EL 7998

[A component of SEL(A)8493, (cancelled).]

ALCOOTA 1 : 250 000 Map, Section 70/5

FINAL REPORT to 25th Feb 1995.

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15 June, 1995.

CONTENTS

PROJECT AIMS

The aims of the project were to identify and test intrusive structures of a type which might have carried economic mineralisation of, (for example), Diamond, Platinum Group Metals, Gold, Niobium, Rare Earth Elements, or other minerals in economic quantities, such as Apatite, Vermiculite, etc.

LOCALITY

EL 7998 was comprised of twenty eight blocks, which were located (broadly speaking) on the western perimeter of the main Mt Bleechmore complex outcrops, on the Alcoota pastoral lease, (ALCOOTA Geological 1: 250 000 Map, Section 70/5). Access to this locality is via the Plenty Highway and station roads. (Map 1.)

This land within the twenty eight blocks is comprised essentially of two parts, by far the greater of which is relatively flat mulga-scrub country, where the mulga trees tend to grow in thick contour-aligned groves along broad low-gradient drainage features. Away from the drainage patterns the groves are less dense and are separated by open lanes, or in some cases treeless areas which cover many hectares.

The other part is comprised of the scattered outcrops of weathered rocks belonging to the Strangways Range Metamorphic Complex, which includes the Bleechmore Granulite, (detailed below).

EXPLORATION PHILOSOPHY

The area which comprised EL 7998 was selected to examine the geology of a number of isolated iron laterite outcrops which might possibly have been the weathered surface expressions of deep seated intrusive pipes, after the fashion of the weathered surface of the Lexandra Carbonatite, identified on EL 7696. If so, they would have had some potential for diamond mineralisation, particularly if kimberlitic in nature.

These exploration targets were selected from airphoto and geological map research, and this was followed up with ground reconnaissance to confirm the nature of the topography.

As part of an overall geological strategy for diamond exploration, (in an area which according to conventional wisdom is non-prospective), it was planned to analyse the bulk rock composition of samples from the proposed drill holes so as to to establish the compositional range of the rocks and residual materials in the unit underneath the ferricrete capping, and to provide data for the interpretation of the mobility of elements during the weathering process. At the same time we felt that the identification of any suspected [relatively] unaltered lamproitic or kimberlitic rocks intersected in the drilling should well become obvious, and easily confirmed, especially if the major element data were to be combined with trace element data.

Our ongoing exploration strategy revolves in part around the fact that any igneous rock now present at or near the surface of the earth, but which originated under depth/pressure conditions within the thermodynamic stability field of diamond, is itself potentially diamondiferous, (especially if the bulk rock composition had a sufficiently high chemical potential of C), or may have picked up diamonds (as xenocrysts) from deep-seated rocks (also within the P/T constraints) through which it passed on its way to the crust.

This model is not nearly so restrictive as the Kimberly- and Argyle-related models, both of which require specific host rocks, but certainly includes them. It does, however, require geochemical signatures and/or mineralogical compositions indicative of the required P/T conditions for diamond stability, such as high Na pyroxenes, high Mg and/or high Na $\pm$ Ti garnets, high Mg ilmenites and so on.

With respect to bulk rock analyses, the above apply in terms of separating out the (regional high-grade metamorphic) country rocks from those igneous rocks which have the potential to have been derived from depths exceeding 150km. Carbonatites, kimberlites, lamproites and other ultra-potassic rocks, certain anorthosites, and ultramafic/ultrabasic rocks are all geochemical targets which warrant further mineralogical attention.

(The rocks of this region are comprised predominantly of the Bleechmore Granulite, a unit of the Strangways Range Metamorphic Complex, and these are described further under the heading Geological Synthesis).

MAGNETIC SURVEYS

Ground magnetic reconnaissance surveys were conducted at the Webb's Flat, Gypsy, and Ottilie localities, (Map 1). The instrument used for these surveys was a Geometrics Unimag G 836 total field proton precession magnetometer, with visual display only, rounded to the nearest ten. No allowance was made for diurnal variation.

DRILLING PROGRAM

One percussion hole was drilled into each of the target features at the localities named Fenchurch and Ottillie, and two holes at those named Webb's Flat and Gypsy. The holes were designated FEN 1, WFL 1&2, GYP 1&2, AND OTT 1., (Map 2, and Table 1.)

DRILLING EQUIPMENT

The drilling rig used was an Ingersol-Rand ECM 350 air track machine, mounted along with an I-R 900cfm compressor on a semi-trailer. It has a boom mounted air hammer and is probably best described as a percussion RAB drill.

SAMPLES

Samples from each hole were collected at three metre intervals, and a parcel of the material from all holes except WFL 2 was sent to Analabs Brisbane for major element analysis, and, (except for GYP 2), trace element analysis, (Table 3.).

Bulk samples from GYP 1, and OTT 1 were washed to remove the clay fraction, and the remaining material was then sized and panned for heavy minerals, (Table 2.)

EXPLORATION RESULTS AND CONCLUSIONS

It is most likely that the percussion drill samples from the outcrops of residual ferricrete on EL 7998 represent quartz and residual clay materials which have been derived principally from the breakdown of the feldspar, hornblende and biotite constituents of the local granulite units, common phases in the Mount Bleechmore Complex.

The trace element data must be interpreted carefully, insofar as the majority of materials analysed are partly or completely altered. The chemical data therefore reflect a range of values, of which some are relatively "mobile" (Sr), through to "immobile" (Zr). Our interpretation of the data accounts for the possibility of selective removal/enrichment of the elements.

We conclude that the samples from these drill holes simply represent country rock, and show no sign of belonging to any of the deeply sourced igneous rock groups mentioned earlier.

