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T A S M I N E X N. L.

NATONE AREA - PHASE I REPORT

by

D. P. GRACE  
Geologist

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1. ABSTRACT

Copper and iron ore have been mined in the past in the Natone area of Tasmania. Exploration for these minerals and others has been carried out in this area in recent years by a number of interested parties. Phase I exploration work carried out in this area by Tasminex N.L. consisted of a detailed geochemical survey of the Natone area and was supplemented by a limited programme of geophysics, percussion drilling and costeaning.

2. INTRODUCTION

The township of Natone lies some eight miles south of Burnie (Fig. 1) and is one of a number of centres serving a rich agricultural district. The town itself consists of a number of houses, post office, general store, church and school. Both the old copper mine, known as Rutherfords Copper, and the iron ore outcrops, from which several hundred tons of iron ore has been taken, are located in the town and are within several minutes walk of the post office.

The old workings in and around Natone form part of the Blythe River mineral district. This district lies wholly within Exploration Licence 1/69, the exploration of which is a joint venture between Tasminex N.L. and the Australian and New Zealand Exploration Company Ltd. However, although the Natone area and the Blythe River mineral district in general lie within E.L. 1/69, they have been excluded from the joint venture and Tasminex has conducted exploration on these areas alone. (Fig. 1)

3. GENERAL GEOLOGY OF THE NATONE AREA

The Natone area is underlain by Precambrian slates and quartzites of the Burnie Series. Originally greywackes and sandstones the rock units have been subjected to low grade metamorphism and have been sharply folded and faulted into anticlines and synclines with a north-easterly strike direction. The rock units therefore, characteristically, have steep dips.

Overlying the Burnie Series is a thick sequence of conglomerates, thinly banded cherts and quartzites and these have been equated by Blake<sup>1</sup> to the base of the Owen Conglomerate of Ordovician age. These rocks have been intruded by Devonian granite and overlying the entire sequence is a Tertiary Basalt.

The older rocks are usually only exposed in creek and river beds while the much younger basalt commonly forms a capping on hills in the area. The physiography therefore, is that of well rounded hills separated by youthful valleys with the widespread development of rich basaltic soil.

The iron ore outcrops in the area adopt a well defined linear trend striking in a north-easterly direction. This is characteristic of the outcrops not only in the Natone area but also in the Blythe River and Penguin areas. Geologists from the Tasmanian Department of Mines<sup>2</sup> suggest that the iron ore is localized in an interformational breccia associated with the unconformity between Precambrian and Lower Paleozoic rock units. As the regional strike is north-easterly and there is some evidence for at least partial bedding of the iron ores,

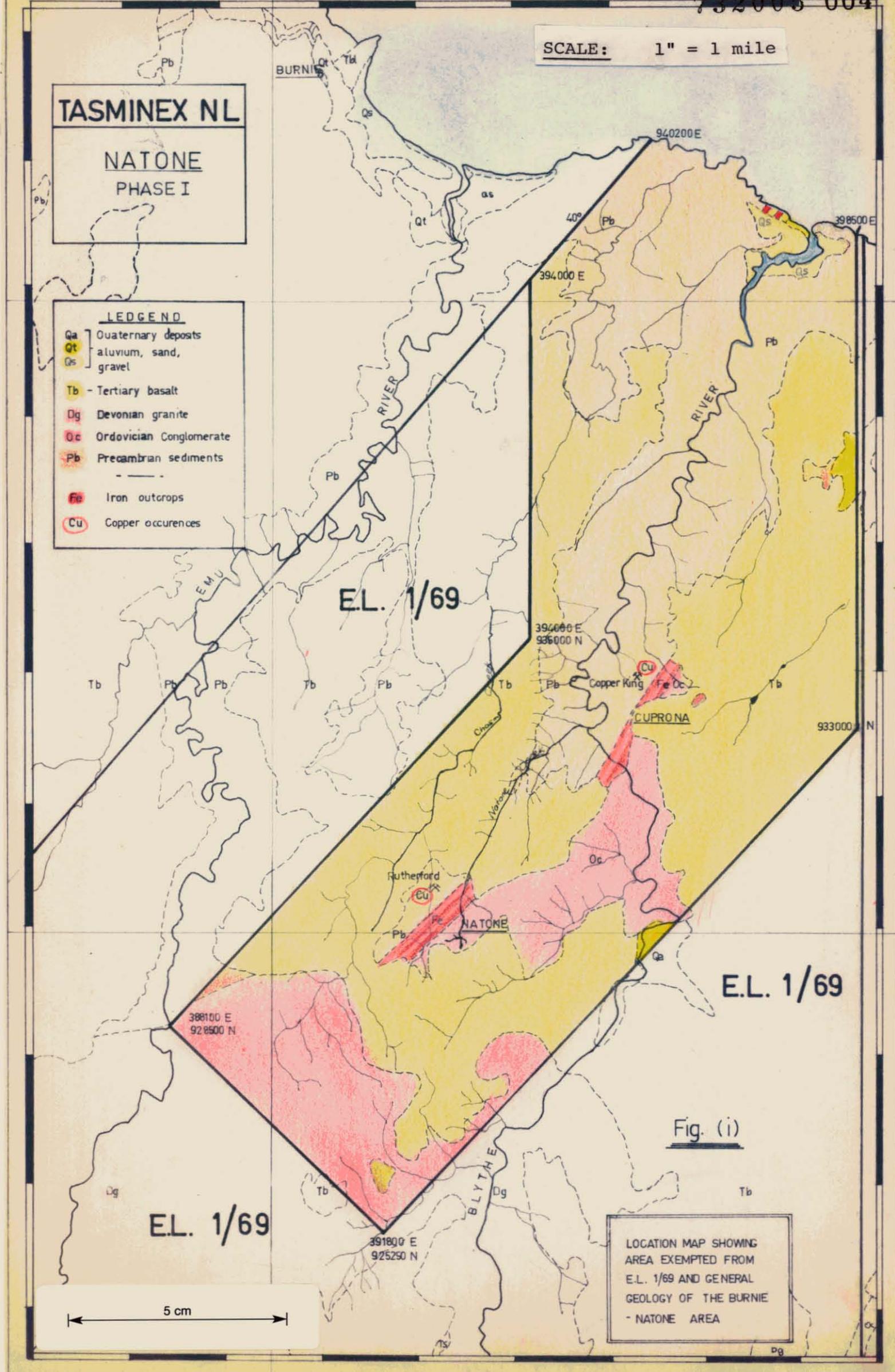
SCALE: 1" = 1 mile

# TASMINEX NL

## NATONE PHASE I

**LEGEND**

- Qa } Quaternary deposits
- Qt } alluvium, sand,
- Qs } gravel
- Tb - Tertiary basalt
- Dg Devonian granite
- Oc Ordovician Conglomerate
- Pb Precambrian sediments
- Fe Iron outcrops
- Cu Copper occurrences



EL. 1/69

EL. 1/69

EL. 1/69

Fig. (i)

LOCATION MAP SHOWING  
AREA EXEMPTED FROM  
E.L. 1/69 AND GENERAL  
GEOLOGY OF THE BURNIE  
- NATONE AREA

5 cm

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i.e. The presence of jaspilites in the Penguin area, a sedimentary origin for the iron is possible and not an igneous origin as had been suggested earlier by Blake (1958). Here it was assumed the iron ore was genetically related to the intrusive Devonian granites, the primary magnetite altering the hematite. The close proximity of mineralized zones to outcrops of iron ore (Rutherfords Copper at Natone and the Copper King in the Blythe River area) would support an igneous origin of the ore.

4. PREVIOUS WORK CARRIED OUT IN THE NATONE AREA

(i) Mining

During the 1920's copper ore was mined at Rutherfords Copper. Production figures are not available, however, mining was on a small scale only and, at best, several hundred tons of ore may have been won. Mining appears to have been from two adits sited some 200 feet apart and driven into a hill of steeply dipping slates and quartzites on the eastern side of Copper Mine Creek (Fig. ii) The two adits appear to have intersected and worked the same lode. A number of exploratory adits and trenches were sunk in the area, presumably at the time of mining, to further investigate the potential of the area and hopefully locate other lodes. It is not known if this work exposed ore material, but it would seem only the one lode was located.

Five hundred yards south of Rutherfords Copper (Fig. ii) is the first of two magnetite-hematite outcrops in the Natone area. The outcrop is manganiferous. Sampling for both iron ore and manganese has been conducted at this locality by the Tasmanian Department of Mines, however, mining has never been undertaken. A second outcrop, some two hundred yards to the south-west of the first, is more extensive and is traversed by a number of trenches from which, presumably, bulk samples were obtained. A cut on the southern side of the outcrop and a shaft near the centre has yielded several hundred tons of ore for mining and/or testing purposes.

(ii) Exploration

Exploration in the Natone area has been carried out by a number of companies and government departments. Interest has mainly centred around the iron ore outcrops and the Natone iron, along with the Blythe River and Penguin iron deposits, have formed the basis of numerous reports since their first investigation by Montgomery<sup>3</sup> in 1894. Because the iron outcrops in the Natone area are much smaller than others in the Blythe River mineral district they have not received as much attention. Blake (1958) reported on the Natone iron deposits and Jack<sup>4</sup> (1964) reported on the manganese content of the Natone iron.

An aeromagnetic survey of the area by the Bureau of Mineral Resources in 1959 and which they followed up with a ground magnetic survey in the same year, outlined a strong magnetic anomaly to the south-west of the Natone township. This prompted Minops Pty. Ltd. some years later (1969) to investigate the iron ore potential of the Natone area and two diamond drill hole sites were selected to test the extension of the Natone iron in a south-westerly direction. Drilling confirmed the iron extends in this direction with an 87 foot intersection of hematite in an inclined hole some 500 feet along strike. However, more significance was placed on the narrow bands of sulphides that were intersected during the drilling programme and Minops Pty. Ltd. attributed many of the anomalous magnetic readings to be due to pyrrhotite. Their report stated that chalcopyrite occurred as an accessory sulphide to major pyrite and pyrrhotite with assay results of

up to 0.3 percent copper. The interval over which this occurred was not given. During the course of their investigation Minops Pty. Ltd. carried out an Induced Polarization survey working from a grid constructed on the baseline shown in Fig. 11. A suitable target was selected and a third diamond drill hole put in, with, apparently, similar results to the first two holes.

Further work in the area was carried out by Hall Relph and Associates in 1970/71. This work was on behalf of Tasminex N.L. who had at this stage secured an Exploration Licence, E.L. 1/69, covering this area. The work was mainly confined to the western part of the Natone area where a detailed magnetometer and soil sampling programme was carried out. From this work eleven shallow percussion holes were sited and drilled. An assay of 0.07 per cent copper over five feet and seven intersections in the order of 0.06 per cent copper over five feet were recorded during the drilling programme. The significance of these results and others mentioned in this section will be discussed later.

In summarizing this section then, at no stage in the past has the mineral potential of Rutherfords Copper or the iron ore outcrops in the Natone area been investigated by a detailed survey. Some interest has been shown in the iron ore outcrops as a source of manganese or iron ore and the base metal potential of an area in the far western part of the Natone area has been investigated by Hall Relph and Associates.

