

## **APPENDIX A**

# **SITE SURVEY REPORT**

**EAGLE BAY RESOURCES N.L**

**HYDROGRAPHIC SURVEYORS REPORT**

**ON**

**SITE HAZARD INSPECTION SURVEY  
NORTHRIGHT .1. WELL SITE  
VIC/P41 TASMAN SEA**

**BY**

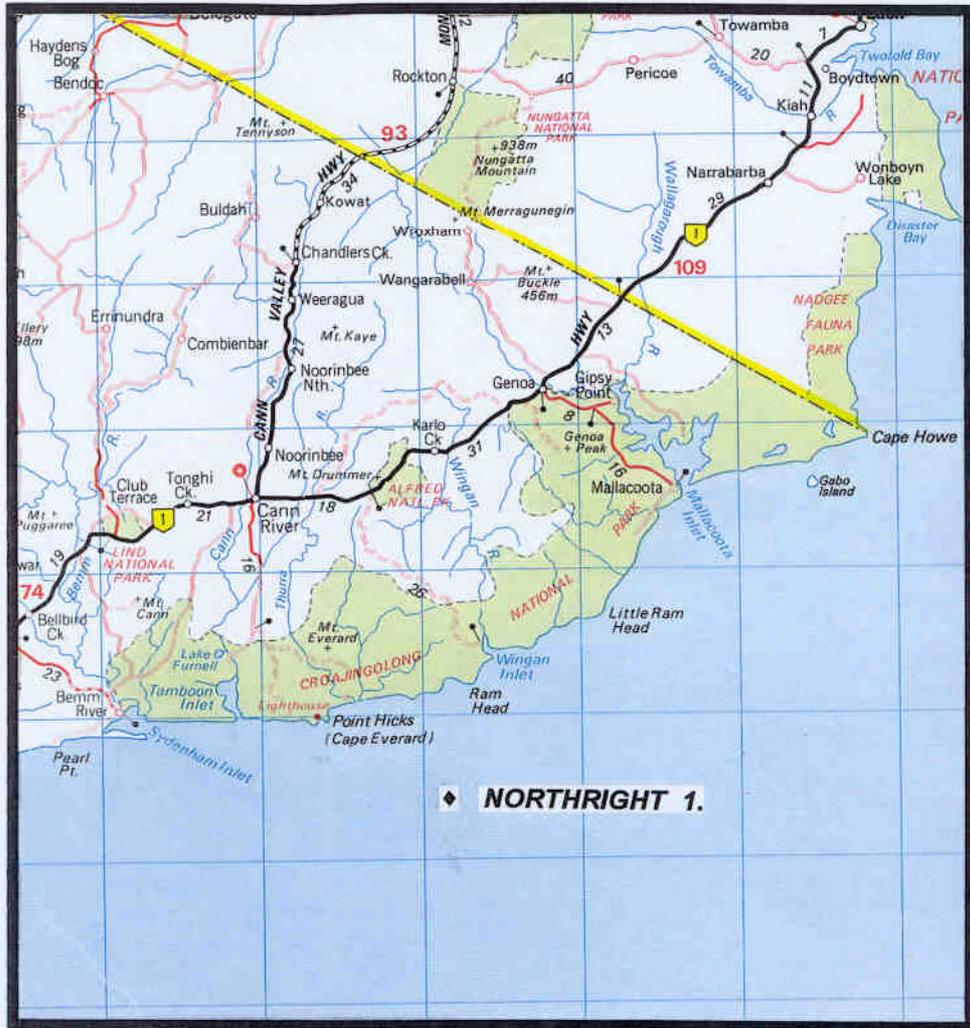
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## **INTRODUCTION**

**ON THE 5TH OF APRIL 2001 ARROWSMITH MUIR & ASSOCIATES PTY.LTD. CONSULTANT LAND ENGINEERING AND HYDROGRAPHIC SURVEYORS OF 11 CLONMILT AV. HIGHETT VIC. 3190 EXECUTED A CONTRACT WITH EAGLE BAY RESOURCES .N.L OF LEVEL1 14 OUTRAM ST WEST PERTH WA 6872 TO UNDERTAKE A SITE HAZARD INSPECTION SURVEY AT THE SITE OF THE NORTHRIGHT-1 WELL SITE LOCATED IN THE TASMAN SEA APPROXIMATELY 80 KILOMETERS SOUTH EAST OF ORBOST VICTORIA AUSTRALIA. THIS REPORT DESCRIBES THE METHODS USED ,PERSONNEL AND EQUIPMENT AND THE FINDINGS BY THE CONSULTANT.**