GEOLOGICAL SYNTHESIS

The following synthesis is derived from a broad investigation of data from EL 7998 and the other contiguous exploration licences in the Mount Bleechmore locality. More specifically, it is derived from a number of field traverses over the greater area of these licences; from fresh surface samples collected during these traverses, and selected thin-sections cut from these samples; and from visual and microscopic examinations of the various diamond drill cores from the program on EL 7696, and petrographic analyses of thin-sections cut from these. It also encompasses geochemical data from the weathering products of this rock suite (as listed in previous reports).

From the available data, there are three principal rock types in the Mount Bleechmore area, namely, the rock suite comprising the Bleechmore granulite, various small leucocratic quartz and feldspar dominated "intrusives", and the rocks comprising the carbonatitic suite, genetically and temporally related to the Mud Tank Carbonatite.

THE BLEECHMORE GRANULITE

The Bleechmore granulite is a heterogeneous suite of pelitic metasediments and intercalated mafic granulites. The dominant lithological type is a heterogeneous, garnetiferous 2-feldspar-quartz-biotite±hornblende+magnetite granulite. This rock type exhibits a wide range of modal compositions and textures, reflecting inherited protolithic compositions and grainsizes; some variants are garnet-free, and others may be mono-, bi- or tri-mineralic assemblages of the above mineral suite, such as garnet-quartz-plagioclase, biotite-quartz-garnet, garnet-biotite, and just biotite. These compositional variants may range from fine bands or lenses of several centimetres thickness, to more massive and continuous layers or lenses exceeding 12 metres in thickness.

The protolithic suite which gave rise to these rocks comprised differing ratios of quartz chlorite and/or montmorillonites, illite and/or kaolinite and/or detrital feldspars, as well as minor calcite, and the usual array of heavy detrital trace minerals such as zircon, monazite, allanite and tourmaline. As a suite, these protoliths were significantly more mafic than normal pelitic sequences.

In common with a number of pelitic rock suites throughout the Arunta Block, the Bleechmore Granulite includes lenses and layers of mafic granulite on a variety of scales up to 40m in thickness. These rocks comprise the assemblages plagioclase+clino- and/or orthopyroxene±hornblende+magnetite, and some of these may contain garnet and/or quartz as their compositions vary towards more silica saturated types; some lower-grade diopside-amphibolites may be observed locally.

Again in common with rocks of similar compositions throughout the Arunta Block, the Bleechmore Granulite may contain variants that are notably rich in magnetite, and we infer that small "blows" of magnetite, up to say 30m in length, may also exist, probably in close proximity to the lithological contact between pelitic granulites and thick mafic lenses. We have not actually observed such blows at the surface in the areas encompassed in the ELs, but these may be responsible for some of the localised magnetic "highs" that that have been recorded, as for example in the rocks immediately north of the small dam in Webbs Pound, (EL 7940, final report)

LEUCOCRATIC "INTRUSIVES"

For the most part, these are quartz- or quartz and feldspar-dominated thin cross-cutting veinlets, veins and dykes, evident both at the surface and in the drill cores. Their most probable source is the anatectic melting of selected compositions of the high grade peletic granulites, (similar to the occurrences in Migma Creek near the Harts Range Police Station), hence their source is localised. Though possible, it is unlikely that these veins and dykes emanated from late-stage post-tectonic granitoid intrusives underlying the Bleechmore granulite, and we have seen no evidence of such granitoids. Geochemically, these leucocratic intrusives are quite 'barren', and are of no economic significance.

CARBONATITIC INTRUSIVES

A locality on EL 7696 (another of the SEL(A) 8493 constituents), is intruded by a small? carbonatitic unit, the deeply weathered outcrops of which are identical in appearance to some of those at Mud Tank, and we believe that the two units are genetically related, and thus coeval. We have not intercepted any fresh carbonatites in our cores, though a number of them show signs of local metasomatism by the carbonatite, in the form of zones of bleaching and strong apatite enrichment from late-stage differentiated fluids. (SEL(A) 8493 Second report - Core log, PDD 4: 142.6m, and 144m.)

Note that lithological variants of the Mud Tank suite may be locally rich in magnetite, (in octahedra up to 6cm); by inference, this allows another explanation for some of the diffuse magnetic anomalies which occur throughout the general Bleechmore area.

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TABLE 1.

DRILL HOLE LOGS.

FEN 1. (-21 metres)

0 - 2 metres, Red iron laterite.

2m - 5m, Mostly bleached clay material, with some ferruginous bands.

5m - 6m, Red ferruginous clays.

6m - 21m, Banded clays.

WFL 1. (24 metres)

0 - 6 metres, Red iron laterite.

6m - 24m, banded red and whitish clays.

TABLE 1
(continued)

WFL 2. (-20 metres)

O - 3 metres, Sandy overburden.

3m - 20m, Dun-coloured clay.

GYP 1. (-16.5 metres)

0 - 0.5 metres, Clay soil.

0.5m - 16.5m, Red iron laterite.

GYP 2 (-12 metres)

0 - 0.5metres, Clay soil.

0.5m - 12m, Red iron laterite.

OTT 1 (-21 metres)

0 - 2 metres, Iron laterite.

2m - 6m, Mostly bleached clays.

6m - 18m, Yellowish clays.

18m - 21m, Pale dun-coloured clay.

TABLE 2.

WASHED SAMPLES

GYP 1.

(Screen: -250 microns, heavy fraction.)

Mostly quartz fragments, some ilmenite, and a few garnet fragments; plus zircon crystals, rutile?, and clear colourless spherical grains, (all rare).

OTT 1.

(-500 micron / +250 micron, heavy fraction.)

Mostly quartz fragments and ilmenite, (some showing leucoxene alteration).

(-250 / +75 micron, heavies.)

Same, plus rare garnet fragments and clear spheroids.

(-75 micron, heavies.)

Same, plus zircon crystals and rutile? fragments.

