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WATSONVILLE GEOPHYSICAL SURVEY,

NORTH QUEENSLAND 1964

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by

E.C.E. SEDMIK

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SUMMARY

A geophysical survey was made between 30th September and 30th November, 1964, in the United North Australia area at Watsonville, North Queensland, to relocate geophysical indications previously found by the Aerial Geological and Geophysical Survey of Northern Australia, in 1938. Promising geophysical indications were to be tested by diamond drilling jointly by the Geological Survey of Queensland and the Bureau of Mineral Resources.

Methods used were the Turam electromagnetic, self-potential, induced polarisation and magnetic.

Most of the geophysical indications obtained by the A.G.G.S.N.A. survey were relocated and additional information on the nature of the conducting bodies was provided.

Two significant geophysical anomalies were found outside the original A.G.G.S.N.A. grid; the first near the Easter Monday workings, and the other in the eastern extension of the A.G.G.S.N.A. grid in an area where very little exploration work was carried out in the past.

Rich tin mineralisation was found exposed in an old adit near 1350E/75N and this mineralisation appears to be connected with the geophysical anomalies obtained in the area. This area has not yet been geologically mapped. A geological survey in this area is strongly recommended.

Drilling recommendations were made to test the more promising geophysical indications.

Six drillholes, totalling about 1765 linear feet, were drilled during 1964. Visible sulphide mineralisation was intersected in all but one hole. The economic value of mineralisation will depend on final assay results.

Drilling is to be continued during 1965. Drillsites D.D.H1, D.D.H4, D.D.H5, D.D.H7, and D.D.H8 have been selected for drilling. These total a further 1,425 linear feet.

1. INTRODUCTION

The United North Australian group of Mines (U.N.A.) is located in the Watsonville tin field, about six miles west of Herberton, on the Atherton Tableland in North Queensland.

This group of mines comprising the North Australian, Good Friday, Grand Secret, Ironclad, Easter Monday, Crucible, Baal Gammon, and Shaughraun (Plate 1) has a history dating back to 1883.

Originally the mines were worked for tin ore but later, some of them produced considerable amounts of copper ore. Production reached its peak in 1917 since when only sporadic gouging has taken place.

Geological and geophysical surveys were carried out in the U.N.A. area by the Aerial, Geological and Geophysical survey of Northern Australia (A.G.G.S.N.A.) in 1937-38. (Queensland Report No. 28 and No. 43), and by Carpentaria Exploration Company Pty. Ltd., (Technical Report No. 20) in 1962.

The U.N.A. ore bodies occur in a series of interbedded graywackes and siltstones which have been folded, extensively faulted, and later intruded by dacite and rhyolite dykes.

In July 1964, a programme of diamond drilling was commenced to test targets based on the A.G.G.S.N.A. surveys. The drilling targets were selected jointly by the Geological Survey of Queensland and by the Bureau of Mineral Resources. Six holes, totalling approx. 1765 linear feet were drilled up to the end of December 1964.

Between the 30th September and 30th November, 1964, a geophysical survey was carried out by the Bureau of Mineral Resources, Geology and Geophysics with the object of relocating the geophysical indications obtained by the A.G.G.S.N.A. survey, and searching for extensions of these indications. The survey aimed also to provide more precise information on the location, dip and pitch of the conducting bodies and to define additional drilling targets.

The geophysical party consisted of E.C.E. Sedmik (Party Leader), R.H. Andrews and J.P. Williams (for part of the survey) geophysicists of the Bureau, and four field hands.

The topographical survey was made by surveyor Brian Maloney from the Department of Interior, Brisbane, assisted by two chainmen.

2. METHODS

Four geophysical methods were used during the Watsonville survey; namely electromagnetic (E.M.), self-potential (S.P.), induced polarisation (I.P.) and magnetic.

Electromagnetic method

This method is used for detecting zones of good electrical conductivity, which are often associated with sulphide mineralisation. Of the more common ore minerals, chalcopyrite has the highest conductivity, then comes pyrrhotite, pyrite and galena in decreasing order. Sphalerite is rarely a good conductor. The conductivity of an ore-body also depends on the mode of occurrence of the minerals, being higher for massive than for disseminated mineralisation, and is influenced also by the porosity and moisture content of the lode material.

The applicability of the elctromagnetic method in the U.N.A. area is based on the frequent association of cassiterite (SnO_2) with pyrrhotite and chalcopyrite. By detecting with the electromagnetic method the sulphides it is hoped also to detect, indirectly, the associated cassiterite mineralisation. Ore containing cassiterite by itself cannot be detected with the electromagnetic method.

However good electrical conductivity does not necessarily imply the presence of mineralisation. Rocks such as graphitic schist and shear zones containing mineralised water, may also act as good electrical conductors, and the presence of these frequently complicates the interpretation of electromagnetic measurements.