**TASMAN SEA      LOCALITY DIAGRAM**

**SCALE 1: 800000**

## 1.0 BACKGROUND,

On the 23<sup>rd</sup> March 2001 Arrowsmith Muir & Associates Consultant Land Engineering & Hydrographic Surveyors were requested by Eagle Bay Resources N.L to provide a proposal to inspect and survey a 2.5 Km square kilometer area around the Northright-1 well site adjacent to the Victorian Coast in the Tasman Sea.

Arrowsmith Muir's proposal was found to be acceptable resulting in the execution of an agreement on the 4<sup>th</sup> of April 2001.

The inspection survey was to be undertaken as quickly as possible owing to the impending arrival of the drilling rig "Ocean Bounty" projected to arrive onsite on April 23.

## 2.0 SURVEY SCOPE OF WORK

The following studies of the seabed were to be carried out over the 2500 metre by 2500 metre square located symmetrically around the proposed well site at.

Lat. 37 55' 57.7"S Long. 149 08' 58.72"E

- (a) SIDE SCAN SONAR COVERAGE
- (b) BATHYMETRY
- (c) SUB-BOTTOM PROFILING
- (d) GRAB SAMPLING

## 3.0 EQUIPMENT

The survey Company proposed and used the following equipment

### 1. Side Scan Sonar

Geoacoustics Dual Frequency Side Scan System consisting of dual frequency tow fish and tow cable, Geoacoustics Transmitter/Receiver and Ultra 120 Thermal Recorder. A second Side Scan being "Edgetech" Digital Colour Side Scan was also on the vessel as a standby unit.

### 11. Positioning Equipment

Trimble 4000 DL GPS Receiver utilising "Omni Star" realtime Differential Corrections via Optus Satellite was used to provide navigational data. The corrected Satellite Data was input into "Hydro" helmsman guidance and Bathymetric Acquisition Software run on an IPC Notebook 486 DSTN Computer.

The computer also output simultaneously regular fix signals to all other recorders used during the course of the work.

Helmsman guidance screens were provided for all recorder operators with a screen also located in the wheel house for the vessels master.

### 111. Bathymetry

The bathymetry was recorded both as digital and analogue records using an "Echotrac" Model DF 3200 digital dual frequency (200Khz & 50 Khz) Fathometer. The digital Bathymetric data acquired was recorded by the Hydro software in HSB file format while the analogue record was printed on 100mm thermal paper.

iv. Sub bottom Profiling Equipment

O.R.E model 5420 Geopulse Power Supply and O.R.E Model 5810 High Resolution Sound Source were supplied as the basic components for the sub bottom profiler. A conventional Hydrophone Array coupled to a EPC Model 4600 Graphic Recorder through a "Khronhite" threshold sound filter captured the sub bottom record. Additionally the signals were also recorded on 6" roll to Roll tape using a Racal Tape recorder. This enables post processing and enhancing of the record should the need arise. The Model 5810 electro mechanical plate transducer was mounted in the traditional Catamaran mount and towed aft of the vessel.

v. Grab Sampler.

A Smith McIntyre positive grab Sampler was provided to obtain samples of the seabed material. The Smith McIntyre Grab system is a preloaded Spring activated grab which when tripped by contact with the seabed closes providing a positive bucket seal thus recovering the bed material. The totally enclosed bucket enables winching to the surface and recovery of the sample with out any wash out.

**4.0 SURVEY VESSEL**

The vessel chartered for the survey was the support/Work Vessel "Starfire".

The vessel was provided by Undersea Marine Pty.Ltd on a subcontract arrangement with the survey Company.

It is 300 HP twin Diesel powered 25 metre x 9 metre vessel.

It is of Catamaran type hull construction providing good stability for the type of work undertaken.

Accommodation is available for 12 persons including a crew of two.

Full electronics including digital chart system , auto pilot,radios, GPS ,Weather Fax and telephone are all available.

Home Port for the Vessel was Lakes Entrance.