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TABLE 3

	TRACE ELEMENT DATA (PPM)					MAJOR ELEMENTS				
	FEN1	WFL1	GYP1	OTT1		FEN1	WFL1	GYP1	GYP2	OTT1
Sc	24	24	11	12	SiO^2	53.40	44.87	41.34	35.57	52.65
Cr	107	101	143	144	TiO_2	0.84	2.97	2.62	2.21	1.17
Ni	61	26	36	33	Al_2O_3	14.42	11.44	24.51	24.04	20.67
Cu	75	62	28	27	Tr Fe_2O_3	18.90	31.90	18.74	26.71	11.26
Zn	147	48	342	250	FeO	0.00	0.00	0.00	0.00	0.00
Sr	26	20	48	48	MnO	0.02	0.03	0.02	0.02	0.02
Y	34	2	1	10	MgO	0.61	0.14	0.37	0.24	0.29
Nb	<10	23	40	16	CaO	1.33	0.09	0.34	0.29	0.96
Zr	18	8	37	11	Na_2O	0.00	0.00	0.00	0.00	0.00
Ba	102	41	62	597	K_2O	0.32	0.03	0.04	0.03	0.40
La	161	5	<5	71	P_2O_5	0.09	0.07	0.02	0.03	0.00
Ce	229	15	<15	114	H_2O	9.49	8.22	10.16	10.11	10.04
Nd	153	10	<10	62	**TOTAL**	**99.24**	**99.76**	**98.16**	**99.25**	**97.46**
Au	(All <0.02)									

Trace element data were determined by ICPOES,
after total dissolution of 0.5gm in Aqua Regia
+ Perchloric Acid + Hydrofluoric Acid.

Gold determination by AAS after 30gm sample treated in Aqua Regia.

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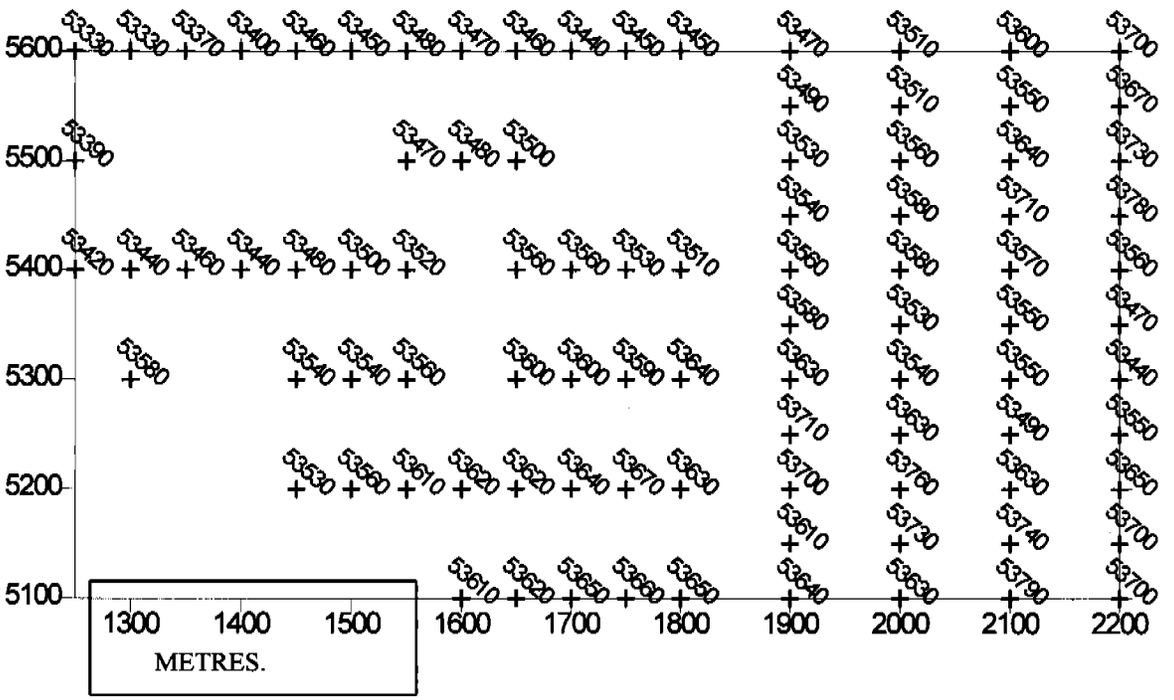
TABLE 4.



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WEBB'S FLAT LOCALITY
Magnetic Line Data

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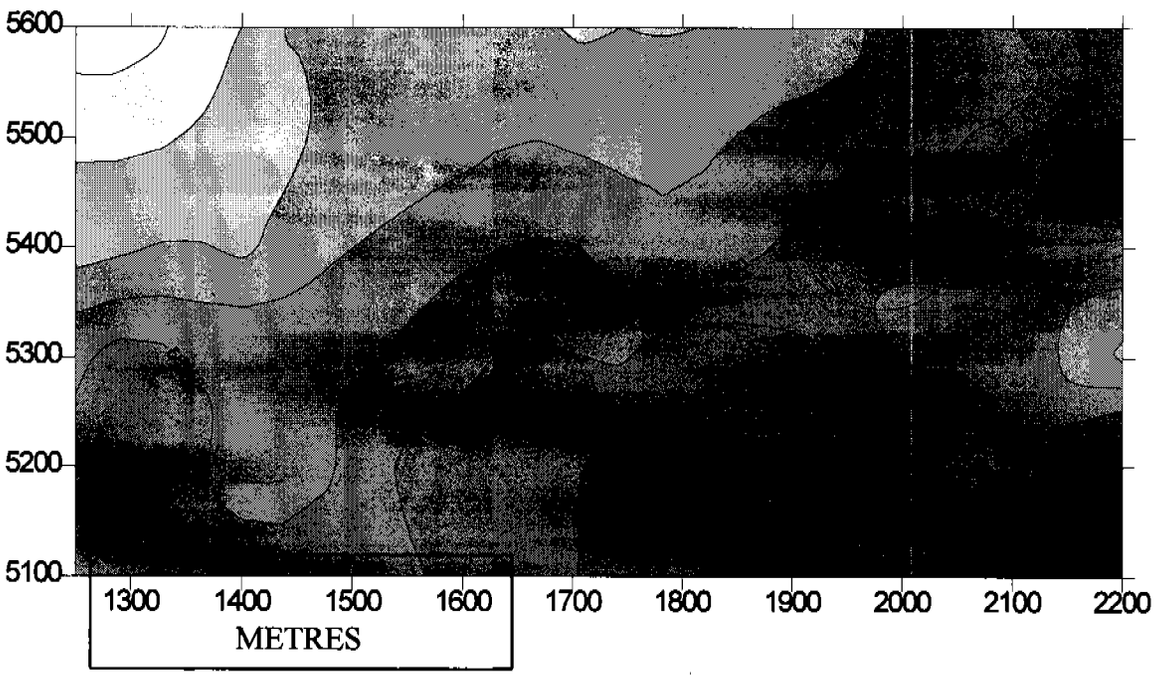
FIGURE 1.