#### 5. THE PHASE I EXPLORATION PROGRAMME

Work in the Natone area was carried out during the months of June, July and August of 1972. The base metal potential of both the old workings at Rutherfords Copper and the hematite-magnetite outcrops was investigated. The work also involved an investigation of the tungsten potential of the area. This work consisted of the following:-

- (i) The construction of two grids on 100' x 100' centres covering Areas A and B (Fig ii)
- (ii) The collection of 797 soil samples using a hand auger and sampling the B horizon, i.e. at a depth of 2 feet.
- (iii) Geological mapping and rock sampling.
- (iv) A magnetometer survey of the old workings at Rutherfords Copper.
- (v) The construction and sampling of seven costeans sited around the old workings.
- (vi) The drilling of five shallow percussion holes.

Conducting exploration in rural and inhabited areas presents a number of problems. The type of fertilizers used, if any, by farmers in the area had to be investigated and agreements covering damage, should there be any, to private property had to be prepared. The only fertilizer used within the gridded area was found to be ammonium nitrate and this was considered to have a negligible effect on the sampling programme. Only one resident requested damage protection.

All soil samples taken were dried, sieved to -80 mesh and assayed (by AMDEL) for copper and lead. Every second sample

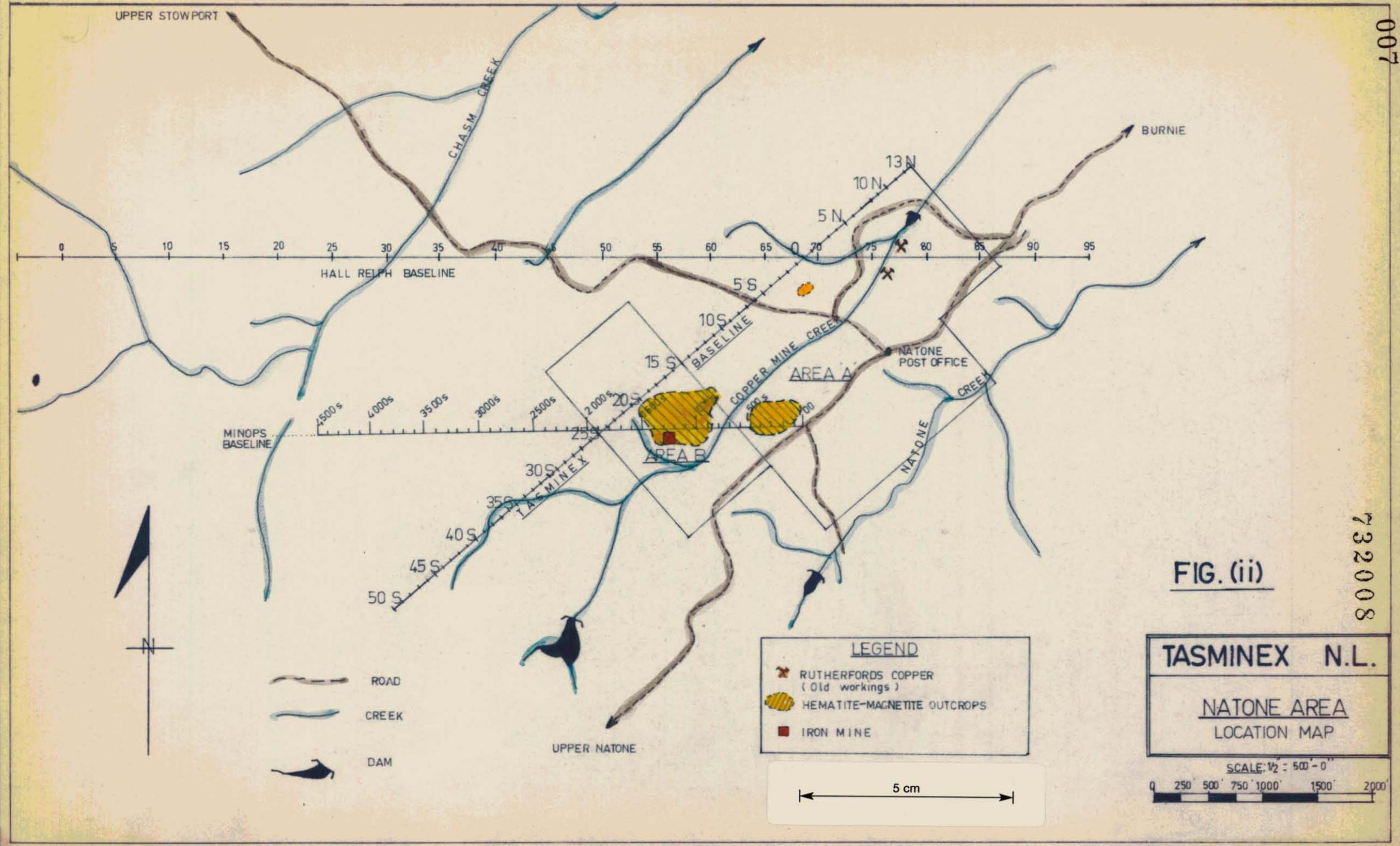


FIG. (ii)

**TASMINEX N.L.**

**NATONE AREA  
LOCATION MAP**

SCALE: 1/2 = 5000 - 0

0 250 500 750 1000 1500 2000

**LEGEND**

- RUTHERFORDS COPPER (Old workings)
- HEMATITE-MAGNETITE OUTCROPS
- IRON MINE

5 cm

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was assayed for arsenic and every fourth for tungsten. As arsenic is often employed as a pathfinder for gold and silver, the base metal potential of the Natone area was satisfactorily covered by the elements, copper, lead, and arsenic, selected for assay. As magnetite bodies in adjacent areas are known to be host rocks for scheelite mineralization, the tungsten potential of the Natone area was satisfactorily covered by the range of tungsten assays requested during the programme.

Selected rock samples taken during the programme were assayed for, in addition to the above, silver, gold, zinc and molybdenum.

Channel samples taken over 5 foot intervals from the wall of a costean were assayed for copper lead, zinc and silver. The same elements, along with molybdenum, were requested on all the percussion samples which were also taken over intervals of 5 feet. Both channel and percussion samples were dried and sieved to -80 mesh before assaying.

The magnetometer used in the survey of the old workings at Rutherfords Copper was hired from the University of Tasmania and the drilling and costeaning equipment from Singline Construction Pty. Ltd.,

6. RESULTS OF PHASE I EXPLORATION WORK

(i) Geology

Rock outcrops in the area were limited and the only good exposures were in creek beds. Within the gridded area and along Coppermine Creek light brown, grey and black shales with inter-bedded quartzites of the Burnie Series outcropped. Narrow chert horizons could be distinguished. A breccia conglomerate outcropped on the hill immediately north-west of Natone and boulders of similar material sometimes appeared as float in the paddocks.

To the south-west of Natone and within the gridded area the hematite-magnetite outcrops formed low hills. Rocks of the Burnie Series bordered the outcrops. A third hematite-magnetite outcrop was identified within the gridded area outcropping some 800 feet to the west of the Natone Post Office. Again the host rocks were rocks of the Burnie Series. This third outcrop was close to Rutherfords Copper (Fig ii) and appeared to be associated with the zone of mineralization outlined by the old workings.

Although the regional dip of the shales and quartzites is to the north-west, local reversals and some overfolding was evident. Faulting, associated with tight folding could be identified with movements and displacements of up to eight feet. Numerous micro faults with displacements in the order of one or two feet could be identified within and across individual units. Mineralization appeared to be associated with some of these faults and quartz veins, sometimes with a gossanous appearance, often outlined these planes of weakness.

The productive lode at Rutherfords Copper was a pyritiferous quartz vein of variable width, but on average about 2 feet wide. Copper sulphides, chalcopyrite, bornite and covellite along with the carbonates malachite and azurite could be identified in the vein. The vein had an approximate north-south strike in the addit nearest the Upper Stowport road (Fig ii) and had a steep dip to the north-west of 80 degrees.

(ii) Geochemistry

The geochemistry of the two gridded areas, Areas A and B, is

summarized in Maps Na 1 - 11. Map Na 1 labelled 'General Geology' shows the various rock units in the area and the position of the old workings. Also shown on this map are the positions of the various rock sampling stations and costeans. Maps Na 2 - 9 show the concentration of copper, lead, arsenic and tungsten values in residual soils in the Natone area. Map Na 10 is a location map and Map Na 11 outlines the rock and costean sampling results.

Significant anomalies were outlined during the soil sampling programme and these can be discussed as follows.

#### Copper:

A number of copper anomalies were outlined in the Natone area. However, most appear as isolated highs, four to ten times background for the area (approx. 50 ppm). In the vicinity of the old workings at Rutherfords Copper at least two of the anomalies appear to have been caused by contamination from the dumps (0N, 6.5E and 7N, 6E). Other anomalies in this area support the existence of a mineralized lode running approximately parallel to the creek (i.e. Rutherfords lode) from 0N to 9N. A second lode running from 4N, 7E to 5N, 9E and having a north-east to south-west strike is suggested by the 100ppm and 200ppm contours.

Broad copper anomalies outline the hematite-magnetite outcrops in the south of the area. These anomalies are probably not indicative of copper mineralization but due to the presence of manganese in the iron and its ability to scavenge trace elements. A somewhat higher anomaly is centred on the smaller iron outcrop (11S, 12E) which is the more manganiferous of the two. An isolated copper high on 13S, 16E was investigated but its origin could not be determined.

#### Lead:

A number of lead anomalies were outlined in the Natone area. In the vicinity of Rutherfords Copper, however, there is a noticeable absence of lead values indicating that lead mineralization is not associated with the old workings.

An isolated high at 5N, 12E was investigated but its origin could not be determined.

Several broad lead anomalies occur in the south of the Natone area and two of them coincide with the iron outcrops. Again the high manganese content of the iron would account for anomalies of this order i.e. three to four times background which can be taken as 30ppm. A third broad lead anomaly occurs in the south-eastern corner of Area A and its origin is unknown.

#### Arsenic:

Some broad arsenic anomalies occur in the Natone area and some well formed peaks occur in and around the old workings at Rutherfords Copper. It is probable that arsenopyrite is an accessory sulphide within the zone of mineralization especially as a number of the arsenic anomalies coincide with copper anomalies. The pronounced arsenic anomaly at 4S, 8E of 1,700ppm is indicative of mineralization at this locality and is probably due to the presence of arsenopyrite at depth. Two anomalies at 1N, 15E and 5N, 12E respectively may be due to mineralization at depth as they are significantly higher than background, the background being taken as 20ppm.

A broad arsenic anomaly occurs in the south of the area and again appears to be associated with the hematite-magnetite outcrops. As with copper and lead, the arsenic values are probably due to the presence of manganese which has the ability to concentrate trace elements.

Tungsten:

Two prominent tungsten anomalies were outlined in the Natone area during the survey, these being at 4S,8E and 19S,6E respectively. However, these were isolated highs and therefore may not be significant.