**5.0 PERSONNEL.**

The Survey Company provided the following personnel

- (a) Navigator & Party Manager H.T.Arrowsmith LS. MIS (Aust.)
- (b) Geologist/Geophysicist. Dr. C.V.G. Phipps Phd. M.Sc.
- (c) Systems Engineer R Fuller Dip Tech (UK)
- (d) 2 Hydrographic Assistants J.Marshall & E. Bedomme.

The Vessel crew consisted of Master,Mate and Deckhand/Cook.

To accomodate all survey equipment and survey personnel a portable site office was fixed to the vessels deck immediately aft of the wheelhouse.

**6.0 MOBILISATION**

Mobilisation of all personnel and equipment took place in Lakes Entrance on Saturday April 7th & 8th April with all equipment tested and accepted as operational at 1200 hours 8th April.

Unfavourable weather conditions prevented departure until 1000 hours on 9th April.

## 7.0 SURVEY METHOD,

It had been agreed prior to the survey that the survey would consist of a series of prime lines run over the survey area at 100 metre spacings .All sensors would be run with the side scan sonar set on 100 metre range so that 100% overlap of the bottom topography would be provided between adjacent lines.

On arrival at the site the prevailing sea condition was predominately from the West South West consequently it was decided that the vessel would remain more stable if the prime lines were run in a East/West direction.

Twenty Eight run lines covering the area in an East/West direction were preprogrammed and progressively run.

Adjacent lines could not be sequentially run owing to the need to keep the side Scan fish above the bottom on turns, accordingly every 4th runline was surveyed with infilling taking place during the course of the work.

On conclusion of the East/West prime lines three tie lines in a North South direction were carried out to tie the east /west transits together.

It was intended to undertake 6 such tie lines however an adverse weather forecast meant the reduction of same to three in favour of completing the work program prior to the deterioration in the weather.

The geologist on the basis of a working knowledge obtained during the course of the work selected 6 locations from which samples were to be obtained.

Four of these were completed before adverse weather prevented further work.

## 8.0 REPORTS

### 8.1 BATHYMETRY,

Soundings were digitally acquired at the rate of 8 per-second from the Fathometer with fixes being recorded every 10 seconds along line.

This equated to fixes being approximately 22 metres apart at the average speed of the vessel which was 2 to 3 kts. The Analogue records of all other recorders were set to automatically mark every third bathymetric fix. This provided sufficient space for fix annotations and any remarks.

During the course of the survey some 8000 Bathymetric fixes were recorded with some 2500 fixes annotated on the other recorders.

During mobilisation the dual frequency transducer was mounted over the side of the vessel 1.65 metres below the waterline , All soundings were automatically compensated for draft on this basis. Sounding Frequency (Speed of Sound in Water) by agreement with the survey supervisor was set at 1500 m/s as traditional "Bar Check" was not possible in 100 metre water depths. Time , being Eastern Standard Time was also set in the fathometer and is automatically printed on the analogue record with each marked fix.

At the beginning of each paper roll all parameters as outlined above appear on the analogue record.

The bathymetry has also not been corrected for tidal effect owing to no reliable tide station being close to the survey area. Previous work undertaken in the nearby Bass Strait oilfield area by the Company has established that the maximum tidal effect that could be expected would not exceed 1 metre at the Northright 1 well site.

The bathymetry fix locations have been corrected offset and layback relative to the GPS antenna and a Chart presented contoured at 1 metre intervals. UTM (Universal Transverse Mercator) grid matrix, Zone 55 is also shown on the chart.

This chart is in the Appendix of the report and indicates a relatively flat site falling gradually from the North West corner to the South East corner (Average Gradient 0.1%) The water depth on the Northern boundary of the site is 106 metres while that on the Southern boundary is 110 metres. The Bathymetry Chart also indicates the location of the recovered samples. The Chart Drawing 10661/1 is presented as a reduced copy in the appendix of this report.

Full scale copies of all charts have also been presented separately and if required all are available as digital drawings.

## 8.2 SIDE SCAN SONAR IMAGERY

The Side scan Transducer (Fish) was towed 194 metres aft of the fixing antenna (Layback). A depressor was attached to the tow cable to in an effort to depress the transducer to the optimum depth of 80 metres however a depth of 60 metres could only be achieved at the average vessel speed of 2 to 3 kts.