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WEBB'S FLAT LOCALITY
Magnetic Line Data
Magnetic Variation Contour

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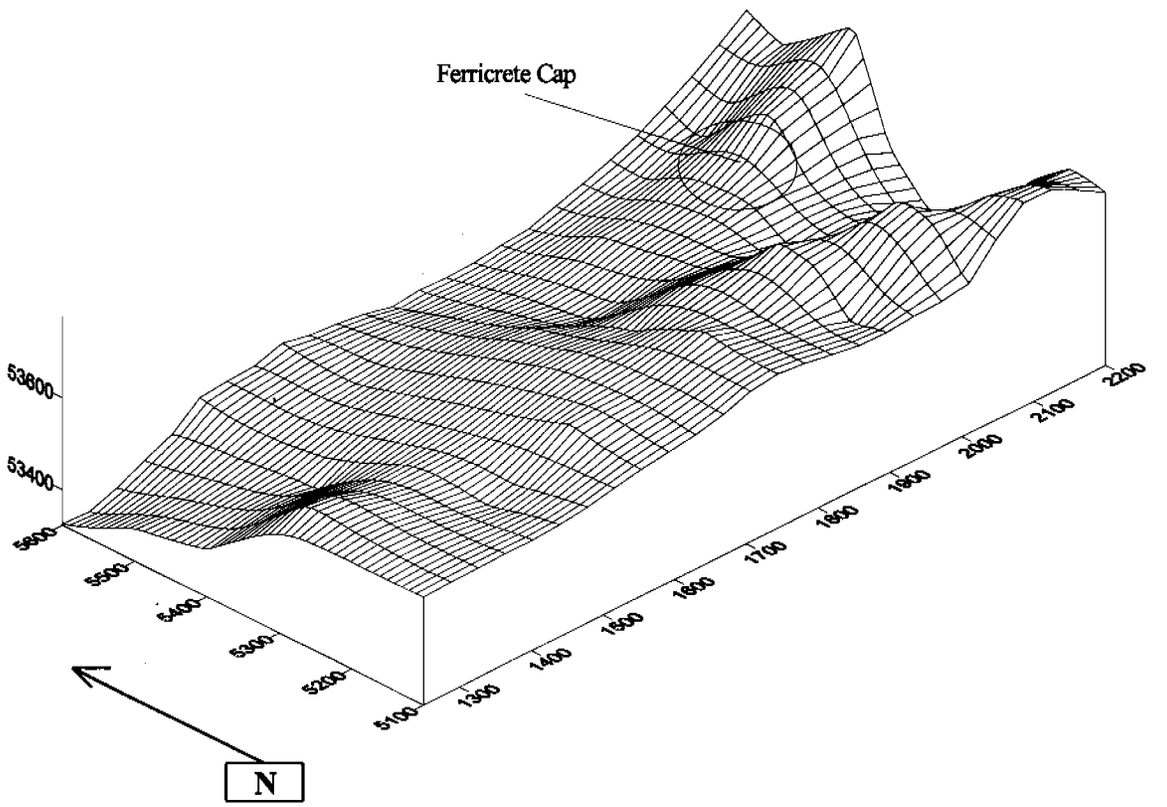
FIGURE 2



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Webb's Flat locality
Magnetic Variation

