectively for the centre of the map. Magnetic North is correct for 1981 and varies annually about 0.7" every three years.



PETRECON AUSTRALIA PTY. LTD. 808011

PLACECO AUSTRALIA PTY LTD

EL 24/86 88-2782
SEDIMENT SAMPLING

No.	24/86-2
DATE	SEPT. 1987
COMPILED	K.M., W.C.
DRAWN	J.M.T.

TO ACCOMPANY: YEAR 1 ANNUAL REPORT - APPENDIX 2

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808012

DOCTORS ROCKS

ALLUVIAL GOLD DEPOSIT

PROPOSAL FOR

EXPLORATION PROGRAMME

Prepared for: AUREOLE RESOURCES PTY. LTD.
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Date: 9 September 1987

015



808013

C O N T E N T S

1. INTRODUCTION
2. SUMMARY
3. DESCRIPTION OF EXPLORATION METHODS
 - 3.1 Option A
 - 3.2 Option B
4. COST ESTIMATES AND PROJECT SCHEDULE
5. SUGGESTIONS FOR FUTURE COMMERCIAL DEVELOPMENT



- 1 -

1. INTRODUCTION

Dawson Offshore has been approached by Aureole Resources to prepare a proposal covering the forthcoming exploration programme for the alluvial gold deposit identified on the seabed at Doctors Rocks in northern Tasmania. Aureole Resources has two exploration permits covering the seafloor for an area of approximately 36 sq. kms. extending eastwards from Table Cape (refer Figure 1). The leases extend seawards from the shoreline a distance of approximately 5 kms.

The gold is contained in tillite sediments underlain by bedrock over a 5 km. length of the coastline. The depth of the sediments varies from nothing in some areas inshore to in excess of 20 cms. approximately 1 km. from shore. Depth of sediments further from shore are unknown at this stage.

The sampling work carried out to date has consisted of trowelling gravel samples into a bucket at various locations up to 1 km. from shore. It is now proposed to undertake a more extensive exploration programme to quantify the grade and volume of sediments within the lease areas.

The sediments are coarse gravel with an average diameter up to approximately 25mm. The sediment also contains larger stones 100mm diameter and greater. The richest gravels lie immediately above the bedrock and it is essential that the recovery operation leaves the underlying rock completely clean. The gold is not contained within or cemented to the bedrock. Although the bedrock also has cracks filled with sediment, the proposed exploration programme will not include recovery of this material as special tools will probably be required.



- 2 -

As requested by Aureole Resources, Option A of this proposal is based upon the dredging of a trench to expose the underlying bedrock for a distance of approximately 3 kms. from the shoreline. It has been assumed the sediment depth varies as follows:

- first kilometre sediment depth averages 0.3m
- second kilometre sediment depth averages 0.45m
- third kilometre sediment depth averages 0.6m

Maximum particle size to be recovered has been assumed as 100mm diameter.

In order to present the minimum cost approach we have also included an option to retrieve a number of samples from the seabed using a confining box frame to obtain a representative sample of the sediments. The samples are then taken to shore for processing.