The scale setting of 100 metres either side of the tow fish was observed to be providing detail to the full extent of the record so the reduced water depth was considered to be satisfactory for the purpose of the survey. (location of seabed hazards,)

The "Ultra" triple channel recorder while testing satisfactory in port when recording commenced on site failed on two channels. The tow cable also had to be rewound on the net winch owing to rope being present and causing the cable to double wind.

The systems engineer transferred the second channel from the side scan to a standby EPC recorder and synchronised both recorders while the rope on the winch was removed and the cable rewound.

This accounted for a delay in commencing side scanning however subbottom profiling and bathymetry had commenced. Lines where the scanning was missed were rerun at the conclusion of the work in order that the coverage was complete.

The use of ships of opportunity for survey work do present problems from time to time for a number of reasons. In most cases the problems are of an electronic nature however in this case it was more of a matter of practical and operational procedures rather than noise affecting the equipment.

The side scan records did indicate the presence of exposed reef up to 3 to 4 metres above the adjacent seabed from time to time otherwise the seabed was found to be quite featureless.

No artificial features were found to exist within the survey area

The location of the reef is shown on the chart 10661/3, and is discussed further in the "Sub bottom Survey report". The Chart is presented as a reduced scale drawing in the appendix of the report.

### 8.3.1 SUB-BOTTOM PROFILING

The O.R.E power supply unit was run at an energy level of 450 joules with triggering by the controlling EPC set at once per second. This was observed to provide the necessary penetration of 10 metres in the harder materials of the seabed. On occasions however penetration of the seabed at this energy level did extend to over 50 metres.

The chief characteristics of the survey area can be classified into three distinct types of sub bottom these being as follows:

#### 8.3.2 TYPE 1.

The southern half of the area to line 15 (N5799400).

This consists of a sequence of buried and partly buried old sand dunes. The samples indicate that these are composed of fine carbonate sands which have become cemented in many areas often at or near the crests. Where the cemented crests are above the seabed they appear on the side scan records as patches of reef standing up to 3 metres above the surrounding flat sea bed.

The symmetry of the dunes indicate that the prevailing winds were from the South East when the dunes were above sealevel.

Some of the swales between the dunes have been filled with later sediment being muds, silts and sands similar to 8.3.4 below

The location of the crests of the dunes have been plotted on the sub-bottom interpretation chart. 10661/3

#### 8.3.3 TYPE 2.

Lines 16 to 21 (N.5799500) to (N.5800020) and predominately on the east side of the area exhibit similar characteristics to the above however the outcropping is not as apparent and a fine layer of sand exists over the eroded dune crests at seabed.

The overlaying sediment averages 4 to 5 metres thick and occasionally up to 7 metres.

The sediment should be regarded as soft sediment as it appears silty in nature. Toward the eastern edge of the area it becomes cemented forming low profile outcrops which are clearly visible on the sidescan records.

On the western side small sand waves running in a south westerly direction had formed in the seabed surface sediment

#### 8.3.4 TYPE 3.

The northern part of the area Lines 22 to 28 (N.5800100 to N.5800700) is a flat sandy bottom, the records indicate a well defined depression which has been interpreted as an infilled former lagoon.

To the west the equivalent lagoonal area is filled with soft holocene mud while to the east the situation is similar however there does appear to be more sand in the infill material.

The bottom of the former lagoon is around 30 metres below the existing seabed.

This whole area should be considered as soft sediment which should be regarded as having limited holding capacity.

A typical seismic section (Figure 1.) Line 24 fixes 2315 to 2335 is presented in the appendix illustrating the above.

Plan 10661/2 provides a composite interpretation of the above with the depth of soft sediment below the seabed in the former lagoon and is contoured at 2 metre intervals.

#### 8.4 GRAB SAMPLING

The Geologist/Geophysicist selected 6 sites from which samples were to be recovered.

At 0550 hours on 11/04/01 a weather forecast issued for eastern Bass Strait for the next 12 hours indicated a serious deterioration in conditions for the forthcoming 24 hour period.

Wind speeds up to 45 Kts with up to 6 metre seas were forecast for the area of the survey; At 0930 hours after agreement with the supervisor on limiting the number of tie lines the survey was considered to be complete.

Seabed sampling commenced as quickly as possible after recovery of the survey equipment:

The Side Scan Cable was unwound from the net winch and a 150 metre long rope wound thereon.

Using the mast boom the grab was deployed over the net pulley on the starboard side of the vessel.