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TABLE 5

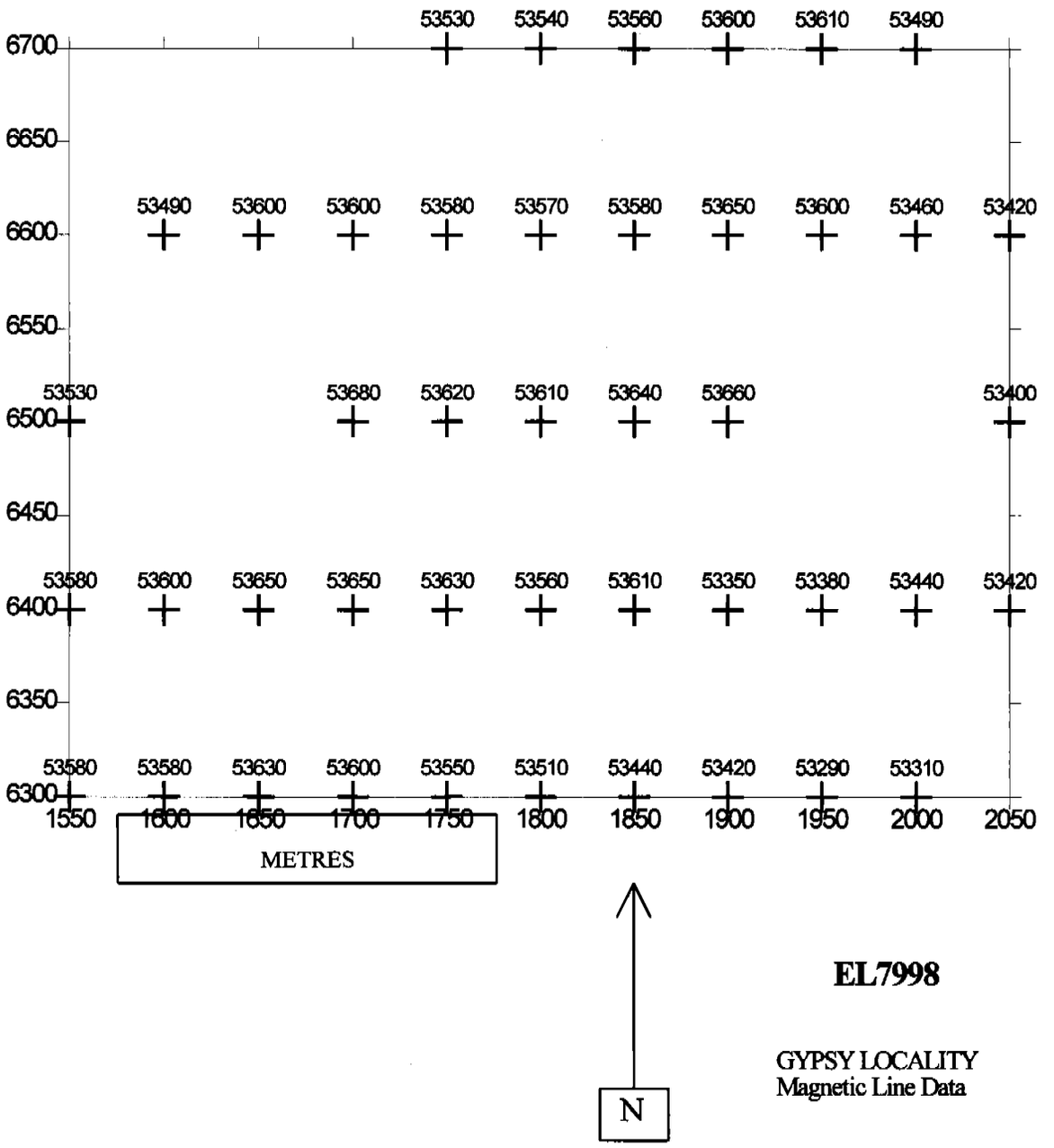

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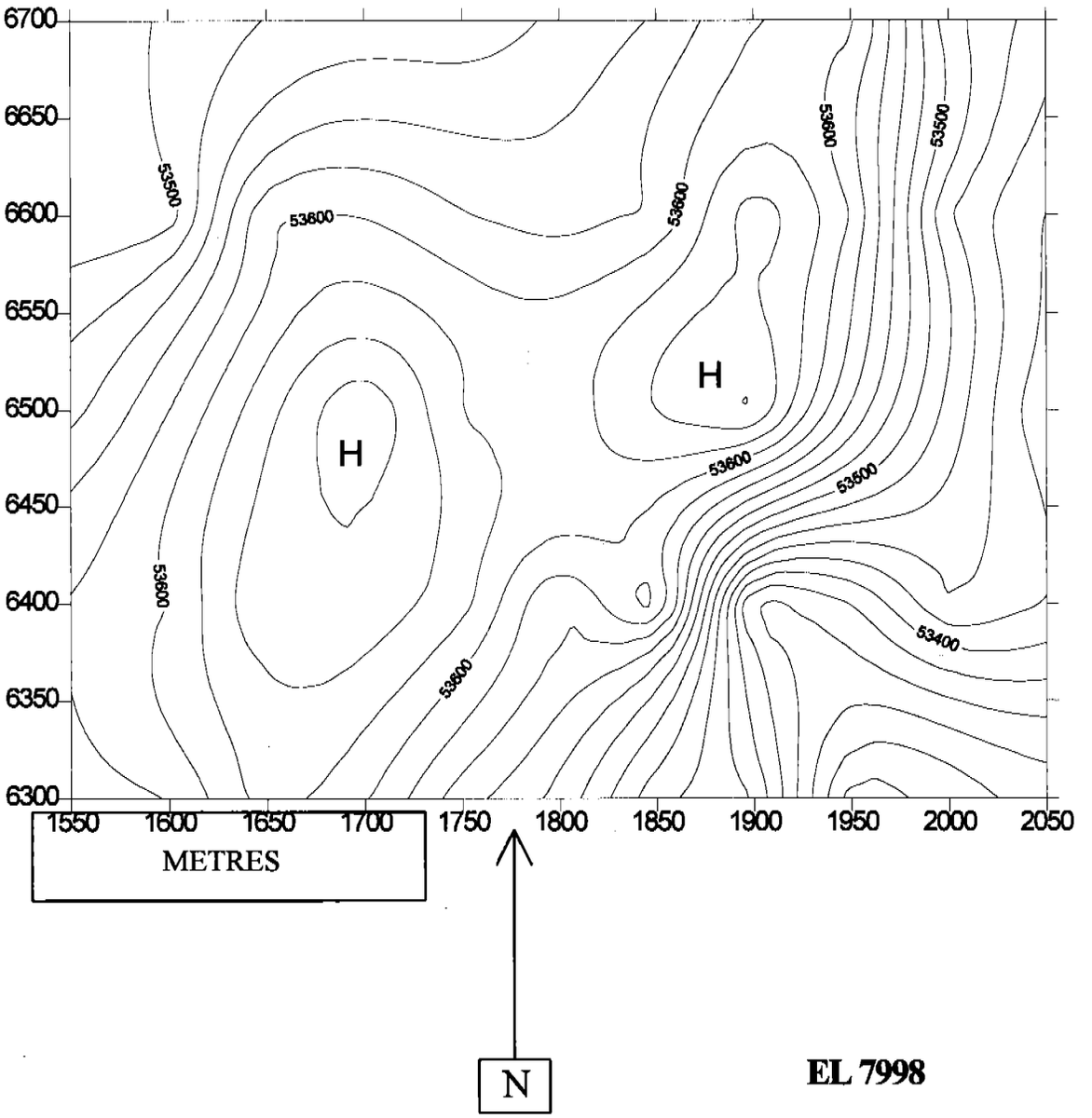
FIGURE 3