The anomaly on 19S,6E occurs on the southern side of the larger of the two hematite-magnetite outcrops in this part of the Natone area. As scheelite is known to be associated with magnetite bodies in adjacent areas this could be indicative of scheelite mineralization. However, if this were the case a somewhat broader anomaly with a higher peak would have been expected. A close inspection of the area failed to reveal the cause of the anomaly.

A tungsten anomaly in the western part of the Natone area and centred on 3S,12W is significantly higher than background. An investigation of this area failed to reveal the source of the anomaly.

The geochemistry and results of the rock, percussion and costean sampling programmes will be listed and discussed in other sections of the report.

(iii) Geophysics

A magnetometer survey was carried out over the old workings at Rutherfords Copper (Fig iii). A Scintrex MF-1 Fluxgate magnetometer hired from the University of Tasmania was used for the survey and readings were taken on 100' x 100' centres on grid co-ordinates.

The area proved to be magnetically flat. However, a number of broad anomalies were outlined. A magnetic anomaly in the south-west corner of the area surveyed, corresponded to an outcrop of hematite-magnetite. The anomaly was approximately 700 gammas above background (6,200 gammas).

A broad anomaly, several hundred gammas above background, was outlined in the vicinity of the productive addits at Rutherfords Copper (Fig iii). This anomaly could be in response to the sulphide pyrrhotite which is known to occur in the Natone area. Pyrrhotite however, could not be identified in the hand specimens collected from the dumps and therefore the source of this anomaly is in question.

(iv) Drilling/Costeaning

Seven costeans and five shallow percussion holes were put in during Phase I exploration work in the Natone area. This work was mainly confined to the area surrounding the old workings at Rutherfords Copper.

The assay results for samples taken from the costeans are shown in Map Na 11. The assay results for rock and gossan samples taken from 25 localities in this area are also shown in Map Na 11. The drilling logs and assay results are included as Appendix (i)

The costeans were put in by means of a backhoe and dug to an average depth of about 6 feet. Five foot channel samples were taken along a wall of the costean near the bottom of the trench. As the trenches were dug to bedrock the samples collected were taken from within a foot or so of the unweathered rock unit and therefore truly representative of the underlying rock type.

All the costeans were dug in steeply dipping weathered shales

and quartzites of the Burnie Series. Siliceous zones and weathered quartz veins were prominent. A narrow (15.0' to 45.0') unit of black shale with abundant pyrite was cut in Costeans 3, 4, 5 and 6. This unit carried anomalous copper values as exemplified by samples taken at Stations 17, 18, 22 and 23 and by samples from Costeans 3 (western end), 5 and 6 (central portion). Costeans 5 and 6 appear to have intersected the main lode at Rutherfords Copper and an assay of 6.0% Cu over 5.0 feet was recorded in Costean TNa6. On inspection a narrow (2.0') quartz vein carrying copper sulphides consisting of chalcopyrite, bornite and covellite heavily stained by manganese had been exposed. The same vein was exposed in an addit at the eastern end of Costean TNa 4 where a rock sample (Station 20) assayed 7.2% Cu, 0.5% As and .49% Ag.

Significant copper and arsenic results were also recorded at Stations 6, 12 and 15.

Drilling was carried out in the area using a Furakawa air-track percussion rig. Five holes were drilled however, only one, PNa 3 was able to reach the target depth of 100 feet. Drilling conditions were difficult because of the clayey nature of the weathered zone. Clay particles would stick together and fall back down the hole giving a poor return and finally clogging the drill bit. Thus, four of the five holes were abandoned before reaching their planned depth.

Hole PNa 1 sited at 9N,8.75E was to intersect a gossan at depth but failed to do so. Hole PNa 2 sited at 5N,8.99E was to also intersect a gossan at depth and determine the source of a copper anomaly. However, the hole was forced to be abandoned at 50 feet without achieving either objective. Hole PNa 3 sited at 4.5N, 7.0E tested a soil anomaly in an area of known mineralization. Significant results were obtained in this hole from 70 feet onwards and an intersiction of 0.52% Cu over 15 feet was recorded. The hole was completed at 100 feet in a pyrite rich black shale carrying anomalous copper values. Holes PNa 4 and PNa 5 sited at 0.75S,1.75E and 4.0S,8.0E respectively were designed to test soil anomalies but had to be abandoned before reaching their target depths. Hole PNa 4 was also sited to test magnetic anomaly. This hole intersected anomalous copper values in the order of 0.1 to 0.2% Cu.

## 7. DISCUSSION OF RESULTS

The soil sampling programme provided useful information and was successful in outlining anomalous areas. In particular the copper and arsenic results were the most useful in outlining the mineralized zone at Rutherfords Copper. On these results it appears likely the mineralized zone extends from 9N,7E to 4S,8E i.e. a strike length of 1.300 feet. Combined with the rock and gossan sampling results the results provided by costeaning gave the best guide to the nature of this mineralization.

Within the mineralized vein associated with the old workings the highly anomalous silver and arsenic values at Station 20 confirms the presence of accessory argentite and arsenopyrite to major pyrite, chalcopyrite, bornite and covellite. The 0.49% Ag from Station 20 is unlikely to be consistent throughout the vein. The vein is approximately two feet wide and was intersected in Costeans 5 and 6. The anomalous copper and arsenic values at Station 15 suggest the vein may persist through to the vicinity of Costean 3, but maybe somewhat narrower. The anomalous copper and arsenic values at Stations 6 and 12 are indicative of mineralization and a second vein is probably present in this vicinity i.e. 450 feet east of the main lode at Rutherfords Copper.

The percussion drilling programme also provided some useful information. Drill hole PNa 3 was sited between Costeans 4 and 5 and passed through a pyrite rich black shale carrying anomalous

copper values. Significant results were recorded from 70 feet onwards to the end of the hole with a top assay of 0.52% Cu over 15 feet at a down hole depth of 70 to 85 feet.

The mineralized zone then, which has been shown to extend from Costean 3 to Costean 6, i.e. 7.25N,7.75E to 2.8N,7.25E and inferred, from the soil sampling results, to extend to the prominent copper/arsenic anomaly at 4S,8E consists of:-

(i) a narrow, conformable, black shale unit with abundant pyrite and carrying anomalous copper values.

Associated with this unit is,

(ii) a mineralized quartz vein carrying major iron and copper sulphides and minor silver and arsenical sulphides.

The presence of a second vein some 450' east of the main lode is supported by the appearance of gossans carrying anomalous copper and arsenic values. From the surface outcrop the vein would appear to be narrower than the first.

## 8. CONCLUSION AND RECOMMENDATIONS

The results obtained during Phase 1 indicate the area investigated in the Natone region of Tasmania has fair potential for containing copper and silver minerals of economic significance.

The lode originally worked as Rutherfords Copper has been investigated and shown to persist at least as far south as Costean TNa 6. Although the lode has been shown to contain minerals of economic importance it is doubtful whether sufficient tonnages could be proved up within the lode to support even a small operation. The real potential of the area possibly lies in one of two facts:

(i) there is evidence for the existence of other lodes in the area.

(ii) the black shale unit with anomalous copper values could be the host rock for a strata bound deposit.

Generally speaking the area doesn't appear to be a favourable environment for base metal deposition since it is almost exclusively sedimentary. However, if the magnetite-hematite outcrops in the area have an igneous origin, as would appear to be the case by examination of outcrops to the south of the Natone area, then mineralizing solutions may have been associated with them. Sulphur may have been introduced to the lode, or lodes, from the black shale unit which contains abundant pyrite. Sulphides pyrrhotite and chalcopyrite have been reported south of the Natone iron outcrops by Minops Pty. Ltd. and to the north is Rutherfords Copper, the area currently being investigated.

From this discussion and from the results obtained in Phase I it is recommended, therefore, that two diamond drill holes be outlined in Phase II to test the possibilities that economic mineralization may be associated with the black shale unit, and that anomalous zones outlined by rock and soil sampling programmes correspond to other lodes in the area.



D. P. GRACE.

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9. REFERENCES

- 1 Blake, F., 1958., Blythe River and Cuprona areas  
Tech. Reports Dep. Min. Tas.,  
2, 25 - 33.
- 2 Noldart, A., 1965, Cuprona Iron Deposit, Tech.  
Reports Dep. Min. Tas., 11,  
55 - 64.
- 3 Montgomery, A, 1894, Deposit of Iron Ore at the  
Blythe River. Ann. Rep. Sec. Min.  
Tas., for 1893 - '94.
- 4 Jack, R., 1964., Natone Manganese Deposit., Tech.  
Reports, Dep. Min. Tas., 9, 21.

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A P P E N D I X

DRILL HOLE LOGS AND ASSAY

RESULTS FOR HOLES PNa 1-5

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TASMINEX N.L.

Date: 11th August, 1972.  
 Dip: 65°  
 Depth: 80' 0"  
 Bearing: 135°

PAGE: 1

NATONE AREA.

Co-ordinates: 9N 8.75E

PNa 1

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Rec. %	Section From / To	Description	Sample		Assay Ppm				
			No.	From / To	Cu.	Pb.	Zn.	Ag.	Mo.
80	0' - 5'	Yellow Clay	PNa. 1	Sample Interval = 5' 0"	10	15	5	<1	<3
90	5' - 10'	" "	2	"	10	15	5	<1	<3
100	10' - 15'	" " , some ironstone.	3	"	10	15	5	<1	<3
100	15' - 20'	" " , " "	4	"	15	5	5	<1	<3
100	20' - 25'	" "	5	"	15	5	5	<1	<3
100	25' - 30'	" "	6	"	20	10	5	<1	<3
100	30' - 35'	Yellow Clay with quartz	7	"	65	25	5	<1	<3
100	35' - 40'	" " " "	8	"	50	25	5	<1	<3
100	40' - 45'	" "	9	"	40	25	5	<1	<3
100	45' - 50'	" " , some ironstone	10	"	40	35	5	<1	3
100	50' - 55'	" "	11	"	30	25	5	<1	<3
100	55' - 60'	" "	12	"	30	20	5	<1	<3
90	60' - 65'	Soft Yellow Clay	13	"	30	20	5	<1	<3
90	65' - 70'	" " "	14	"	30	20	5	<1	<3
85	70' - 75'	" " "	15	"	15	5	5	<1	<3
80	75' - 80'	" " " , Cultings possibly contaminated.	16	"	25	10	5	<1	<3
Hole abandoned in clayey ground. Drilling conditions difficult.									

Co-ordinates: 5-N 8.99-E

P Na 2

732017

Rec. %	Section From / To	Description	Sample		Assay ppm				
			No.	From / To	Cu.	Pb.	Zn	Ag.	Mo.
70	0' - 5'	Yellow Clay, some ironstone and quartz.	PNa 17	Sample Interval.	130	20	5	1	3
80	5' - 10'	" " , " " " "	18	5' 0"	190	10	5	1	3
90	10' - 15'	" "	19	"	200	25	5	1	3
100	15' - 20'	" " , some ironstone.	20	"	180	20	5	1	3
100	20' - 25'	" "	21	"	210	20	5	1	3
100	25' - 30'	Yellow/White Clay	22	"	220	10	5	1	3
100	30' - 35'	" " "	23	"	220	10	5	1	3
100	35' - 40'	" " " , with quartz.	24	"	230	5	5	1	3
90	40' - 45'	" " "	25	"	240	15	5	1	3
75	45' - 50'	" " "	26	"	190	15	5	1	3

Hole abandoned when drilling conditions became difficult.