Four samplings were undertaken before the weather deteriorated to the point where further work was not possible.

Three samples were recovered from 4 attempts and classified by the geologist as follows:

Sample #1 Fine to medium brown sand

Sample #2 Fine to medium brown shelly sand (no signs of cementing)

Sample #3 Medium brown sand with lumps of green to black silt

The location of each sample is shown on the Bathymetric chart 10661/1 in the appendix

#### 9.0 DEMOBILISATION

At 1230 hours on 11/04/01 sea conditions were of the order of 6 to 8 metres and winds gusting to 50 kts from the south west..The Master was consulted as to ability of the vessel to negotiate the Lakes Entrance Bar and we were advised that this would be not possible at least the next 24 hours. Accordingly and in interests of safety the decision was made to take the vessel to Eden in Twofold Bay and to demobilise the survey personnel and equipment and return the vessel back to Lakes Entrance at the first suitable opportunity.

All equipment was secured and the vessel left the survey area at 1300 hours arriving at Eden at 2100 hours on 11th April. Personnel were dispatched to Lakes Entrance on a midnight bus to collect vehicles so that the demobilisation could take place the next day. The vessel subsequently returned to Lakes Entrance at 1000 hours Friday 13th April.

**10. DAILY LOG.**

- April 6th Hydrographic assistants to Lakes Entrance with  
equipment & vehicles  
Geologist & Systems Engineer travel from interstate
- April 7th 0800 Vessel on Charter, Crane loads Office and secured to deck  
Transducer bracket fabricated and fitted.  
1000 Geologist & Systems Engineer arrive and fitout commences.  
1030 Safety meeting on mobilisation procedures  
1700 Manager arrives with equipment from overseas.  
2400 Fitout of office complete
- April 8th 1200 All equipment commissioned and accepted  
Spread put on Standby owing to bad weather forecast.
- April 9th 1030 Vessel sails Lakes Entrance.  
1100 Safety lecture by Master on procedures at sea.  
1700 Vessel arrives survey Area.  
2300 Survey commences at line 28
- April 10th 0000 to 2400 survey continues all day
- April 11th 0930 Survey work completed.  
1000 Grab Sampler deployed Weather commences to deteriorate  
1230 Sampling abandoned due to bad weather  
1300 Vessel proceeds to Eden  
2100 Vessel arrives Eden, vessel & Equipment on Standby  
2355 Three Personnel to Lakes Entrance to get Vehicles
- April 12th 0730 Personnel & Vehicles return to Eden demob commences  
1330 Demob Complete except for survey Office.  
1500 Personnel and equipment depart Eden  
2000 Vessel departs Eden for Lakes Entrance
- April 13th 1000 Vessel Arrives Lakes Entrance  
1200 Crane removes Office and vessel off charter.