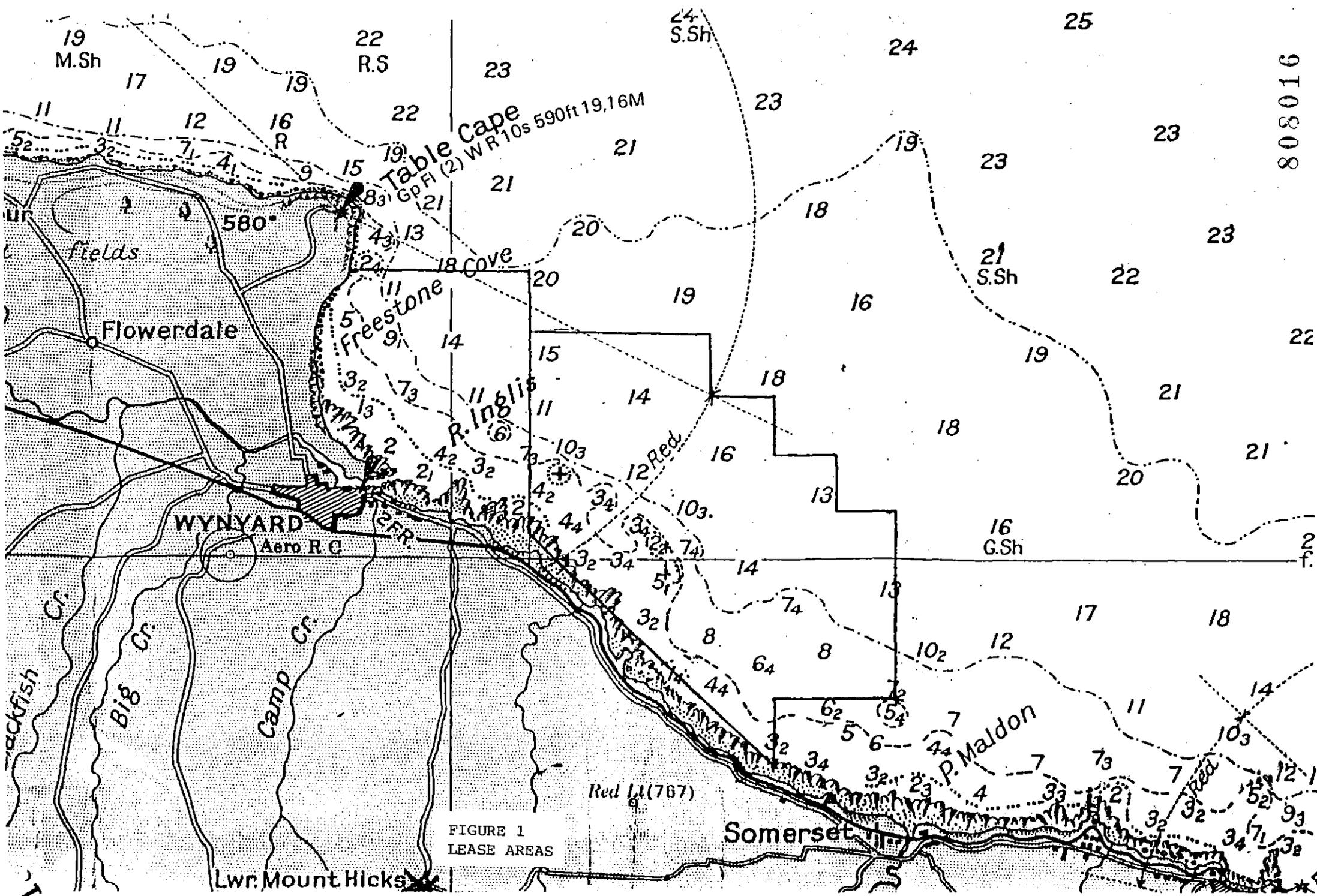


FIGURE 1
LEASE AREAS

TO



- 3 -

2. SUMMARY

Two options have been identified for the recovery of the gold bearing sediments, they entail either:

- (a) Trenching along the seabed for a total distance of 3 km., either in one straight line or small lengths at various locations. This will require either a vessel or barge mounted gold recovery plant.
- (b) Obtaining discrete samples at selected points, using a confining box frame to take a representative sample of the sediments down to the underlying rock.

Cost estimates for both options have been included in this proposal, along with a minimum cost exposure should insufficient quantities of gold be recovered and the programme is abandoned after say three days.

For Option A the use of a vessel was found to be more economical and the details of the barge option have not been included in this proposal.

Option A

It is proposed to place the suction equipment, processing plant and diving spread on a suitable vessel to enable the sediments to be recovered and processed at sea (refer Figures 2 and 3 for proposed equipment layouts).

The sediments will be removed from the seabed through the use of a skid mounted suction nozzle, followed by a diver using a small hand held suction hose to remove the remaining sediments and inspect the underlying rock surface. Sediment depth measurements will be taken at predetermined intervals (refer Figure 4).



- 4 -

The processing plant would be rented and it has been assumed that the plant currently available through James Malley at Smithton is suitable. The use of vibrating jigs as the primary separation unit may have to be reviewed if the requirement that they be levelled to within 10mm cannot be overcome. This tolerance cannot be achieved on a vessel of the size proposed under ocean swell conditions. If jigs are not suitable, the larger sluice boxes may be used.

It is estimated that should the gold recovery average 5.5 grams per tonne of sediment, then the throughput of the plant is such that approximately \$25,000/day of gold can be recovered.