In the Turam method used at Watsonville, the primary field was applied to the ground by passing an alternating current through a straight insulated cable grounded at both ends. Usually the length of this cable was about 5000 ft. Measurements were made of the amplitude ratios and phase differences of the vertical fields detected by two coils which were

moved along traverses at a constant separation of 100 ft. Frequencies of 660 and 220 cycles per second were used.

The results of Turam surveys are generally presented as separate maps showing contours of ratio and phase difference, both of which are used in the interpretation. In general, an anomaly due to a conducting body appears as a maximum in the ratios and a large negative value in the phase differences. As the ratio contours give a better indication of the conductivity of the conducting bodies, they are generally more important in the search for minerals than the phase contours. Only the ratios are contoured in this progress report.

Self-potential method

In this electrical method the naturally occurring earth potentials are detected and their distribution at the ground surface is measured. A negative anomaly is commonly associated with a sulphide body undergoing oxidation.

Self-potential measurements were made in all areas where significant electromagnetic indications were observed. The instruments used were a Cambridge meter and a transistorised S-P meter designed and constructed in the Geophysical Laboratory of the Bureau.

Induced polarisation method

In this electrical method the change of impedance of the ground with change in transmitting frequency is measured. The Geoscience equipment was used with a dipole-dipole electrode configuration as shown diagramatically on Plate 8. The apparent resistivity at 10 cps and .3 cps were measured and the change in resistivity, the frequency effect, is a function of the induced polarisation effect.

The metal factor term used in the induced polarisation survey is the ratio of frequency effect to the apparent resistivity multiplied by a constant.

Magnetic method

The variations in the vertical component of the magnetic field were measured by using an A.B.E.M. (S/N 4503) magnetometer. Magnetic observations were made over the whole area, readings being taken at 25 ft. intervals.

3. RESULTS

The traverse layout for the geophysical survey is shown in Plate 1 and consisted of two grids, one corresponding to the A.G.G.S.N.A. grid with extensions to the north and east, the other a new grid referred to as the B.M.R. grid. The field work commenced with the laying out of the B.M.R. grid over the area in which the A.G.G.S.N.A. Indication "E" was situated with the aim of relocating it and making a quick selection of a drilling target. The base line was made parallel to the general strike direction of Indication "E" and intersected the A.G.G.S.N.A. base line at an angle of $53^{\circ}56'$. The point of intersection of the base lines was 283.3W on the B.M.R. grid and 397.2S on the A.G.G.S.N.A. grid.

Traverses were placed 100 ft. apart and readings with E.M., S.P. and magnetic methods were made at intervals of 25 ft. along the traverses. E.M. and magnetic surveys covered the whole area of both grids but S.P. and I.P. observations were made only over those traverses which showed intersecting E.M. or magnetic results. The E.M. survey was greatly handicapped by the presence of a high tension power line running through the area and by the very complicated nature of the local geology.

The results of the E.M. survey are shown as Turam ratio contours in Plates 4 to 7. The results of the S.P. and magnetic surveys are shown in Plates 2 and 3, respectively. One I.P. traverse is illustrated in Plate 8.

B.M.R. Grid

The Turam survey was made with a primary cable about 5000 ft. long placed along the base line of the B.M.R. Grid. (Cable layout No. 1, Plate 4). The survey relocated Indication "E" at 200E/875S and traced its continuation to the west to 800W/725S. Small to medium Turam ratios and phase differences up to -11.6° were observed, indicating a rather poorly conducting zone. The absence of I.P. and S.P. anomalies on traverses 100E and 700W, where the Turam anomaly was most pronounced, suggested no mineralisation.

Drill hole N.S.4 was drilled from 150E/880S in a southerly direction at an angle of depression of 80° to test the indication. The drill hole intersected a nearby vertical fault zone and was stopped at 101 ft. because of drilling difficulties. No mineralisation was encountered and it is assumed that the conducting zone is due to a shear containing mineralised water.

A weak Turam anomaly corresponding to A.G.G.S.N.A. Indication "D" was observed at 300W/575S. It appears to continue towards 700W/400S where it becomes stronger, but its direction is different from that of Indication "D". An S.P. anomaly extending from 400W/600S to 700W/450S (Plate 2) suggests the presence of sulphide mineralisation. The location of the S.P. anomaly slightly south of the Turam anomaly may be due to a northerly dip. The I.P. results on traverses 600W, 700W and 800W suggest that mineralisation is associated with the Turam anomaly. The strongest I.P. anomaly was found along traverse 600W.

The Turam work north of the B.M.R. baseline was carried out with the aim of explaining the results of drill holes N.S.1 and N.S.2, which had been completed before the start of the 1964 geophysical work. The drilling results did not appear to be in complete agreement with the interpretation of the A.G.G.S.N.A. survey. The Turam results (Plate 4) indicated two nearly horizontal conducting bodies. This area was also investigated by Turam work on the A.G.G.S.N.A. grid (Layouts 2 and 3) and a discussion on these conducting bodies will follow under heading A.G.G.S.N.A. Grid, Layout 2.