016

017

## TASMINEX N.L.

PAGE: 1

NATONE AREA.

P Na 3

Date: 24th August,  
 Dip: Vertical  
 Depth: 100' 0"  
 Bearing: 0°

Co-ordinates: 4.5 N 7.0 E

732018

Rec. %	Section From / To	Description	Sample		Assay ppm				
			No.	From / To	Cu	Pb	Zn	Ag	Mo
90	0' - 5'	Soft, red - yellow clay	PNa 27	Sample	250	25	85	<1	3
95	5' - 10'	Yellow - blue clay, Chert.	28	Interval	340	40	85	<1	<3
100	10' - 15'	Blue Clay / Shale, sulphides and quartz.	29	5' 0"	230	20	30	<1	<3
100	15' - 20'	" " " " " "	30	"	310	20	30	<1	<3
100	20' - 25'	" " " " " "	31	"	140	20	15	<1	<3
100	25' - 30'	Blue / Black Shale, " " "	32	"	75	15	5	<1	<3
100	30' - 35'	" " " , with sulphides (pyrite)	33	"	65	10	10	<1	<3
100	35' - 40'	" " " " " "	34	"	95	25	10	<1	<3
100	40' - 45'	" " " " " "	35	"	85	20	25	<1	<3
100	45' - 50'	" " " " " "	36	"	60	10	20	<1	<3
100	50' - 55'	" " " " " "	37	"	85	10	15	<1	<3
100	55' - 60'	" " " " " "	38	"	85	10	10	<1	3
100	60' - 65'	" " " " " "	39	"	95	10	15	<1	3
100	65' - 70'	" " " " " some quartz.	40	"	260	30	10	3	<3
100	70' - 75'	" " " " " "	41	"	5500	10	20	12	<3
100	75' - 80'	" " " " " "	42	"	7000	10	35	18	3
100	80' - 85'	" " " " " "	43	"	3500	10	20	7	3
100	85' - 90'	" " " " " "	44	"	2800	10	30	6	<3
100	90' - 95'	" " " " " "	45	"	2400	15	20	5	<3
100	95' - 100'	" " " " " "	46	"	2600	15	25	5	<3

Hole completed at 100' 0"

018

TASMINEX N.P.

PAGE: 1

NATONE AREA.

Date: 25th August, 197  
 Dip: 75°  
 Depth: 55' 0"  
 Bearing: 225°

Co-ordinates: 0.75 S 1.75 E

P Na 4

732019

Rec. %	Section From / To	Description	Sample		Cu	Pb	Assay ppm		
			No.	From / To			Zn	Ag	Mo.
70	0' - 5'	Red Soil, Ironstone.	PNa 47	5' Sample	1800	15	20	4	<3
90	5' - 10'	" " "	48	"	2050	10	25	5	3
95	10' - 15'	Ironstone ( hematite ), soil	49	"	1400	5	20	3	<3
95	15' - 20'	" " "	50	"	1350	10	20	3	<3
95	20' - 25'	" " "	51	"	1050	10	15	3	<3
95	25' - 30'	" " " /Clay	52	"	1150	10	10	3	<3
75	30' - 35'	Shale	53	"	1050	10	15	3	<3
75	35' - 40'	Blue / Black shale	54	"	1350	10	10	3	<3
75	40' - 45'	" " "	55	"	1400	10	15	4	<3
75	45' - 50'	Brown Clay	56	"	800	10	15	3	3
50	50' - 55'	" " - wet.	57	"	600	5	15	1	3

Hole abandoned due to difficult  
drilling conditions.

013

TASMANIA N.L.

Date: 26th August, 1975  
 Dip: 75  
 Depth: 65' 0"  
 Bearing: 95

PAGE: 1

NATONE AREA...

P Na 5

Co-ordinates: 4 S 8 E

732020

Rec. %	Section From / To	Description	Sample		Cu.	Pb.	Assay ppm		
			No.	From / To			Zn.	Ag.	Mo.
75	0' - 5'	Grey/brown shale / soil	PNa 58	5' 0" Samp.	550	10	15	1	3
70	5' - 10'	" " " / Soil/Clay	59	"	380	10	15	1	3
90	10' - 15'	" " " / Clay/Quartzite.	60	"	170	50	90	9	3
90	15' - 20'	" " " / Quartzite	61	"	190	30	130	12	3
90	20' - 25'	Brown clay, quartzite	62	"	65	40	55	1	3
90	25' - 30'	" " "	63	"	45	40	55	1	3
70	30' - 35'	" " "	64	"	45	40	65	1	3
70	35' - 40'	" " "	65	"	35	40	70	1	3
70	40' - 45'	Shale, quartzite cuttings	66	"	55	30	45	1	3
65	45' - 50'	" " "	67	"	45	20	35	1	3
60	50' - 55'	" " "	68	"	85	25	25	1	3
50	55' - 60'	" " "	69	"	35	20	20	1	3
45	60' - 65'	" " "	70	"	50	30	25	1	3

Hole abandoned at 65' 0" in shale/clay/quartzite when drilling conditions became difficult.

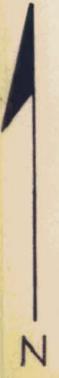
030

SCALE: 1" = 100'-0"



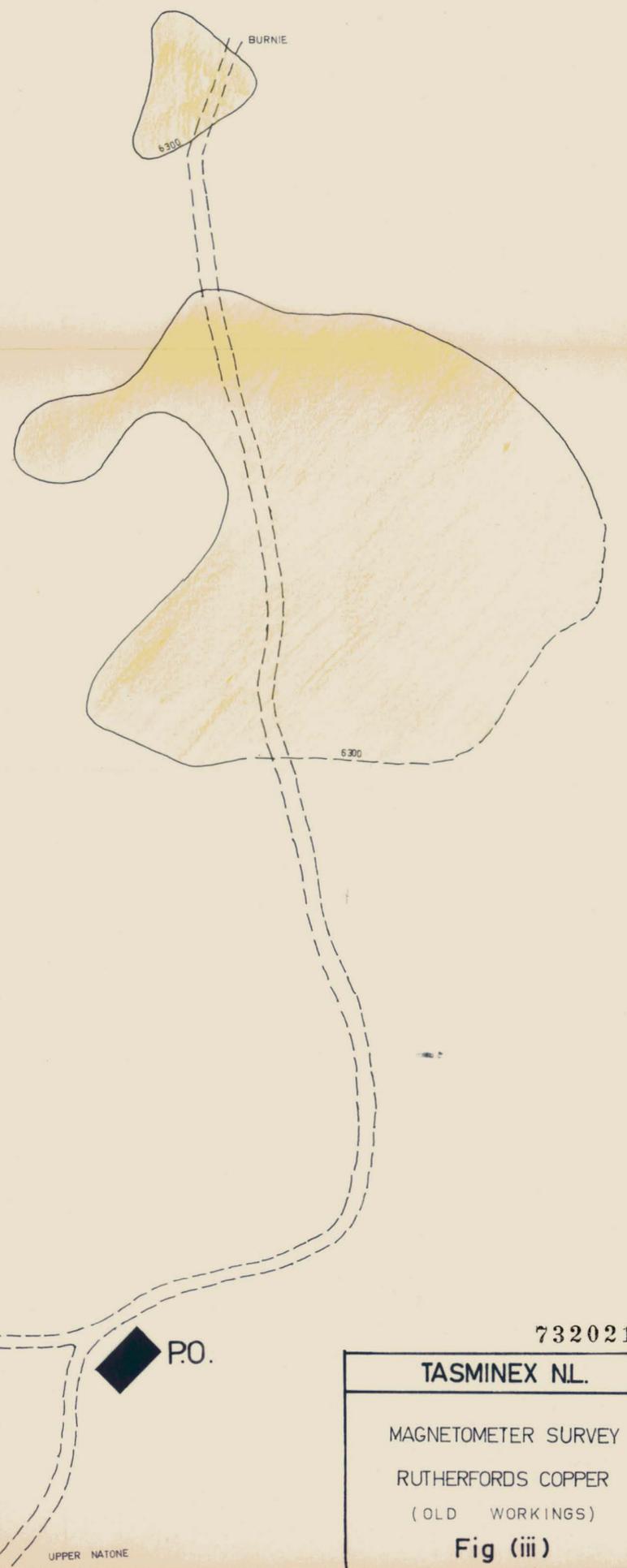
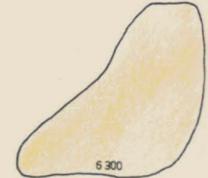
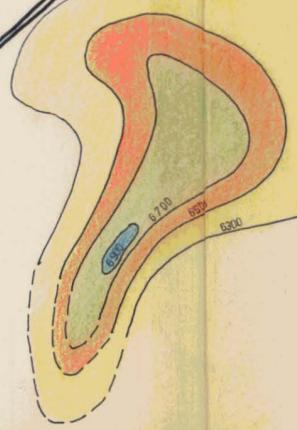
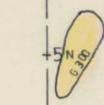
NB: ALL READINGS IN GAMMAS

13N  
12N  
11N  
10N  
9N  
8N  
7N  
6N  
5N  
4N  
3N  
2N  
1N  
00  
1S  
Baseline



CREEK

BURNIE



STOWPORT - UPPER NATONE ROAD



UPPER NATONE

732021

TASMINEX NL.
MAGNETOMETER SURVEY
RUTHERFORDS COPPER
(OLD WORKINGS)
<b>Fig (iii)</b>

72-897

TASMINEX N.L.		
NATONE AREA		
GENERAL GEOLOGY		
Prepared by: D.P.G.	Drawn by: K.N.M.	
Scale: as shown	Date: 24/8/72	Drawing No: NA 1
Based on: Soil Samples		



**LEGEND**

- QUARTZ VEIN
- GOSSAN LOCALITY
- ADDIT
- SHAFT
- DUMP
- DIP & STRIKE OF STRATA
- SCHISTOSITY
- GEOLOGICAL BOUNDARY (Approximate)
- COSTEAN
- SAMPLING STATION
- PERCUSSION HOLE
- BASELINE
- BUILDING
- ROAD
- CREEK
- DAM

**GEOLOGICAL LEGEND**

**TERTIARY**

- BASALT

**DEVONIAN ?**

- HEMATITE-MAGNETITE

**CAMBRIAN ?**

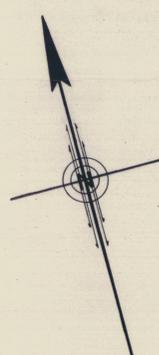
- BRECCIA CONGLOMERATE

**PRE CAMBRIAN**

- QUARTZITE
- SHALE (Undifferentiated)
- BLACK SHALE UNIT WITH ABUNDANT PYRITE

13N  
12N  
11N  
10N  
9N  
8N  
7N  
6N  
5N  
4N  
3N  
2N  
1N  
00  
1S  
2S  
3S  
4S  
5S  
6S  
7S  
8S  
9S  
10S  
11S  
12S  
13S  
14S  
15S