Total project duration has been estimated at 18 weeks including 15 weeks for planning, design and equipment mobilisation and 13 days for site operations.

Option B

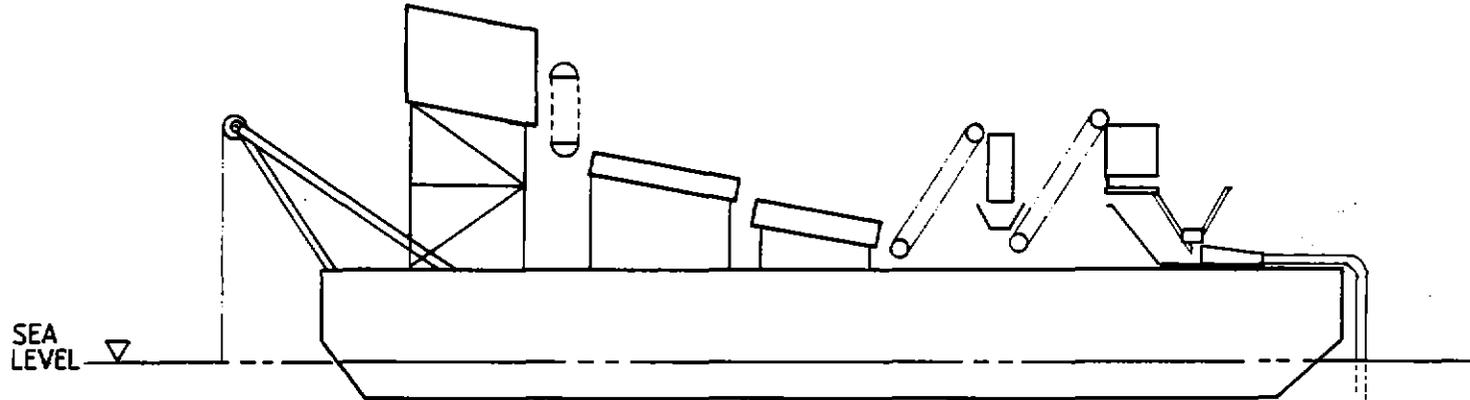
This option uses a box frame vibrated through the sediments to rest on the underlying bedrock. The box is then cleaned out using a small hand held suction hose and the material stored on board the support vessel for processing onshore.

The confinement of the sediment using an open ended box will ensure that a representative sample is taken at each location.

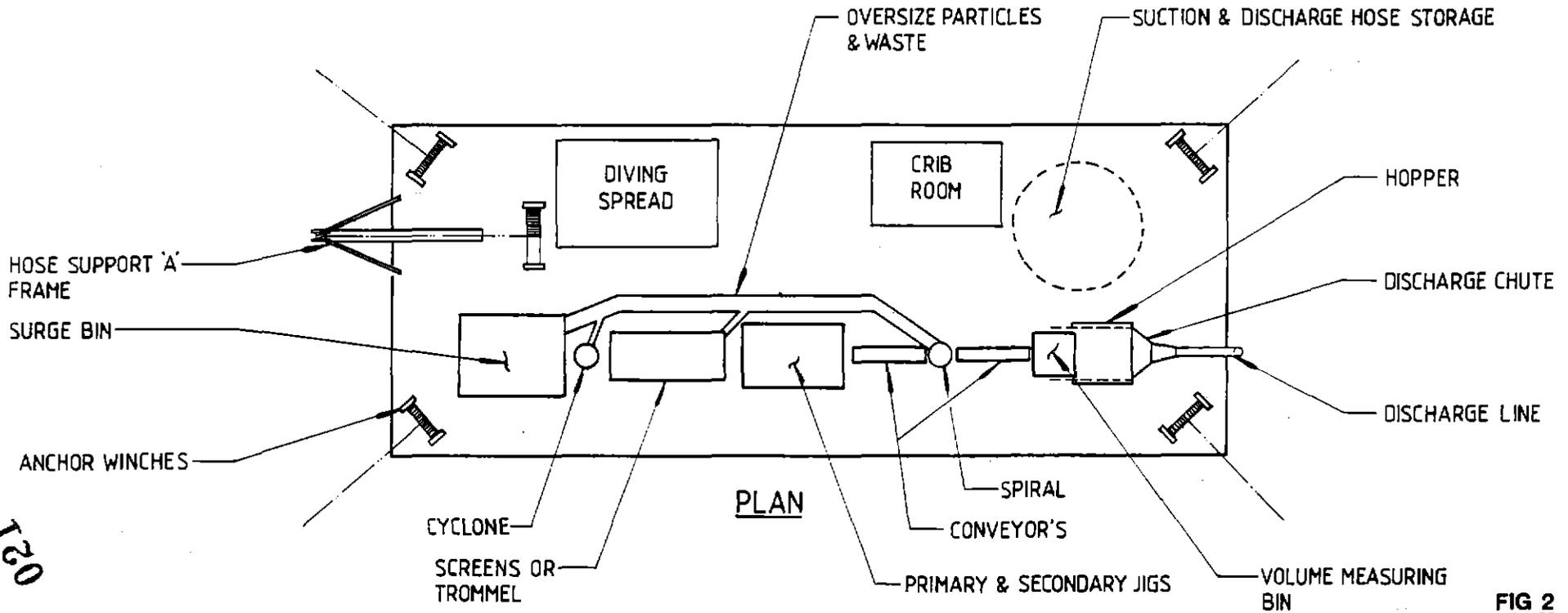
This option reduces the vessel size and equipment required allowing significant cost savings over Option A.