I.P. work along Traverse 800W indicated high frequency effects and good metal factors at shallow depth between 200N and 600N.

A.G.G.S.N.A. Grid

This grid was re-established after relocation of most of the indicator pegs laid down by the A.G.G.S.N.A. survey to delineate the axes of geophysical indications. The A.G.G.S.N.A. grid was later extended in a northerly and easterly direction to cover the Easter Monday workings, the Easter Sunday workings, and the continuation of a promising geophysical anomaly discovered on traverses 900E and 1000E.

Surveying of the A.G.G.S.N.A. grid with the Turam method was carried out in two different directions, once with the traverses running in a north-westerly direction, and then with traverses running in a north-easterly direction. This was considered desirable because of the very complicated nature of the geology which suggested two different faulting directions namely north-east and north-west. Any mineralisation striking north-west was unfavourably located for detection by the A.G.G.S.N.A. electromagnetic survey.

Only parts of the grid could be observed with the Turam method for any one straight grounded cable layout used. Turam observations close to the high tension power line were unreliable. No observations could be made beyond 1000 ft. distance from the grounded cable because the signal was found to be too weak and the minima too broad.

Three different cable layouts (referred to as Nos. 2, 3 and 4) were used over the A.G.G.S.N.A. grid as follows:

Layout No. 2.

With the primary cable along 250E, traverses 1000S to 100N were surveyed with the Turam method from 50E to 950W. The results are presented as ratio contours on Plate 5. These results indicate the existence of two nearly horizontal good conducting bodies, north of Jamies Creek, approximately following the A.G.G.S.N.A. Indication "A". South of Jamies Creek, the Turam work shows a weak anomaly suggesting a rather deep seated, steeply dipping body, the position of which coincides with the southern continuation of the A.G.G.S.N.A. Indication "A".

The flat laying conducting body situated immediately north of Jamies Creek has been tested by drill holes N.S.1, N.S.2, and N.S.5.

A vertical drill hole, N.S.5, was drilled on the basis of the 1964 work to test the geophysical interpretation. The hole intersected about 86 ft of mineralisation (18' - 104'). The economic value of this mineralisation is not known, as assay results of the core are not yet available.

A comparison of geophysical results obtained along Traverse 200S (A.G.G.S.N.A. Grid) using different methods with actual drilling results from drill hole N.S.1 is shown on Plate 8. The drilling results (Plate 8) are shown projected onto Traverse 200S although the N.S.1 is located north of it and diverges considerably from it.

The Turam profiles of Traverse 200S indicate a flat lying good conducting body extending approximately from 775W to 475W and having a slight easterly dip. The depth to current concentration is estimated to be approximately 100-130 ft.

A detailed magnetic traverse along the direction of N.S.1 (Plate 8) shows a magnetic anomaly of about 400 gammas between 725W and 525W suggesting existence of pyrrhotite in the flat lying body. The shape of the magnetic profile suggests shallow mineralisation dipping slightly to the east. N.S.1 intersected good mineralisation between 100 ft and 179 ft. Outcropping sulphide mineralisation can be seen in old workings close to the surface near 700W on traverses 200S and 100S (A.G.G.S.N.A. Grid, Plate 1), thus confirming the easterly dip. N.S.1 was drilled to 400 ft depth in barren rock after passing through the flat-lying conductor.

The S.P. anomaly at 200S/700W (Plate 8) can be explained as due to the oxidised portion of the flat lying sulphide mineralisation. The absence of an S.P. anomaly above the eastern edge of this mineralisation may be explained by lack of oxidation zone due to ground water level being above the mineralisation.

The I.P. results (Plate 8) are not very conclusive. They appear to show a much wider zone of low apparent resistivities and high frequency effects and metal factors and suggest a considerable depth extent for the mineralisation.

Indication "B" of the A.G.G.S.N.A. survey, immediately west of the Shaughraun workings, was also located. The Turam results suggest a body with a steep easterly dip. The depth to the current concentration causing the Turam anomaly was calculated along Trav. 350S and was found to be between 135 ft and 155 ft.

Drill hole N.S.6 was drilled from 335S/140W (as shown on Plate 5) to test this anomaly. Sulphide mineralisation (pyrrhotite, chalcopyrite and possibly arsenopyrite) was encountered in the drill core in portions from 97 ft. to 140 ft. and again from 176 ft. to 219 ft.

Layout No. 3

The primary cable was placed along 700N with the aim of detecting conducting bodies striking south-east. The results are shown on Plate 6. They confirm the existence of the northern flat-lying body discovered from

Layout No. 2. The Turam observations could not be made beyond 300S on any of the traverses because of the adverse influence of the high tension power line, and consequently the survey did not cover the other flat-lying body.