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GYPSY LOCALITY
Magnetic Variation Contour

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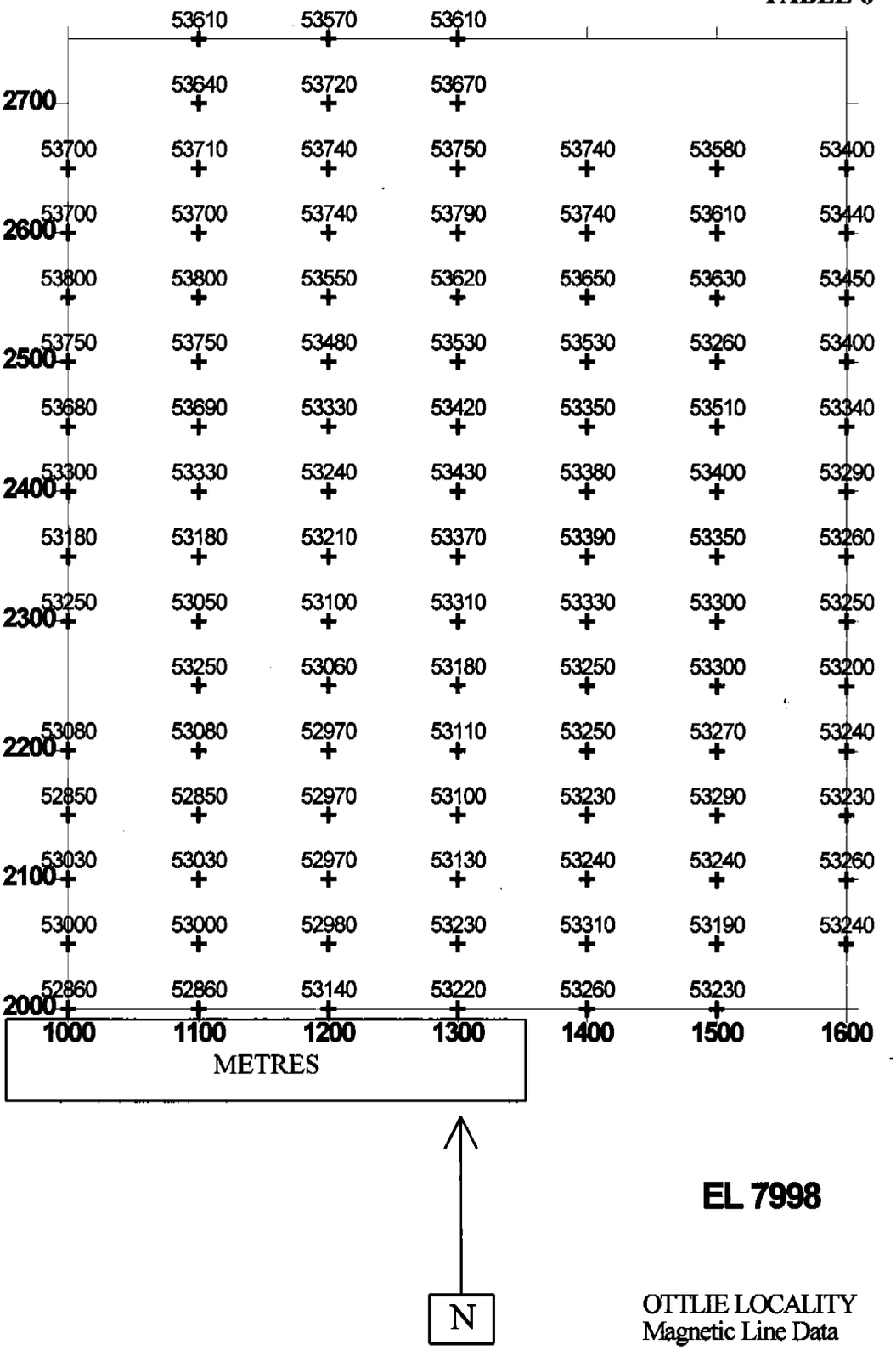
TABLE 6