However, as the amount of material recovered will be less than 2 tonnes per day, the opportunity to recover costs through the sale of gold is not available.

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ELEVATION



PLAN

FIG 2

120

DRAWING NO.	REFERENCE DRAWINGS	NO.	DATE	REVISION	BY	CHK	ENG	CLIENT	CLIENT

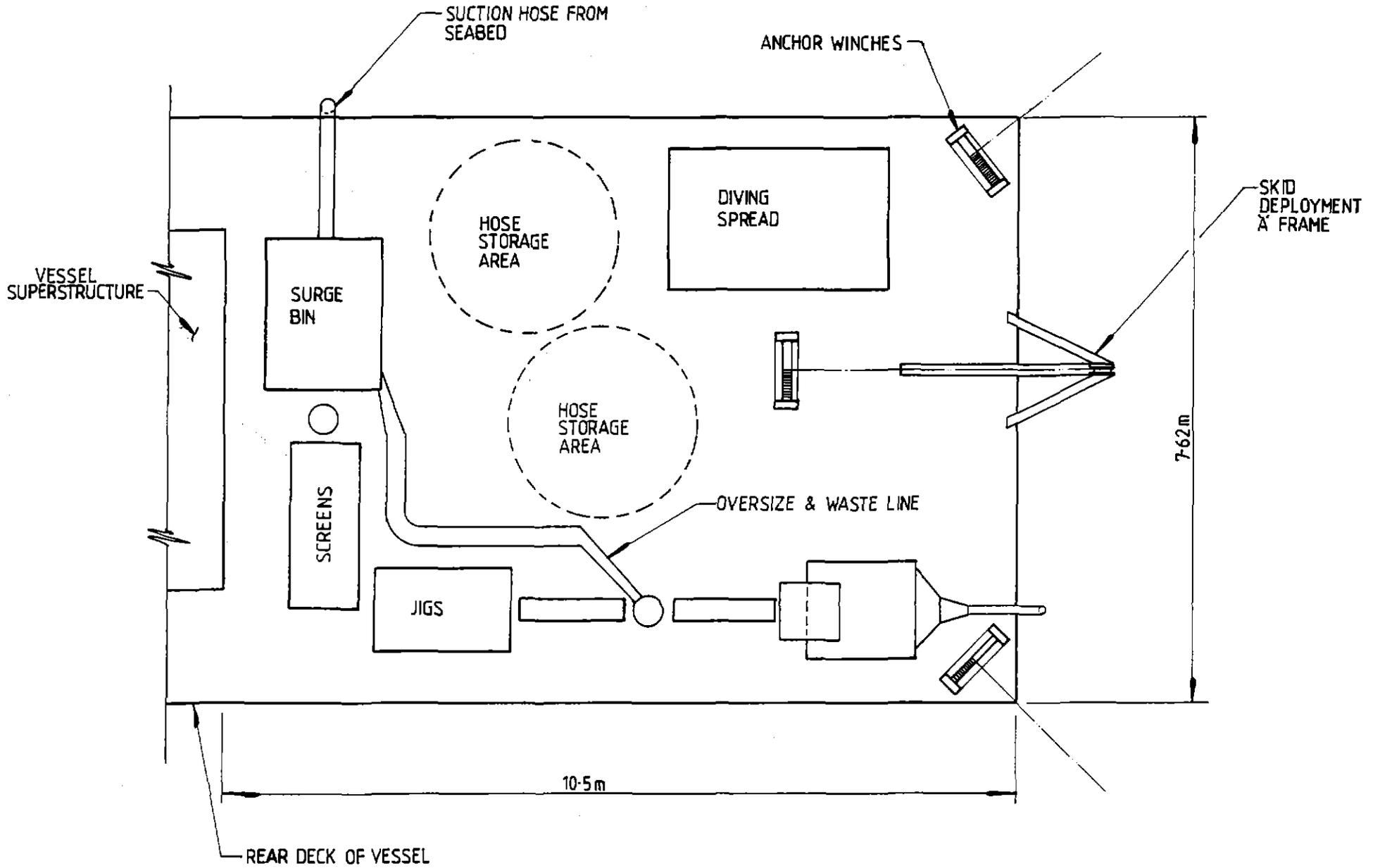
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SCALE:	
DRAWN:	070 13-87
CHECKED:	
ENGINEER:	
APPROVAL:	
CLIENT APPROV:	