The Turam work showed a well defined anomaly south of the Easter Monday workings, which suggest a good conducting body striking approximately east and dipping steeply. The calculated depth to the current concentration causing this anomaly is between 145 and 200 ft. No self-potential anomaly corresponding to this E.M. anomaly could be detected. A well defined magnetic anomaly of about 400 gammas, (Plate 3) corresponding in position with the E.M. anomaly, suggests presence of pyrrhotite mineralisation. Although no I.P. work could be carried out over this anomaly because of breakdown of the I.P. equipment it is considered that the E.M. and magnetic results should be tested and D.D.H.5 is recommended for this purpose.

A very strong Turam ratio anomaly was discovered on the southern portion of Layout 3 extending from Traverse 700E to 1000W. This may indicate existence of an extensive shear zone. However, Turam observations in this area were very much influenced by the nearby high tension power line. Observations were difficult to make and the minima obtained were broad and uncertain. The shape of the elctromagnetic profiles obtained were unusual suggesting considerable distortion of the elctromagnetic field probably caused by the presence of the high tension power line and not by sulphide mineralisation. Surveying of traverses beyond Traverse 700E was suspended when it became evident from the observations that the ground return current was producing abnormal effects due to the cable being grounded in a conducting zone.

Layout No. 4

The primary cable was placed along 600S with the aim of reducing the adverse influence of the high tension power line by having the cable as close as possible to it. The grounded cable was extended to the east to enable the Turam survey to cover the continuation of a promising magnetic and self-potential anomaly discovered on traverses 900E and 1000E.

(A.G.G.S.N.A. Grid, Plates 2 and 3).

The Turam ratio contours of Layout No. 4 are presented on Plate 7. The interpretation of Turam results is difficult because high Turam ratio values alternate the low values indicating existence of at least two flat lying bodies.

A well defined ratio anomaly extending from 1200E/200S to 100E/150S indicates a possible shear zone in which the Grand Secret open cut, the Good Friday workings and the Ironclad workings are located. However, the results on which this interpretation is based are rather uncertain as the individual traverses indicated distortion in the electromagnetic field. A.G.G.S.N.A. Indication "C" is situated on the flank of this anomaly, but has a completely different strike and was not located by the Turam survey.

A flat-lying conducting body appears to be located near the southern bank of the Jamies Creek at 900E/300N, extending towards 1100E/300N where the surface is completely covered with rubble from the cuttings of the newly constructed bitumen road. A considerable amount of pyrite mineralisation is exposed and dumps nearby show copper staining in abundance indicating possible mineralisation.

Another flat lying good conductor is shown between 1150E/125N and 1400E/100N (Plate 7). The Turam anomaly corresponding to this conductor is well defined but rather weak. Sulphide mineralisation crops out in the cutting of the road which crosses this anomaly.

An interesting magnetic anomaly was discovered in the area where these two flat-lying bodies are situated (Plate 3). The amplitude of the anomaly, over 2000 gammas, suggests the presence of massive pyrrhotite mineralisation. An S.P. anomaly (up to -500 millivolts) (Plate 2) accompanies the magnetic anomaly, and suggests sulphide mineralisation. Lode material showing tin mineralisation was observed in a small adit near 1350E/75N. Although the workings in the adit are rather small, the position of the lode material at the edge of the geophysical anomalies is considered significant as it would suggest that the mineralisation extends to the west and becomes stronger where the geophysical anomalies become more pronounced.

Comparatively little exploration has been carried out in this part of the area and testing of the geophysical results by diamond drilling (D.D.H.7 and 8) is strongly recommended.

4. CONCLUSIONS AND RECOMMENDATIONS

The Turam electromagnetic survey re-discovered most of the electromagnetic indications obtained by the A.G.G.S.N.A. survey in 1938. The ratio and phase data of the Turam gave more detailed information on the nature of the good conducting bodies and allowed dip and pitch estimations. Depth to current concentration causing some of these anomalies could also be calculated.

A.G.G.S.N.A. Indication "A" appears to be caused by two flat-lying good conducting bodies located north of Jamies Creek, and by a steeply dipping, rather poorly conducting body south of it.

Drillholes N.S.1, N.S.2 and N.S.5 were drilled to test Indication "A". Sulphide mineralisation sufficient to account for the geophysical results was found in all three holes (80 - 100 ft. thick). Assays of mineralised portions of drillcores with exception of those of N.S.1 have still to be made. The most strongly mineralised section of core from N.S.1 assayed between 7 and 8 per cent copper and 3 per cent tin over a length of about 7 feet. Drillholes D.D.H.1 and D.D.H.2 are proposed to test the northern flat-lying body.

A.G.G.S.N.A. Indication B was relocated and interpreted as being caused by a nearly vertical good conducting body having a steep easterly dip.