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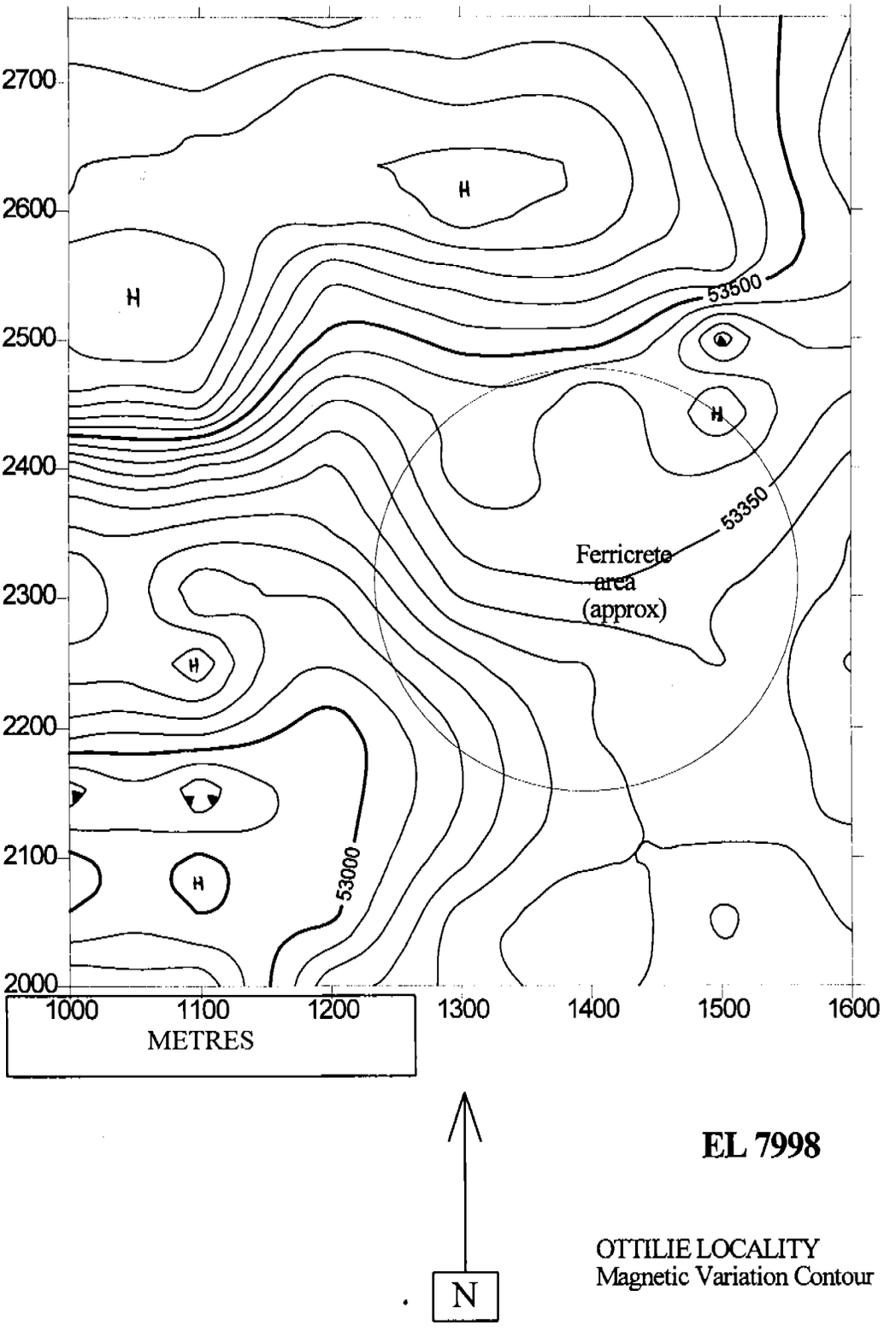
OTTLIE LOCALITY
Magnetic Line Data

FIGURE 4



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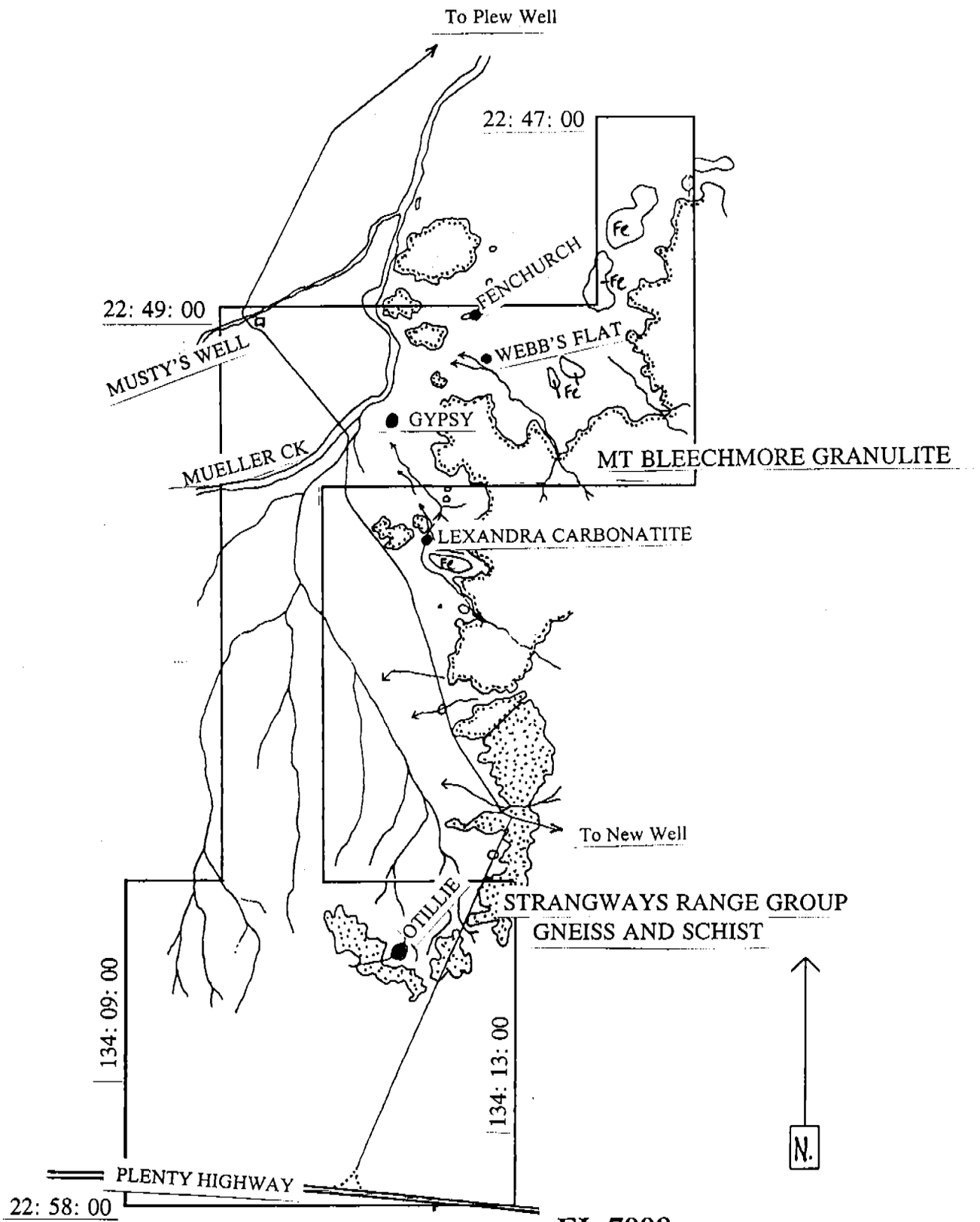
OTTILIE LOCALITY
Magnetic Variation Contour