TITLE:	GOLD SAMPLING PROPOSED BARGE LAYOUT		
JOB NUMBER:	MO08	DRAWING NUMBER:	
REV:		SHEET NUMBER:	
		OF	

808020



230

FIG 3

DRAWING NO.	REFERENCE DRAWINGS	REV.	DATE	REVISION	BY	CHK.	END.	CLIENT	CLIENT	SCALE	TITLE
											GOLD SAMPLING
											PROPOSED BOAT LAYOUT
											JOB NUMBER: MOOS
											DRAWING NUMBER: 010 81687
											REV. SHEET NUMBER
											OF

A 81687 ISSUED FOR INFORMATION

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3. DESCRIPTION OF PROPOSED EXPLORATION METHODS

3.1 Option A

General

The exploration programme to be carried out on the Doctors Rocks leases will be designed to estimate the volume and grade of gold bearing gravels. For this option the gravels will be removed from the seabed by a skid mounted suction nozzle and follow up diver's hose. The skid mounted unit will remove almost all the material with the diver removing any traces of sediment remaining.

Following removal from the seabed the gold bearing sediments and water will be placed in a surge bin to allow excess water to runoff into the discharge pipe through an overflow system. The sediments are then treated in the processing plant to remove the gold, with the volume of sediment measured before being returned to the seabed.

The combination of the skid mounted suction unit and the on-board processing is designed to maximise the efficiency of the sampling programme without requiring the use of sophisticated and expensive equipment. With the largest costs being incurred through vessel and diving spread dayrates etc., large volume throughput is desirable to attain an economical unit sampling cost. The volume of material sampled should be limited only by the capacity of the available plant to process it.

Equipment Required

The recommended sampling programme will require the following major items of equipment and personnel:

- (i) seagoing vessel
- (ii) sediment suction/transporting unit
- (iii) gold recovery plant
- (iv) diving spread



- 6 -

In addition to the major items listed above, the vessel will be required to carry the following:

- (i) winches (2)
- (ii) air compressor (800 cfm)
- (iii) generator (55 kw)
- (iv) hoses, floats etc.
- (v) water pump for general use
- (vi) cabling and anchor lines

(i) **Seagoing Vessel**

The vessel selected for the sampling programme will have sufficient deck space available to carry the equipment listed above while allowing diving and skid deployment operations to be performed.

It is unlikely that a vessel less than 80' (25m) in length will be suitable for the programme and the cost estimate dayrate has been determined accordingly.

The vessel will return to port each evening during the course of the exploration programme and therefore does not require accommodation facilities for the operations personnel. Movement of the vessel during the dredging operation will be carried out using anchor winches forward and aft, as the diver deployment will require a stationary propeller.

The seagoing characteristics of a shaped vessel are superior to those of a flat bottomed barge, this will result in less weather downtime being experienced than if a barge is used.



- 7 -

The use of a vessel will allow seabed samples to be taken from many different locations to give a more accurate result in determining the extent of mineralisation. An anchored barge can move along a straight line by hauling on the anchor winches, but requires a tug if different sample sites are selected.