## **APPENDICES**

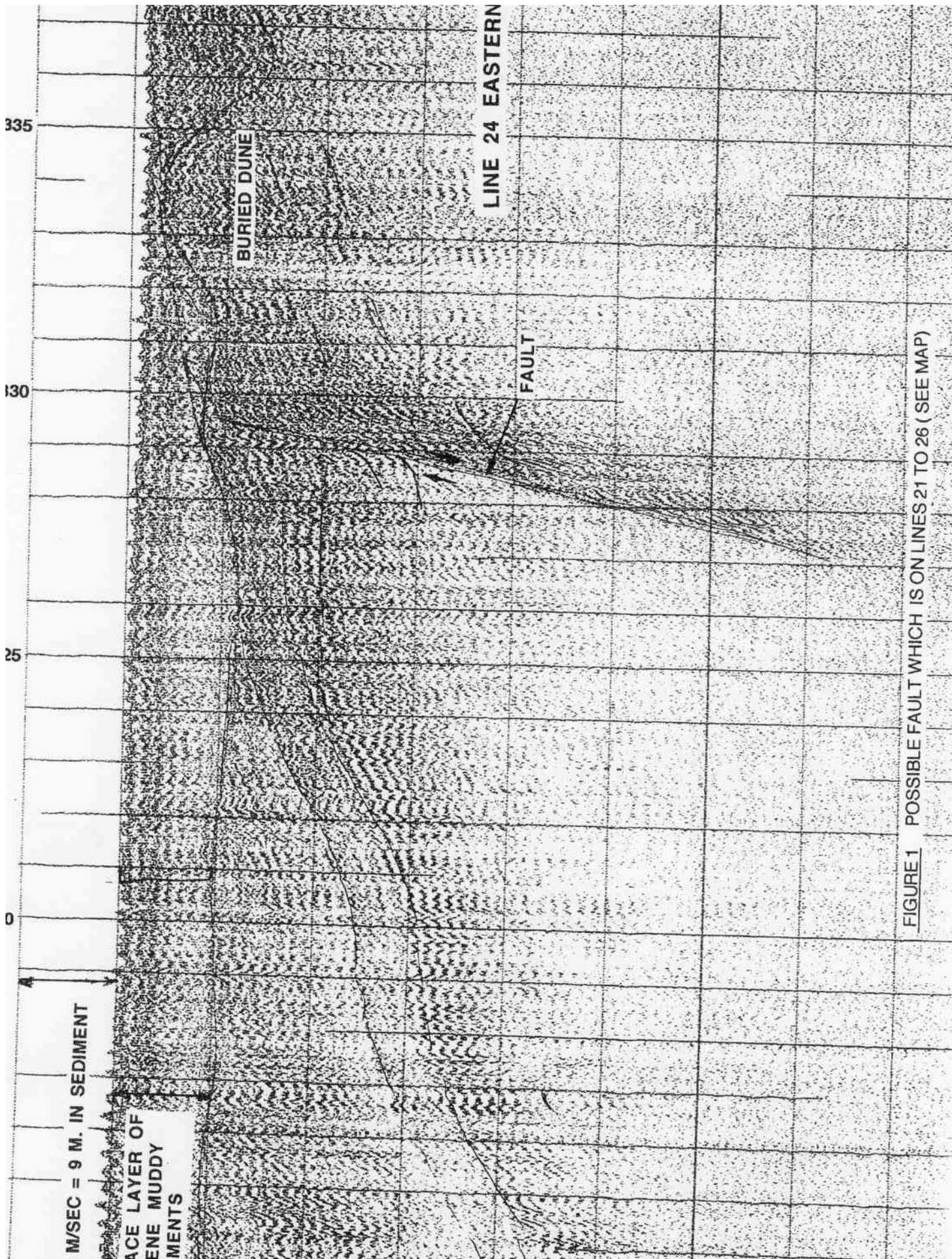


FIGURE 1 POSSIBLE FAULT WHICH IS ON LINES 21 TO 26 (SEE MAP)



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TASMAN SEA  
 NORTHRIGHT.1.  
 SUB-BOTTOM SURVEY INTERPRETATION  
 SCALE 1-6000

LEGEND & NOTATIONS

- RUNLINE NUMBER & DIRECTION
- HOLOCENE MUDS THICKNESS CONTOUR
- BURIED ERODED DUNE CRESTS
- BURIED DUNE CRESTS AS SEALED SWALES FILLED WITH SAND
- BURIED DUNE CRESTS AS UNSEALED SWALES FILLED WITH SAND
- FOR COMMENTED SEDIMENT MATERIAL(S) ABOVE SAND SEALED
- SEE SIDE SCAN SONAR PLAN 10661/3
- PKT AND PKT NUMBER
- SITE BOUNDARY