Baseline



TO UPPER STOWPORT

TO STOWPORT

TO UPPER NATONE

TO CAMENA

13 NORTH 0 EAST 60 35 15 25 10 5 25 35 5 5 35 15 50 10-13 NORTH 13 EAST

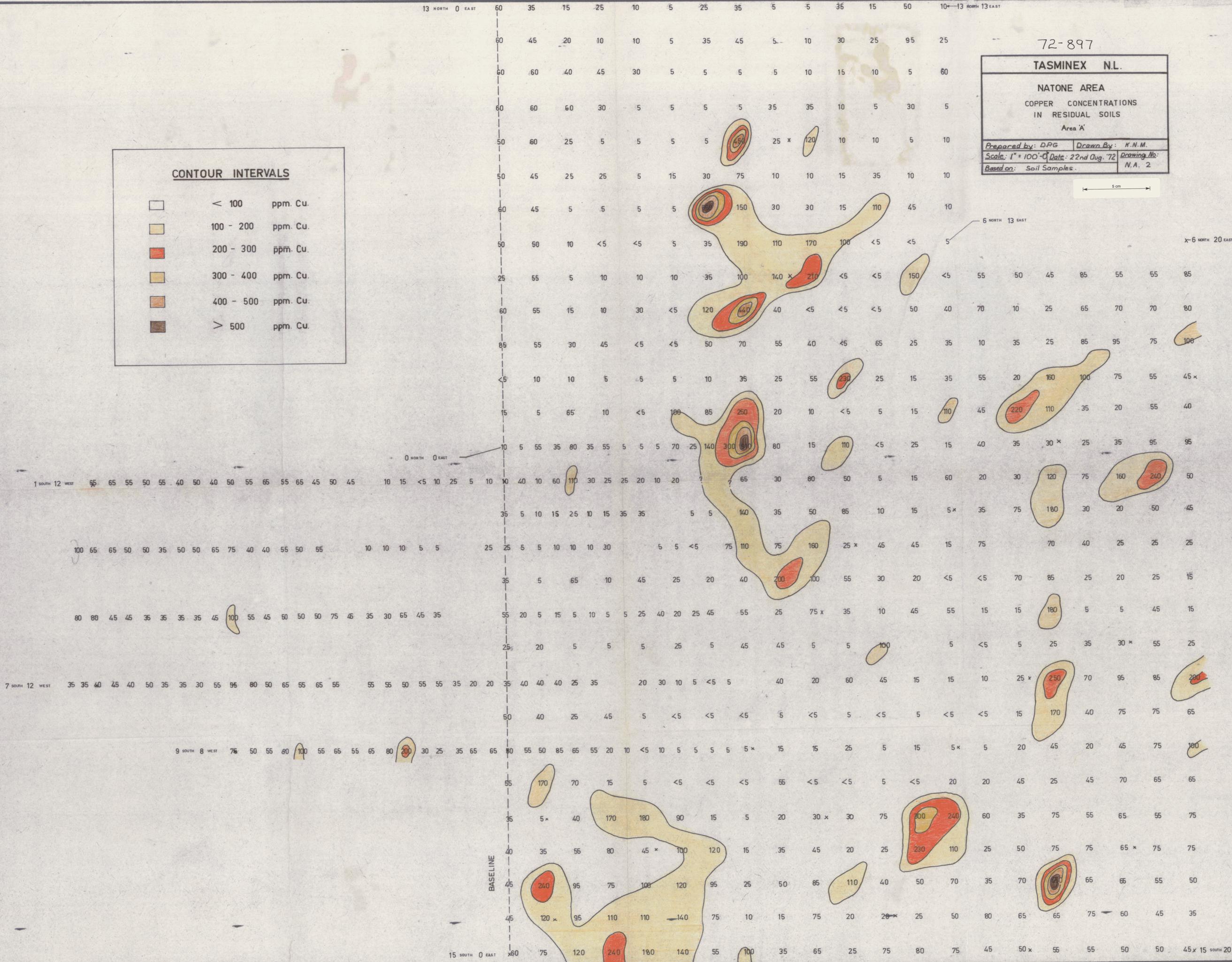
72-897

<b>TASMINEX N.L.</b>	
<b>NATONE AREA</b>	
COPPER CONCENTRATIONS IN RESIDUAL SOILS	
Area 'A'	
Prepared by: D.P.G.	Drawn By: K.N.M.
Scale: 1" = 100'-0"	Date: 22nd Aug. '72
Based on: Soil Samples.	Drawing No: N.A. 2

**CONTOUR INTERVALS**

	< 100	ppm. Cu.
	100 - 200	ppm. Cu.
	200 - 300	ppm. Cu.
	300 - 400	ppm. Cu.
	400 - 500	ppm. Cu.
	> 500	ppm. Cu.

5 cm



72-897

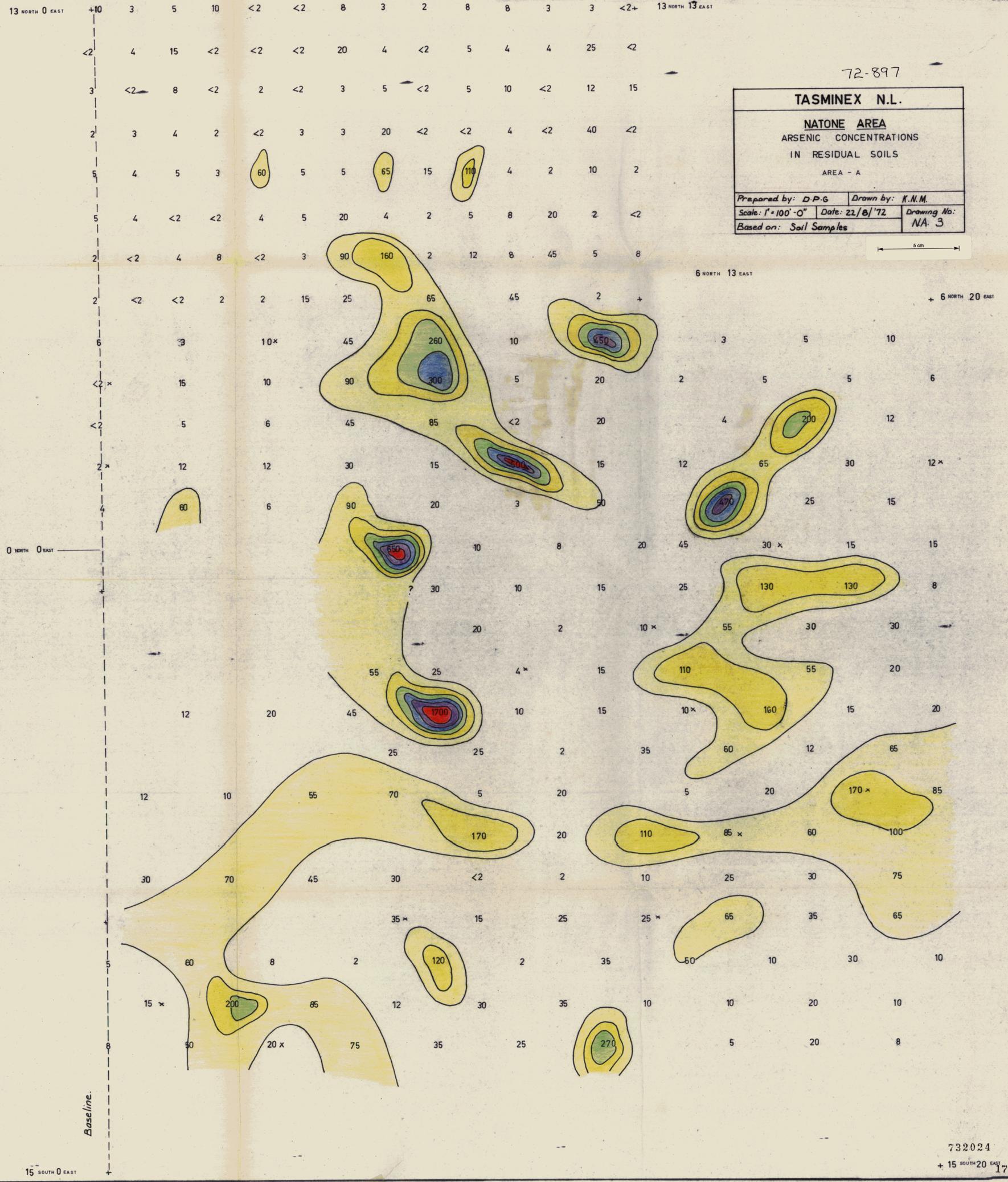
**TASMINEX N.L.**

**NATONE AREA**  
ARSENIC CONCENTRATIONS  
IN RESIDUAL SOILS  
AREA - A

Prepared by: D.P.G. Drawn by: K.N.M.  
Scale: 1" = 100' - 0" Date: 22/8/'72 Drawing No: NA-3  
Based on: Soil Samples

**CONTOUR INTERVALS**

White	< 50	ppm As
Light Yellow	50 - 100	ppm As
Yellow	100 - 200	ppm As
Light Green	200 - 300	ppm As
Blue	300 - 400	ppm As
Purple	400 - 500	ppm As
Red	> 500	ppm As