(ii) **Sediment Suction/Transporting Unit**

As previously noted this will consist of a skid mounted suction nozzle, a diver's hand held hose and a conveying hose to the surge bin on board the vessel. The skid will be pulled along the seabed by a winchline passing over an A frame.

As the seabed material will be recovered from water depths as shallow as 4m and lifted approximately 3-4m above sea level to the surge bin, two fluid lifting systems are required. The shallow water recovery will be undertaken almost entirely by a submersible gravel pump fixed to the skid (refer Figure 5). As the water depth increases (35' or 11m and greater) the effectiveness of air lifting improves, allowing it to transport the majority of the material. The submersible pump may be used to complement the air lift in the deeper water, thereby increasing the flow rate.

It is recommended that a 150mm diameter hose and pump be used for the sampling programme. The expected flow rate is approximately 5.3 cubic metres per minute as required to lift 100mm diameter solids vertically. Providing the suction skid is pulled through the sediment at a reasonable rate, the minimum expected rate of sediment removal is approximately 25 tonnes per hour (3% solids).



- 8 -

The expected travel rate of the suction skid is expected to be approximately 1m per minute in 0.3m thick material, and proportionally less for deeper sediments. The skid may be able to remove all of the sediment, allowing the diver to be freed for other tasks or for increasing the on-bottom dredging time.

A video camera may be fitted to the skid allowing inspection of the exposed underlying rock to be conducted from the surface.

(iii) **Gold Recovery Plant**

This will be a mobile alluvial plant modified as required. It will consist of the following components:

- surge bin
- cyclone
- excess water overflow or by-pass
- vibrating screens
- jigs or sluice boxes
- spiral
- volume measuring bin and discharge chute

The larger items of equipment may be rented for the sampling programme (possibly from James Malley). The cyclone, spiral, measuring bin and discharge chute will probably require purchase or fabrication.

The surge bin will be a rectangular shape, elevated to allow the sediments to gravity feed through the cyclone and screens. Excess water will flow out of the bin directly into the discharge chute.



- 9 -

The cyclone will remove surplus water before the sediments are passed over the screens. The vibrating screens will remove all oversize material in preparation for the jigs or sluice boxes.

The spiral is the last item of processing equipment the material will pass through before combining with the oversize in a small surge hopper, in preparation for the fixed volume measuring bin. The measuring bin will be filled and then dumped into the discharge chute recording the total volume of sediment passing through the plant (refer Figure 6 for proposed layout).

All sediment will be discharged down current on the seabed to reduce clouding of the water in the vicinity of the diver.

(iv) **Diving Spread**

The diving spread consists of a supervisor and two divers, and all diving equipment.

The diving team will monitor the effectiveness of the suction skid; ensure the bedrock surface is clean and measure sediment depths as required.

Diving time has been assumed to be an average of three hours per day per diver, allowing for ascents this will give an effective on bottom dredging time of approximately eight hours per day. As all diving to depths in excess of 18m require a decompression chamber on-board the vessel, it is proposed to limit the diving to less than this depth.



- 10 -

Using a video monitor, it should be possible to deploy the suction skid in deeper water without an attendant diver and still be confident of obtaining the sediment removal standard required.

Procurement

Where possible all materials and fabrication requirements will be sourced locally to reduce transport costs.

Various steel fabrication shops exist in Burnie to service the paper industry and obtaining skilled manpower for the plant installation and removal should not be a problem.

A number of specialised items may need to come from Melbourne e.g. submersible gravel pump, these will be kept to a minimum.

Assembly and Fitout

It is proposed to use the Port of Burnie as the fitout site and base for the vessel during the course of the sampling programme. Wharfage space is available at nominal rental providing load limits are not exceeded.

All fabrication and labour requirements will be within close proximity, expediting the fitout of the vessel.

The Port of Wynyard is not suitable for use as a base for the vessel. Maximum draught allowable when entering the Inglis River is approximately 6' (2m).



- 11 -

3.2 Option B

General

This option limits the recovery of material to a number of small representative samples throughout the exploration area. It is important to ensure the material recovered will be for the full depth of the sediments, and not contain proportionally larger amounts of the top layers.

The sample to be removed from the seabed will be confined using an open ended box arrangement vibrated through the sediments to rest on the underlying rock. Following installation of the frame down to rock, all material contained within will be removed by a diver using a small hand held suction hose. The sediments will be stored in individually marked drums for onshore processing.