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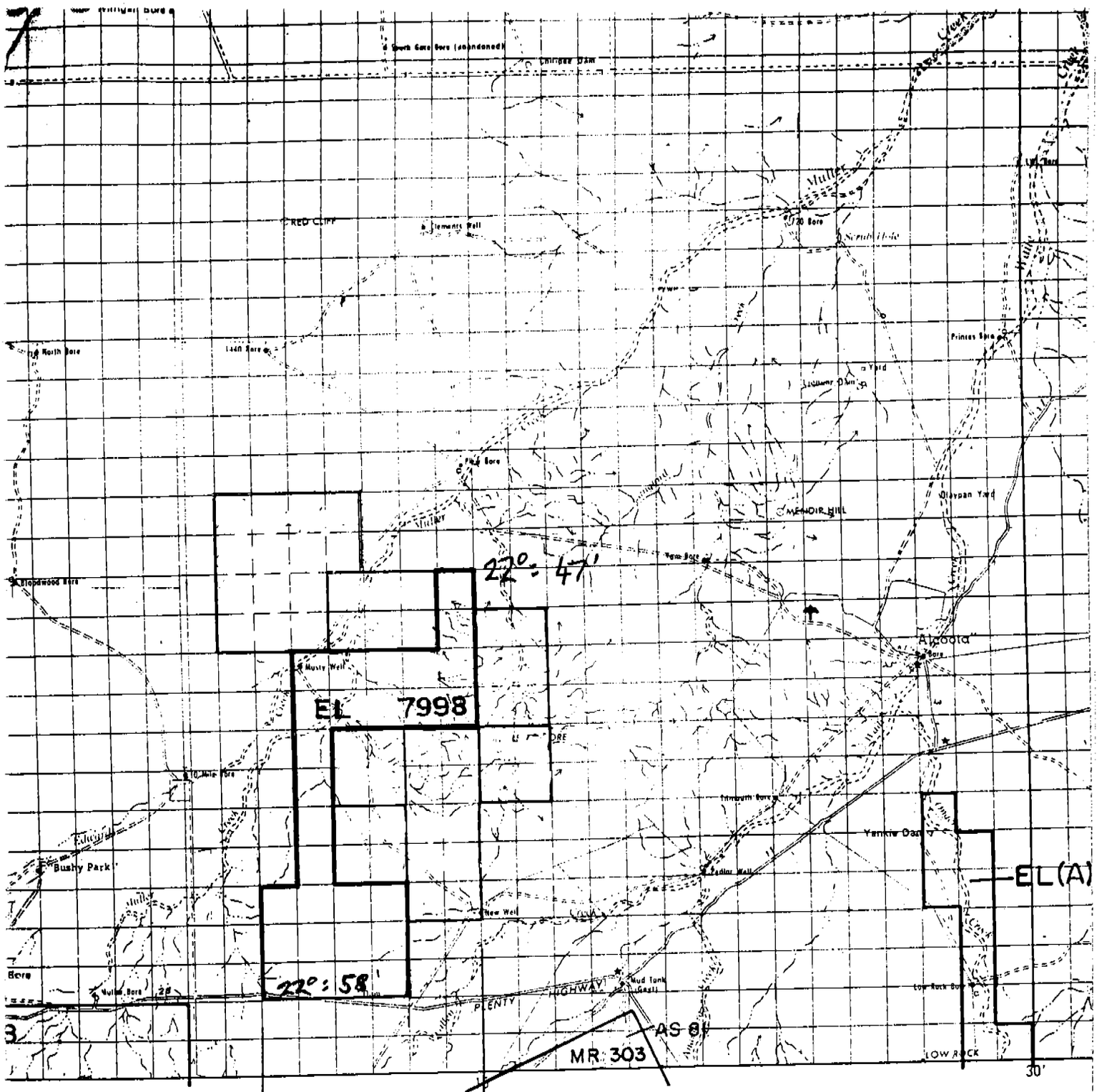
SCALE - 1:100 000

Kms 0 1 2 3 4 5



SCALE 1:250 000

5 0 5 10 15 20 25 30 35 40 45 50 kilometres

FULL LATITUDE AND LONGITUDE VALUES ARE SHOWN AT THE SHEET CORNERS. WITH EVERY 15' VALUE BEING LABELLED AROUND THE NEATLINE.

- ...nal route marker 48
- ...ighway; Road bridge .....
- .....
- .....
- .....
- ...ilway bridge .....
- ...n line; Fence .....
- ...mit .....

- Aboriginal Land Claim Boundary ..... A
- Exploration Licence (application) ..... EL
- Exploration Licence (granted) ..... RO or MR
- Mining Reserve ..... BA
- Business Area ..... DC
- Dredging Claim ..... ERL
- Exploration Retention Lease ..... EML
- Extractive Mineral Lease ..... EMP
- Extractive Mineral Permit .....

- Licence to treat tailings .....
- Machinery Area .....
- Machinery Lease .....
- Mineral Claim .....
- Mineral Lease .....
- Tenement number .....
- Prospecting Area .....
- Quarry Area .....
- Residence Area .....

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TOTAL EXPENDITURE

PERCUSSION DRILLING, sample collection and handling. (114.5 metres @ $35.00/metre)	$4,007.50
DRILLING RIG, mob/demob, (38.4km @ $6.00/km)	$230.40
TOYOTA LANDCRUISER field vehicle, (2150.4km @ $1.00/km	$2,150.40
FIELD EXPLORATION etc. (activities other than drilling)	$4,011.00
S K DOBOS & ASSOCIATES, geological consultants.	$1,490.00
ANALYTICAL EXPENSES	$444.00
Office costs, reporting, phone and fax, stationery, etc.	$472.00
TOTAL	**$12,805.30**