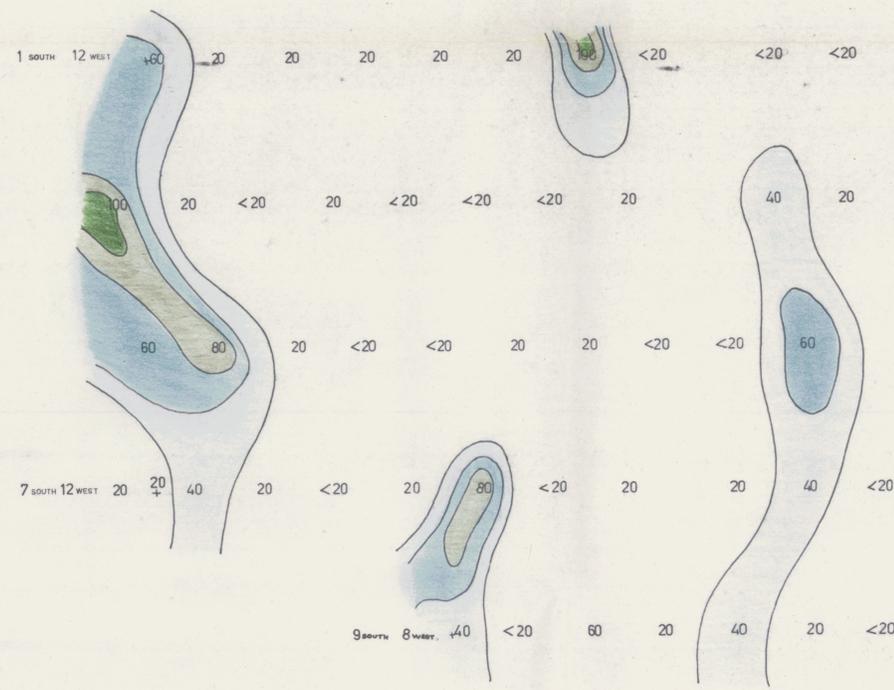
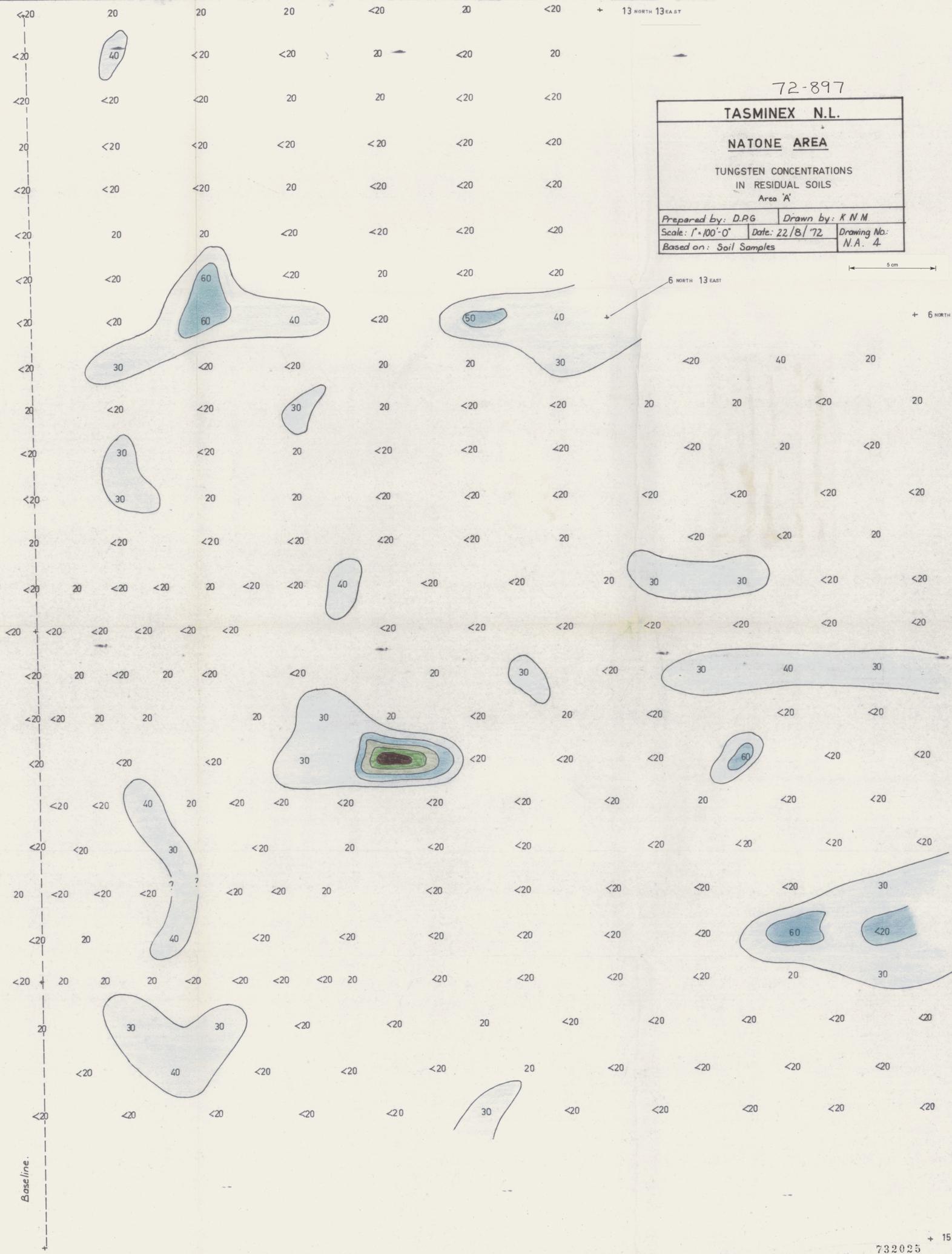
13 NORTH 0 EAST

13 NORTH 13 EAST

72-897

<b>TASMINEX N.L.</b>			
<b>NATONE AREA</b>			
TUNGSTEN CONCENTRATIONS IN RESIDUAL SOILS Area 'A'			
Prepared by: D.P.G.	Drawn by: K.N.M.		
Scale: 1"=100'-0"	Date: 22/8/'72	Drawing No:	N.A. 4
Based on: Soil Samples			

CONTOUR INTERVALS		
	< 25	ppm Tungsten
	25 - 50	ppm Tungsten
	50 - 75	ppm Tungsten
	75 - 100	ppm Tungsten
	100 - 200	ppm Tungsten
	> 200	ppm Tungsten



15 SOUTH 0 EAST

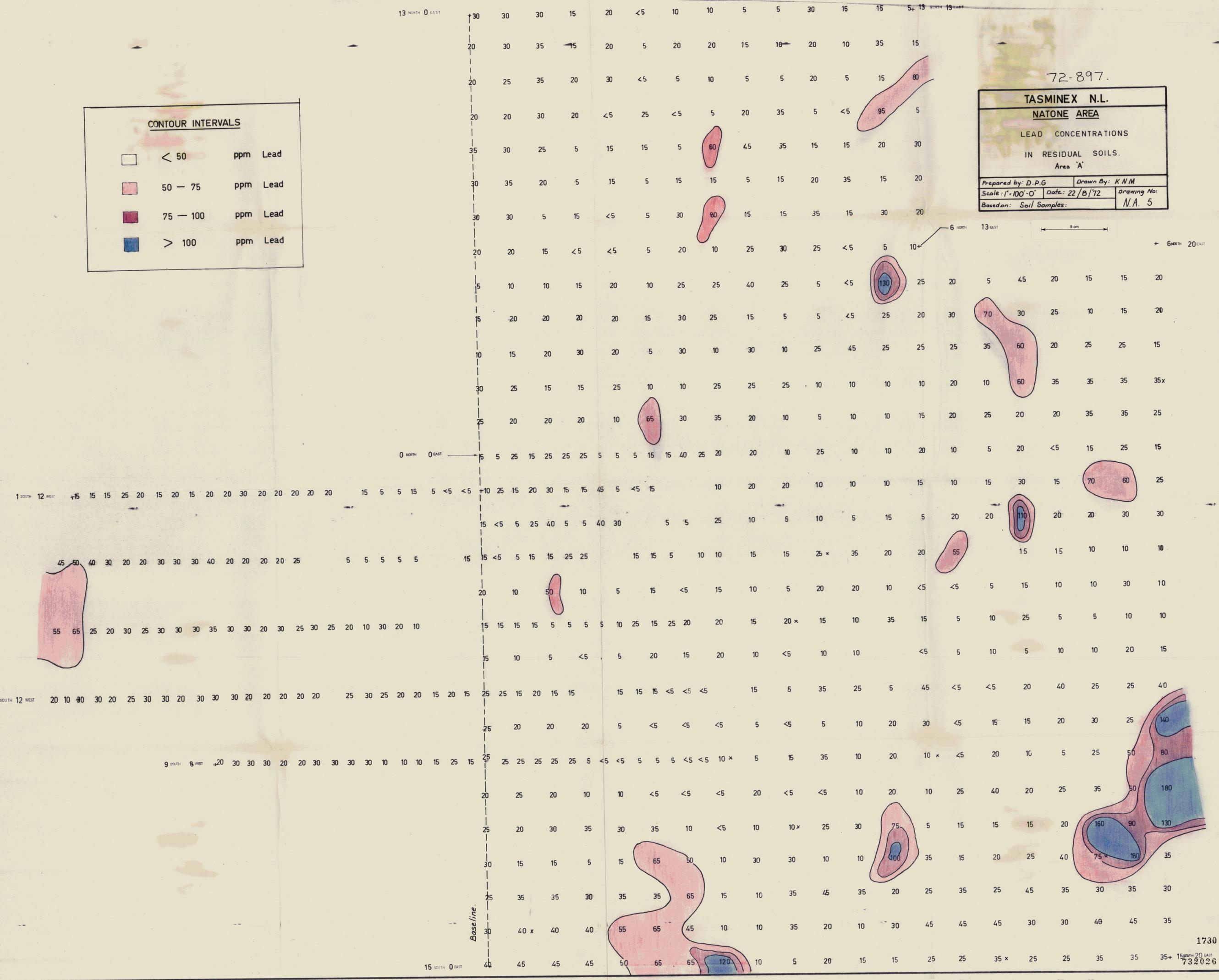
732025 + 15 SOUTH 20 EAST 1729

72-897.

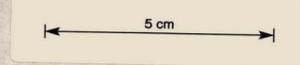
<b>TASMINEX N.L.</b>		
<b>NATONE AREA</b>		
LEAD CONCENTRATIONS		
IN RESIDUAL SOILS.		
Area 'A'		
Prepared by: D.P.G	Drawn By: K.N.M	
Scale: 1:100'0"	Date: 22/8/72	Drawing No:
Based on: Soil Samples:		N.A. 5

**CONTOUR INTERVALS**

□	< 50	ppm Lead
■	50 - 75	ppm Lead
■	75 - 100	ppm Lead
■	> 100	ppm Lead



<b>TASMINEX N.L.</b>		
<b>NATONE AREA</b>		
COPPER CONCENTRATIONS IN RESIDUAL SOILS.		
Area 'B'		
Prepared by: D.P.G	Drawn by: K.N.M.	
Scale: 1" = 100' - 0"	Date: 23/8/72	Drawing No: N.A. 6
Based on: Soil Samples		