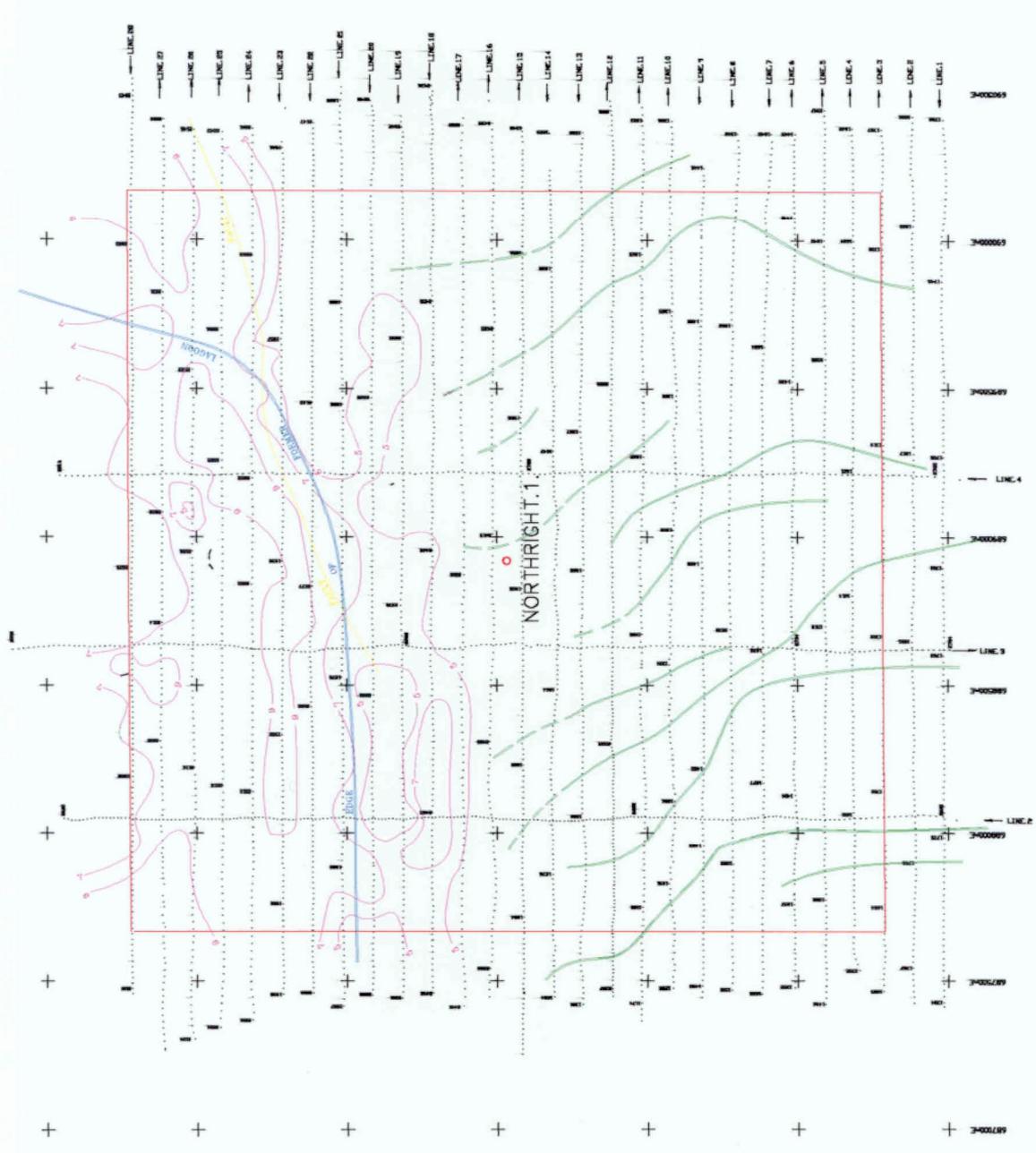
NOTES

1. GRID CO ORDINATES ARE U.T.M.  
 (GENERAL TRANSVERSE MERCATOR) ZONE 55
2. MUD THICKNESS CONTOUR INTERVAL 2 METRES

|           |          |              |         |
|-----------|----------|--------------|---------|
| SURV.     | A.M.A    | DRAWN        | H.T.A.  |
| CHKD.     | G.V.G.P. | PLOT DATE    | 5/05/01 |
| JOB No.   | 10661    | CAD FILE No. | EAGLE2  |
| REVISIONS |          |              |         |
| PLN No.   |          |              | DATE    |
|           |          |              |         |

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| SHEET No. | 1 | SCALE | 1:6000 | TRF No. | 10661/2 | REV | 0 |
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TASMAN SEA  
 NORTHRIGHT.1.  
 SIDE SCAN SONAR SURVEY  
 SCALE 1-6000

LEGEND & NOTATIONS

- ROUNLINE NUMBER & DIRECTION
- FLAT SANDY BOTTOM OVER SOFT SEDIMENT
- SAND WAVES OVERLAYING ERODED DUNES
- SANDY BOTTOM OVERLAYING BURIED DUNES
- CEMENTED SEDIMENT MATERIAL(ROCK) ABOVE SAND SEABED
- FIX AND FIX NUMBER
- SITE BOUNDARY