This option allows a large number of small samples to be obtained at various locations, while eliminating the need to support a mineral processing plant at sea. This allows a smaller vessel to be used and significantly reduces mobilisation requirements.

Equipment Required

The equipment and personnel required for this option shall consist of the following:

- (i) vessel equipped with winch and A frame
- (ii) vibrating confinement frame
- (iii) suction equipment
- (iv) diving spread



- 12 -

(i) **Vessel**

Smaller in size than required for the first option, the vessel will have sufficient deck space to carry the diving spread and storage drums for the recovered sediment, and still allow frame deployment and diving operations to be conducted.

A locally sourced scallop boat or similar may be satisfactory, reducing the vessel hire costs. It is envisaged a vessel approximately 50' (15m) in length will be adequate.

(ii) **Vibrating Confinement Frame**

This will consist primarily of an open ended box frame with an out-of-balance rotating shaft fixed to it. The frame will have sufficient weight to penetrate the sediments quickly, with a large enough base to remain stable when placed on the seabed.

Following penetration through to the underlying rock, the frame will be cleaned out by a diver using a hand held suction hose approximately 75mm in diameter. It is estimated that four samples may be taken per day, recovering a total of approximately 2 tonne of sediment.

(iii) **Suction Equipment**

The sediments will not require lifting to a significant height above sea level and it may be possible to use a vessel mounted suction pump for the shallow water in combination with air lifting in deeper water.

As the amount of material recovered will be less than Option A, the suction equipment size required is correspondingly reduced.



- 13 -

(iv) **Diving Spread**

This will be the same as that required for Option A, a three man diving team.

To effectively remove the contents of the confinement frame, manual guidance of the suction nozzle will be required. Therefore the diving spread will be required for the full duration of the exploration programme.

Should samples be required in water depths greater than 18m, it will be necessary to have a portable decompression chamber on board the support vessel.

Procurement

The equipment requirements for this option are substantially reduced over Option A and it should be possible to source all items locally.

Assembly and Fitout

As per Option A using the Port of Burnie.



4. COST ESTIMATES AND PROJECT SCHEDULE

Cost estimates have been prepared for both options. It was assumed the time required at site was the same for both, as a larger number of samples would be required for Option B.

The estimates are based on a 10 hour working day port to port.

Option A

For Option A an 80' (25m) long vessel is suitable and is available. A vessel of this size will have a three man crew, this will allow one crewman to be available for winch operations and general duties.

To run the plant and recovery operations the crew required consisted of the following:

- Operations Supervisor
- Plant Operator
- Assistant
- Sampling Technician/General Hand
- Three-man Diving Team

Actual time required to complete the 3 km. sampling strip has been estimated at 12 days. In addition one day allowance for trialing the skid and recovery system has been included.

Option B

Based on a 50' (15m) vessel, this option requires only an Operations Supervisor and Assistant in addition to the three-man diving team.

A one day allowance has been included for trialing the recovery system. No allowance has been made for a decompression chamber on board the vessel. If diving is required in depths exceeding 18m, then hire costs for a chamber should be added. These are as follows:

- Mobilisation/Demobilisation = \$4,500
- Dayrate = \$325 per day



- 15 -

Estimate Summary Sheet - Option A

Planning and Detailed Design including:

- Project Planning
 - Detailed Design
 - Site Visit to inspect Plant, Fitting-Out Wharf etc.
 - Drafting and Secretarial
- TOTAL \$ 14,500

Equipment Procurement, Purchases, Rental and Fabrication including:

- Project Management and Procurement
 - Purchase of:
 - cyclone, spiral
 - cables, shackles, assorted lifting gear
 - Fabrication of:
 - surge bin (modified)
 - measuring bin
 - discharge chute and hopper
 - miscellaneous support steelwork
 - suction skid
 - air lift attachment
 - skid deployment A frame
 - Rental (fixed term) of:
 - processing plant
 - submersible gravel pump
- TOTAL \$ 86,000

Mobilisation, Set-Up and Test including:

- Vessel mobilised to Burnie (allow 2 days)
 - Miscellaneous equipment hire - compressor, generator, hoses etc.
 - Processing plant - fix on vessel
 - testing
 - Cranage, wharf fees
 - Diving team and equipment - set-up
 - Personnel including travel costs
- TOTAL \$ 42,000