This indication was tested by drillhole N.S.6 which intersected sulphide mineralisation in portions from 97 to 140 ft and again from 176 to 219 ft. Drillhole D.D.H.3 is proposed to test the southern continuation of Indication "B".

A.G.G.S.N.A. Indications "C" and "D" could not be relocated with the Turam electromagnetic survey. However, Turam ratio anomalies were detected in the general area in which indications "C" and "D" were located but these show completely different striking directions.

A.G.G.S.N.A. Indication "E" was relocated and its extension to the west was followed up to Trav 800W on the B.M.R. grid. Indication "E" was tested by drillhole N.S.4. This hole intersected an unmineralised shear zone and had to be abandoned because of drilling difficulties.

Extension of the A.G.G.S.N.A. grid to the north revealed a strong Turam anomaly south of the Easter Monday workings. This anomaly is supported by a well defined magnetic anomaly. Drillhole D.D.H.5 is proposed to test this anomaly.

A most significant anomalous area was discovered in the eastern extension of the A.G.G.S.N.A. grid, between traverses 900E and 1400E. This area is being tested at present at drillsites D.D.H.7 and D.D.H.8.

Lode material containing a considerable amount of tin mineralisation (of order of several per cent/Sn) was found exposed in an old adit near 1350E/75. A thorough geological investigation of this area is warranted as it has apparently escaped the attention of more recent prospectors and has not even been mapped.

In conclusion it should be noted that the geophysical work in the U.N.A. area could not detect any of the pipe type mineralised bodies which were worked in the past and reputedly contained rich parcels of tin and copper ore. However, the geophysical work located several indications considered to be caused by lode type mineralisation containing sulphides (pyrite, pyrrhotite, chalcopyrite). These indications are being tested by diamond drilling jointly by the Geological Survey of Queensland and by the Bureau of Mineral Resources.

Six holes N.S.1 - N.S.6 were drilled in 1964. The position of these drillholes with relevant drilling details are shown on Plate 1. All holes with the exception of N.S.4 intersected visible sulphide mineralisation. The economic value of this mineralisation however will depend on final assay results which are still to be carried out.

After detailed study of all geophysical results available the following additional drilling is recommended in the U.N.A. area :

Drill Site No.	Position	Direction	Angle of depression	Approximate length
D.D.H.1	400W/760N (BMR Grid)	Towards North, in direction of traverse.	80°	200 ft
D.D.H.2	0N/650W (AGGSNA Grid)	-	Vertical	150 ft
D.D.H.3	650S/150W (AGGSNA Grid)	Towards 600S/300W	50°	250 ft
D.D.H.4	600W/350S (BMR Grid)	Towards South, in direction of traverse.	50°	250 ft
D.D.H.5	216W/188N (AGGSNA Grid)	In direction of Easter Monday shaft.	60°	350 ft
D.D.H.6 N.B. This is in fact Site C selected on geological grounds	340E/60S (AGGSNA Grid)	Towards 300E/125S	45°	425 ft
D.D.H.7	1000E/150N (AGGSNA Grid)	Towards North, in direction of traverse	45°	250 ft
D.D.H.8	1200E/50S (AGGSNA Grid)	Towards North, in direction of traverse	45°	375 ft

The order of priority recommended is DDH8, DDH5, DDH7, DDH4, DDH1, DDH2, DDH3, and DDH6.

Since these recommendations were made, the Queensland Geological Survey and the Bureau of Mineral Resources agreed to continue testing geophysical targets in the Watsonville area. Approval has been given to drill sites D.D.H.8, D.D.H.5, D.D.H.7, D.D.H.4, and D.D.H.1 totalling a further 1425 linear feet.