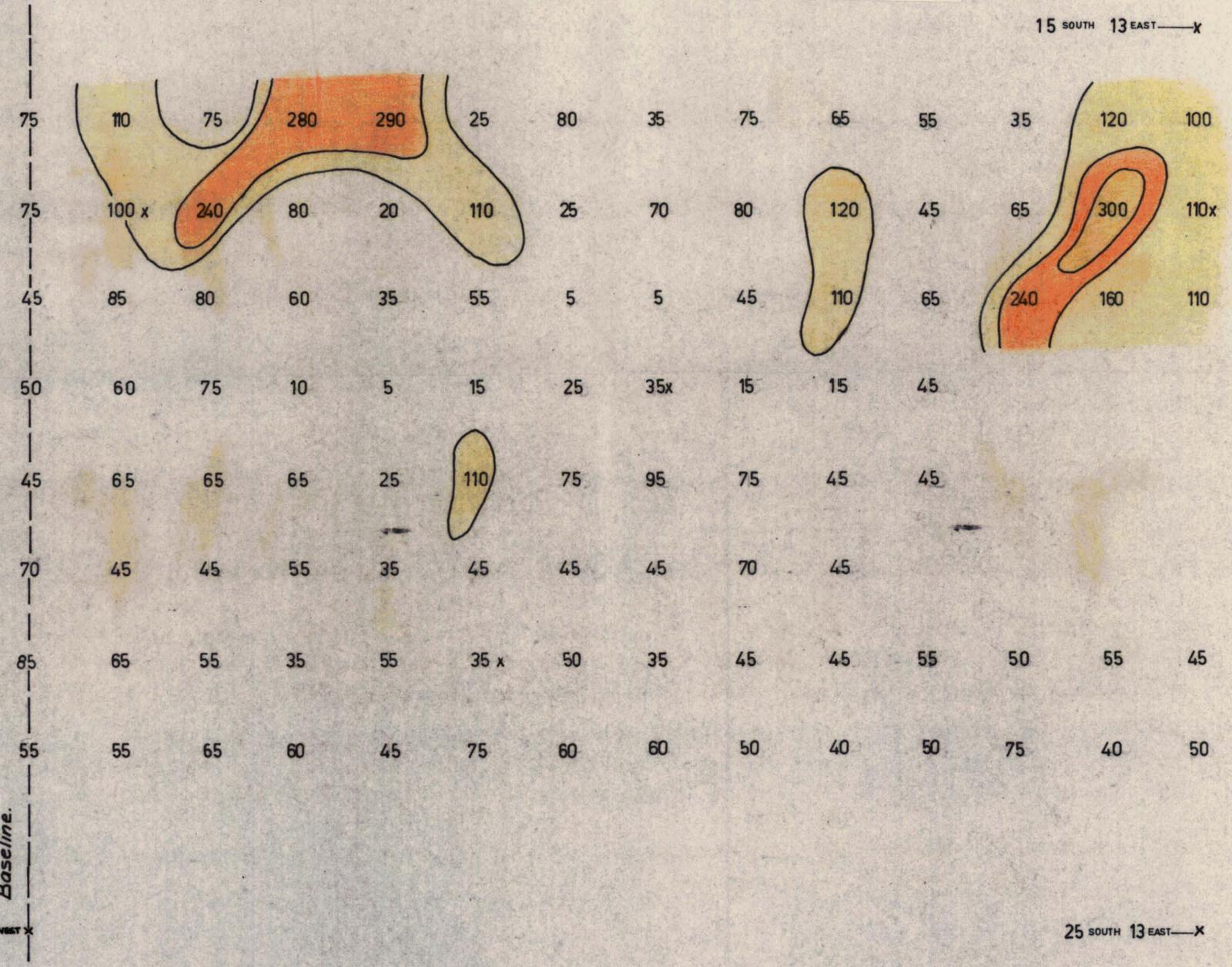


x-15 SOUTH 8 WEST

15 SOUTH 13 EAST — x

**CONTOUR INTERVALS**

	< 100 ppm Cu
	100 - 200 ppm Cu
	200 - 300 ppm Cu
	> 300 ppm Cu



x-25 SOUTH 8 WEST

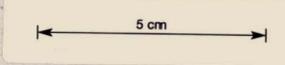
25 SOUTH 13 EAST — x

**TASMINEX N.L.**

**NATONE AREA**

LEAD CONCENTRATIONS  
IN RESIDUAL SOILS.  
AREA - B

Prepared by: D P G	Drawn by: K N M
Scale: 1:100' - 0"	Date: 23/8/72
Based on: Soil Samples	Drawing No: N.A. 7

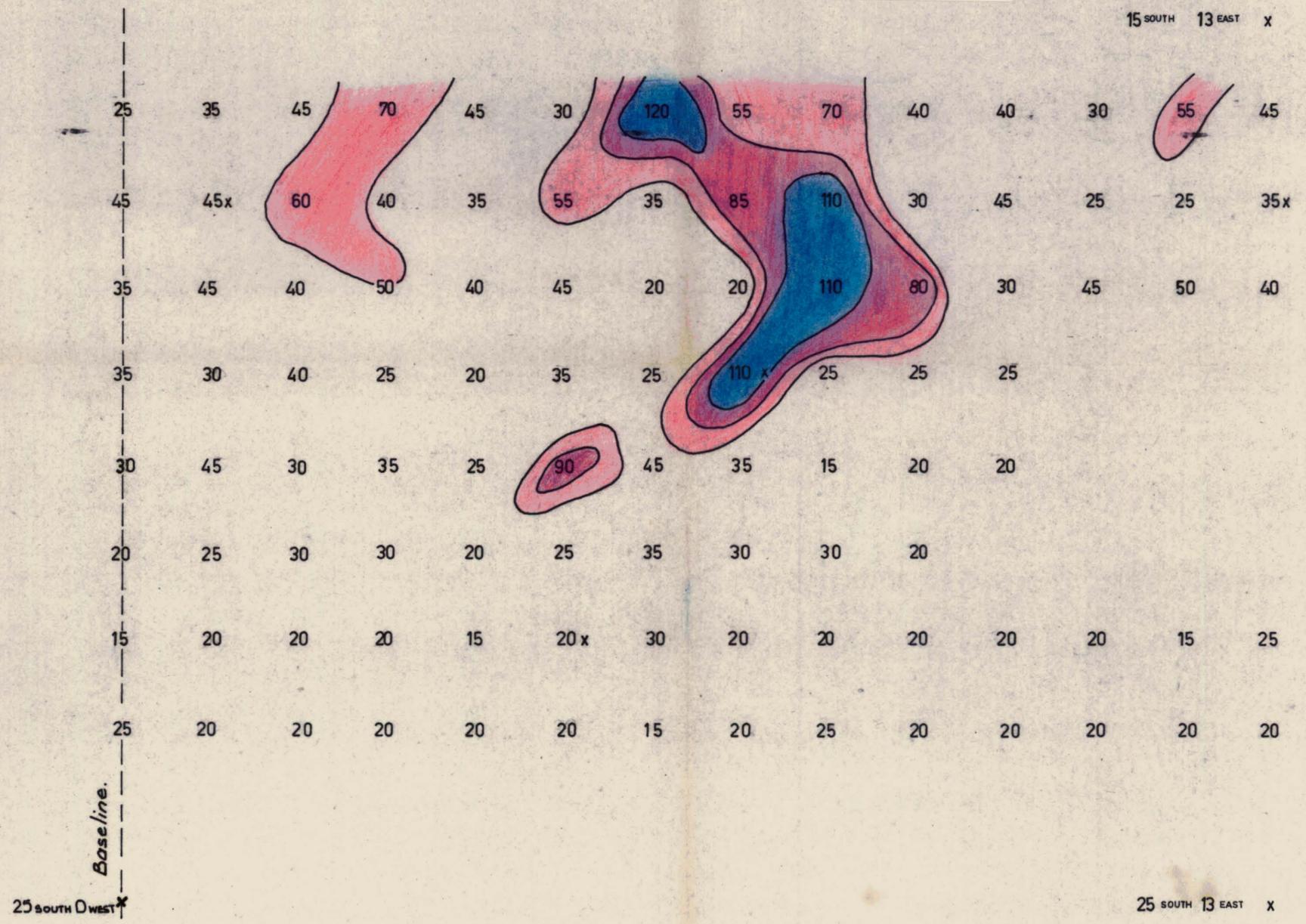


x 15 SOUTH 8 WEST

15 SOUTH 13 EAST x

**CONTOUR INTERVALS**

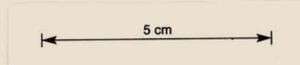
□	< 50	ppm Pb
■ (light pink)	50 - 75	ppm Pb
■ (dark pink)	75 - 100	ppm Pb
■ (blue)	> 100	ppm Pb



x 25 SOUTH 8 WEST

25 SOUTH 13 EAST x

<b>TASMINEX N.L.</b>		
<b><u>NATONE AREA</u></b>		
ARSENIC CONCENTRATIONS IN RESIDUAL SOILS. Area 'B'		
Prepared by: D P G	Drawn by: K N M.	
Scale: 1" = 100'-0"	Date: 23/8/72	Drawing No: N.A 8
Based on: Soil Samples		

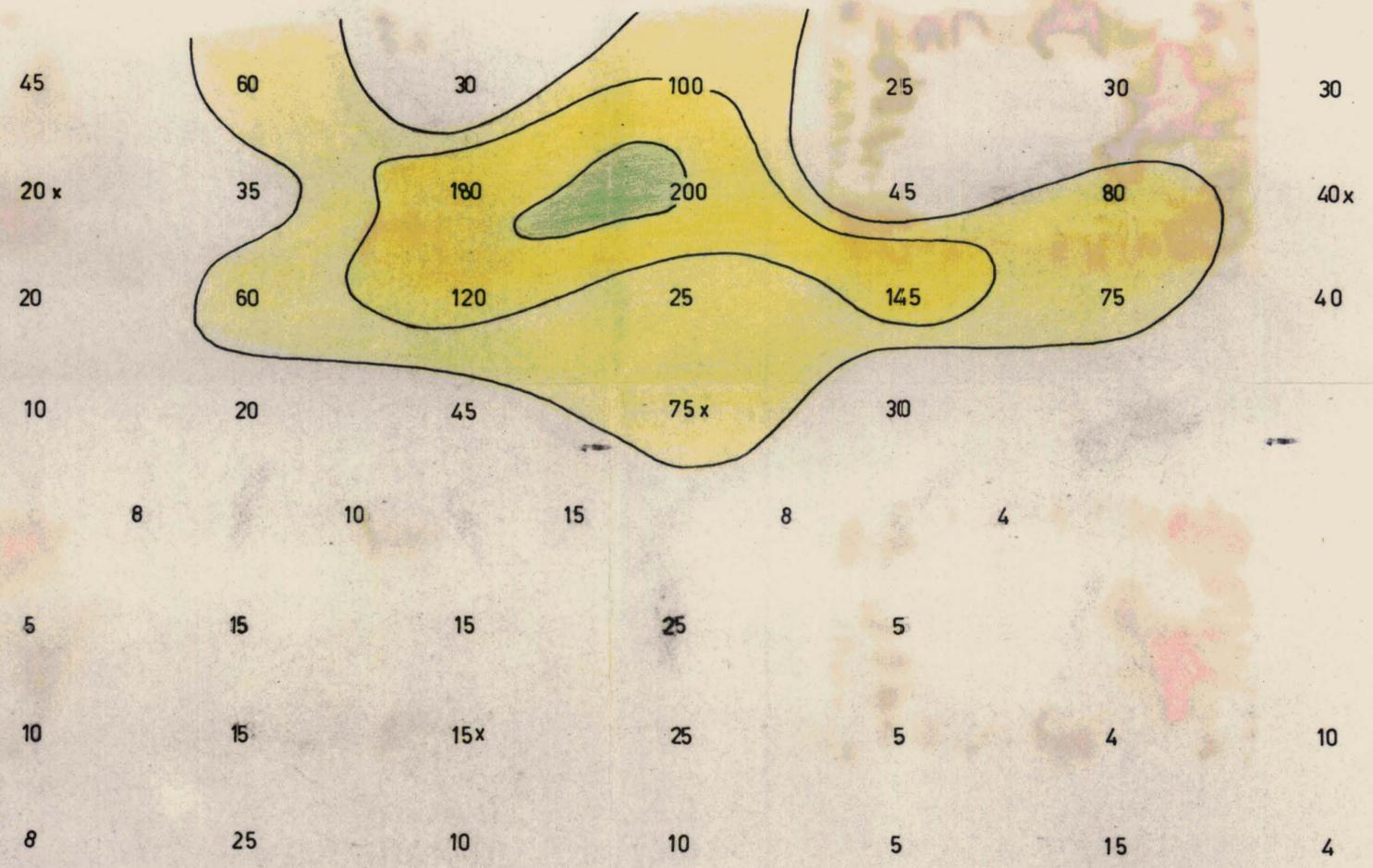


15 SOUTH 8 WEST

15 SOUTH 13 EAST x

**CONTOUR INTERVALS**

□	< 50	ppm. As.
■	50 - 100	ppm. As.
■	100 - 200	ppm. As.
■	> 200	ppm. As.