NOTES

1.GRID CO ORDINATES ARE U.T.M.  
 (UNIVERSAL TRANSVERSE MERCATOR) ZONE 55

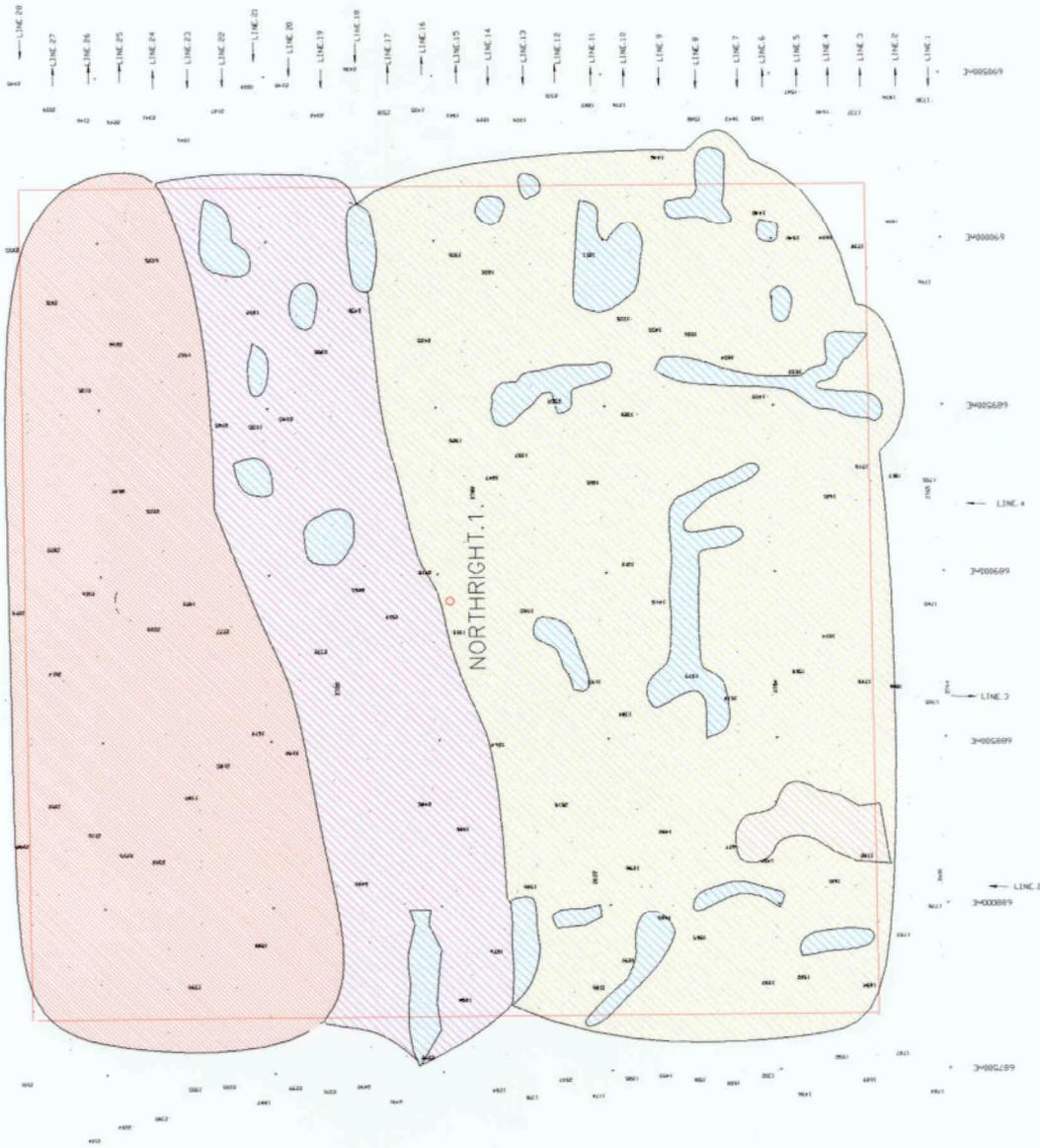
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|---------|-------|--------------|--------|
| SURV.   | A.M.A | DRAWN        | 5/5/01 |
| CHKD.   | G.T.  | PLOT DATE    | 6/5/01 |
| JOB No. | 10661 | CAD FILE No. | EAGLE3 |

REVISIONS

| PLN No | SCALE | DATE |
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