5. REFERENCES

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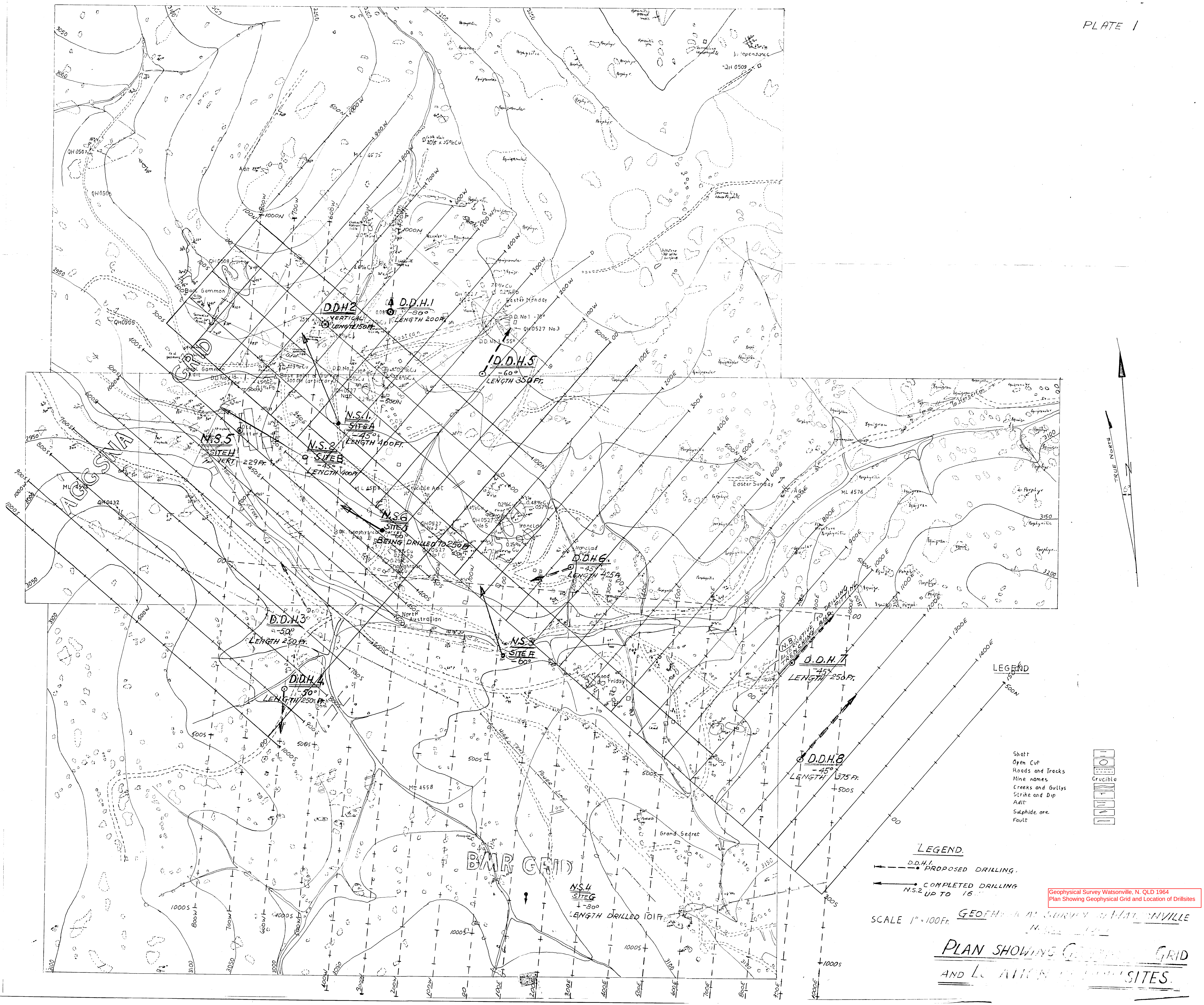
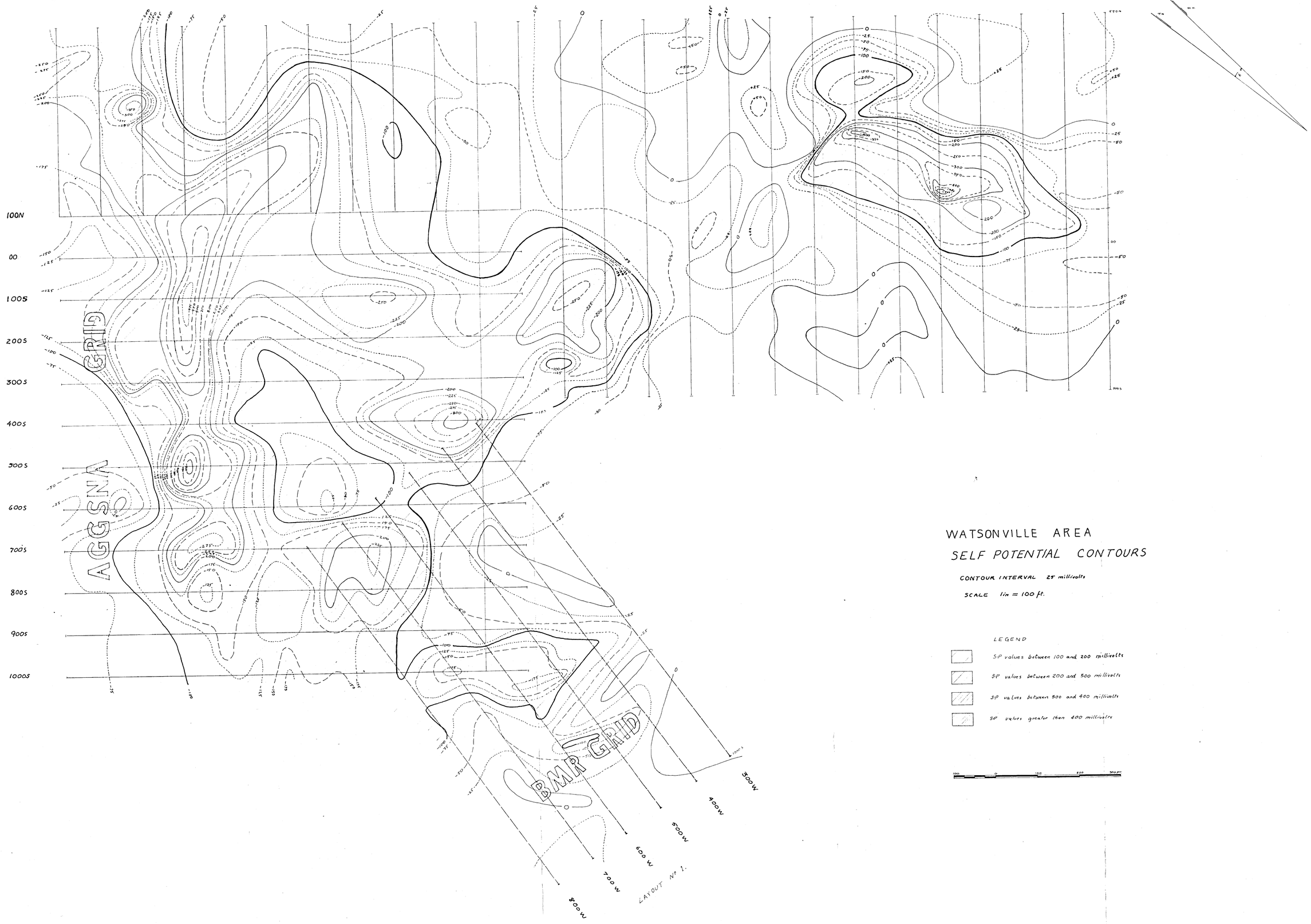
THYER, R.F., RAYNER, J.M. and NYE, P.B.	1938	Geophysical Report on the United North Australian group of mines, Watsonville, Herberton District. A.G.G.S.N.A. Queensland Report No. 43 (unpublished).
WADE, M.	1937	Report on Watsonville tin field. A.G.G.S.N.A. Queensland Report No. 28 (unpublished).