25 SOUTH 8 WEST

25 SOUTH 0 WEST

25 SOUTH 13 EAST x

Baseline

<b>TASMINEX NL</b>		
<b>NATONE AREA</b>		
TUNGSTEN CONCENTRATIONS IN RESIDUAL SOILS		
AREA - B		
Prepared by: D.P.G	Drawn by: K.N.M.	
Scale: 1" = 100' - 0"	Date: 24/6/72	Drawing No:
Based on: Soil Samples	N.A. 9	

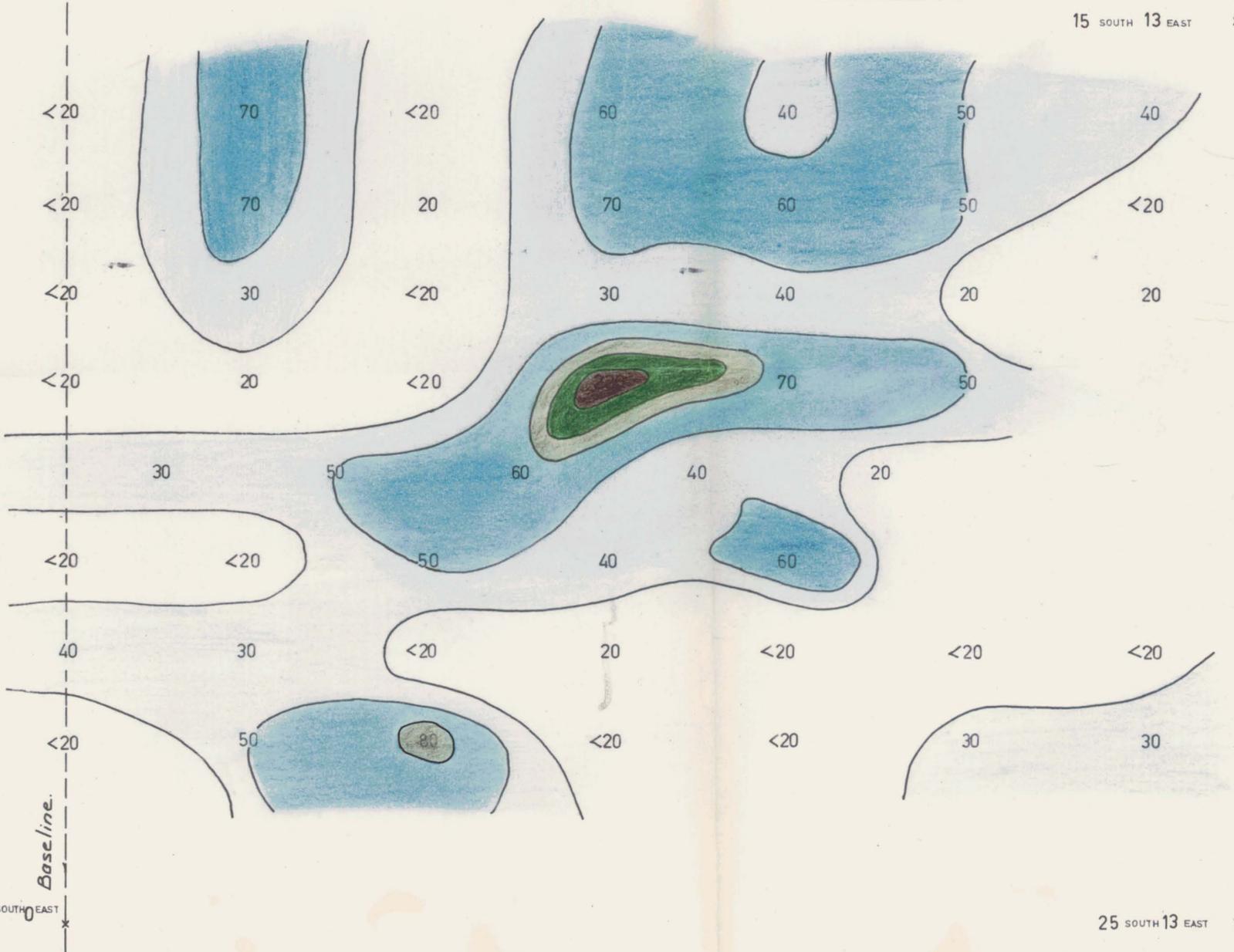


x 15 SOUTH 8 WEST

15 SOUTH 13 EAST x

CONTOUR INTERVALS

	< 25 ppm Tungsten
	25-50 ppm Tungsten
	50-75 ppm Tungsten
	75-100 ppm Tungsten
	100-200 ppm Tungsten
	> 200 ppm Tungsten



x 25 SOUTH 8 WEST

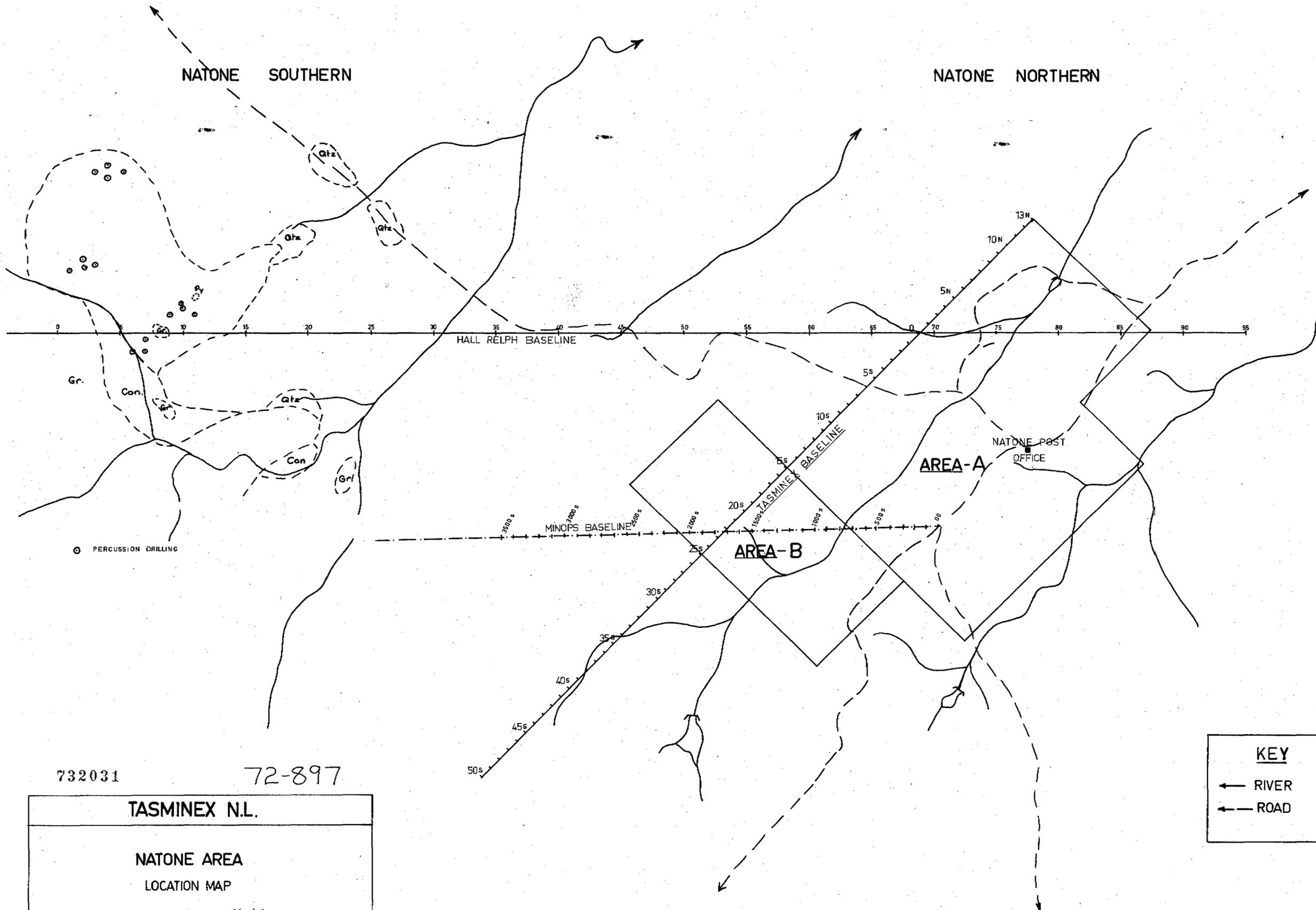
25 SOUTH 0 EAST

25 SOUTH 13 EAST x

# NATONE BASE METAL PROSPECT

NATONE SOUTHERN

NATONE NORTHERN



732031

72-897

<b>TASMINEX N.L.</b>		
<b>NATONE AREA</b> LOCATION MAP INDICATING AREAS 'A' & 'B'		
Prepared by: D.P.G.	Drawn by: K.N.M.	
Scale: 1" = 500'-0"	Date: 28/8/72	Drawing No: N.A. 10
Based on: Soil Samples:		

5 cm

KEY	
←	RIVER
- - -	ROAD

NATONE EASTERN

72-897

TASMINEX NL.

ROCK & TRENCH SAMPLES FROM  
NATONE AREA

Prepared by: D.P.G.	Drawn by: K.N.M.
Scale: 1" = 50' - 0"	Date: 27/9/72
Based on: Assay results per: Amdel	Drawing No: NA 11

5 cm

COLOUR CODE	
<b>COPPER</b>	
	< 125 ppm
	125 - 250 ppm
	250 - 500 ppm
	500 - 1000 ppm
	1000 - 2000 ppm
	2000 - 4000 ppm
	> 4000 ppm
<b>LEAD</b>	
	< 50 ppm
	50 - 100 ppm
	100 - 200 ppm
	200 - 400 ppm
	> 400 ppm
<b>SILVER</b>	
	25 - 50 ppm
	> 50 ppm
<b>ARSENIC</b>	
	500 - 1000 ppm
	1000 - 2500 ppm
	2500 - 5000 ppm
	> 5000 ppm

B A S E L I N E

LEGEND	
	COPPER ASSAYS
	LEAD ASSAYS
	COSTEAN
	COPPER
	SILVER
	LEAD
	ARSENIC
	STATION

NOTE: All samples assayed for copper and lead.