- 16 -

Sampling, Recovery Operations (13 days duration)

- Spread vessel day rate including:
 - Vessel hire (including winches, anchors etc.)
 - Miscellaneous equipment
 - Survey costs (bearings from shore)
 - Operations Supervisor
 - Sampling Technician/General Hand
 - Plant Operations - operator
 - assistant
 - Consumables - fuel etc.
- TOTAL \$ 8,200/day

Demobilisation, Refurbishment including:

- Vessel (allow 2 days return passage)
 - Processing plant - repainting
 - repairs (if required)
 - removal
 - Miscellaneous equipment hire
 - Cranage, wharf fees
 - Personnel including travel costs
- TOTAL \$ 39,000

TOTAL FOR 13 DAY SITE OPERATIONS \$288,100

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- 17 -

Estimate Summary Sheet - Option B

Planning and Detailed Design including:

- Project Planning
- Detailed Design
- Site Visit
- Drafting and Secretarial
- TOTAL \$ 14,500

Equipment Procurement - Purchases, Rental and Fabrication including:

- Project Management and Procurement
- Purchases - cables, shackles etc.
 - storage containers
- Fabrication - confinement frame and drive
 - air lift attachment
- Rental (fixed term) of: gravel pump
- TOTAL \$ 39,000

Mobilisation, Set-Up and Test including:

- Vessel fitout (allow 1 day passage to Burnie)
- Miscellaneous equipment - compressors, hoses etc.
- Equipment installation on vessel
- Cranage, wharf fees etc.
- Diving team and equipment - set-up
- Personnel including travel costs
- TOTAL \$ 12,500

Sampling, Recovery Operations (13 day duration)

- Spread vessel day rate including:
 - Vessel hire (including winches, anchors, etc.)
 - Miscellaneous equipment
 - Survey costs (bearings from shore)
 - Operations Supervisor
 - Assistant
- TOTAL \$ 5,750/day



- 18 -

Sampling, Recovery Operations (13 day duration)

- Onshore transport and processing costs including:

- Plant hire
- Operator
- Assistant
- Transport costs

TOTAL	\$ 900/day
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Demobilisation, Refurbishment including:

- Vessel (allow 1 day return passage)
- Miscellaneous equipment - removal and return
- Cranage, wharf fees etc.
- Personnel including travel costs

TOTAL	\$ 11,250
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TOTAL COST FOR 13 DAY PROGRAMME

	\$165,500
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5. SUGGESTIONS FOR FUTURE COMMERCIAL DEVELOPMENT

The commercial exploitation of the gold bearing sediments found at Doctors Rocks will require consideration of a number of issues, including the following:

- environmental constraints
- mining method
- processing requirements

This section briefly discusses a possible method to mine and process the sediments.

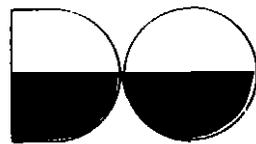
To avoid double handling of the material, it must be removed and processed on board a floating plant before being returned to the seabed. This will need to be a high volume operation to achieve sufficient gold output to justify the substantial capital equipment costs. Order of magnitude quantities are discussed below. Of course the optimum throughput will only be determined after a thorough feasibility study has been completed.

The gold bearing sediments have been identified over a 5 km. section up to 1 km. from the coastline. Assuming the deposit extends seawards for a distance of 4 km. at an average depth of 0.3m the total volume of material to be processed is approximately 6 million cubic metres.

The removal of the sediment from the seabed will probably be accomplished using a skid mounted cutter suction head arrangement equipped with water jetting and video monitoring. This may be self propelled or pulled along the seafloor as proposed for Option A of the exploration programme.

Using 5 metres per second as an indicative fluid transport velocity required for the larger stones and a suction unit of approximately 500 to 600mm in diameter, throughput of approximately 3,800 cubic metres per day (6,100 tonnes) should be achieved. The entire operation would then take about five years using one such vessel.

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Dawson Offshore

- 20 -

The processing plant may be mounted on a large barge that will move through the area using the anchor lines. The barge should be of sufficient size to enable operations to continue during the winter swell conditions. The anchor pattern used would allow the barge to move for a considerable distance, before requiring an anchor handling vessel to reset the pattern.