Geophysical Survey Watsonville, N. QLD 1964
Plan Showing Geophysical Grid and Location of Drillsites

LAYOUT No 3.

PLATE 2.



WATSONVILLE AREA

SELF POTENTIAL CONTOURS

CONTOUR INTERVAL 25 millivolts

SCALE 1in = 100 ft.

LEGEND

- S.P values between 100 and 200 millivolts
- SP values between 200 and 500 millivolts
- SP values between 500 and 400 millivolts
- SP values greater than 400 millivolts

BRITISH MADE ALLIANCE

BRITISH MADE ALLIANCE

PLATE 3

AGGSNA GRID

BMR BASELINE

AGGSNA BASELINE

BMR GRID

MN

TN

MONDAT

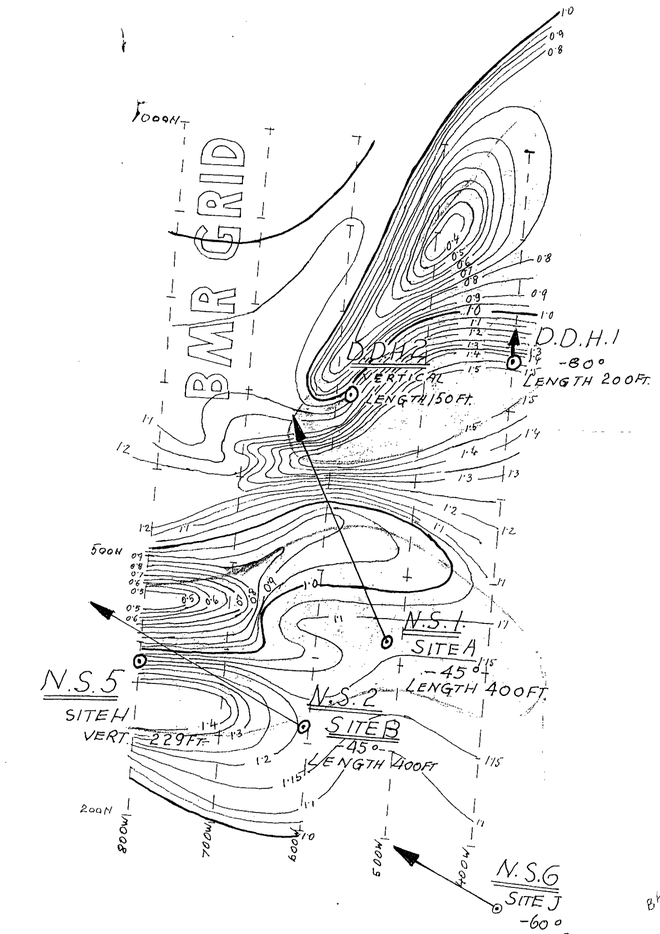
WATSONVILLE via HERBERTON, 1964

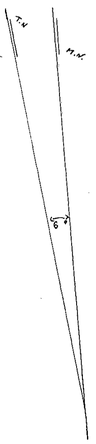
PRELIMINARY CONTOUR MAP OF THE VERTICAL MAGNETIC FORCE COMPONENT

Contour interval 100 gammas

Scale

PLATE 4





LEGEND.

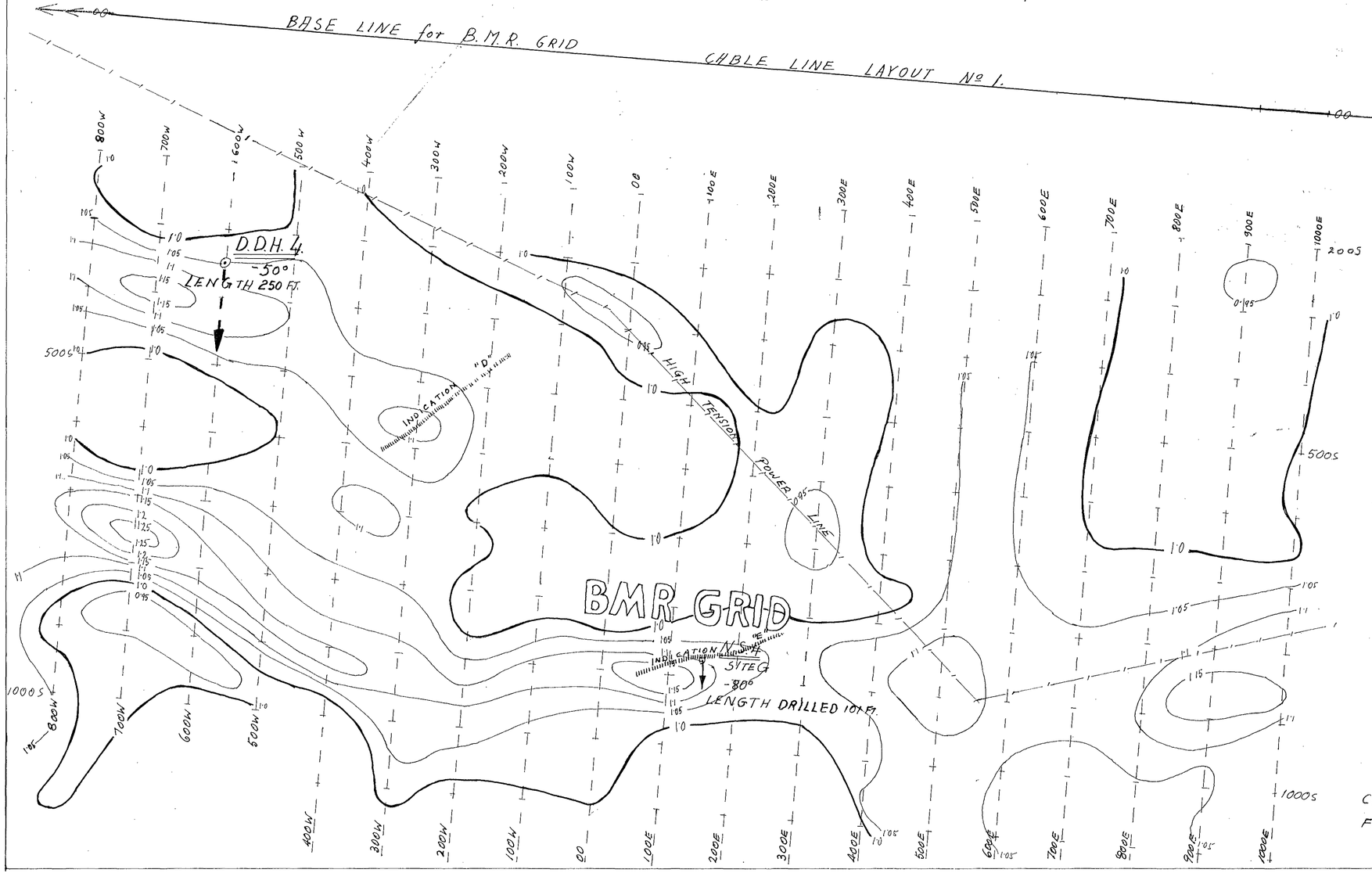
D.D.H.1 PROPOSED DRILLING.

N.S.2 COMPLETED DRILLING UP TO 16.12.64

TRENCHING.

APPROX. POSITION OF FLAT LYING GOOD CONDUCTING BODY.

Strong / Weak } INDICATIONS BY ELECTRO-MAGNETIC METHOD AGGSNA SURVEY 1937



WATSONVILLE, N. QLD.

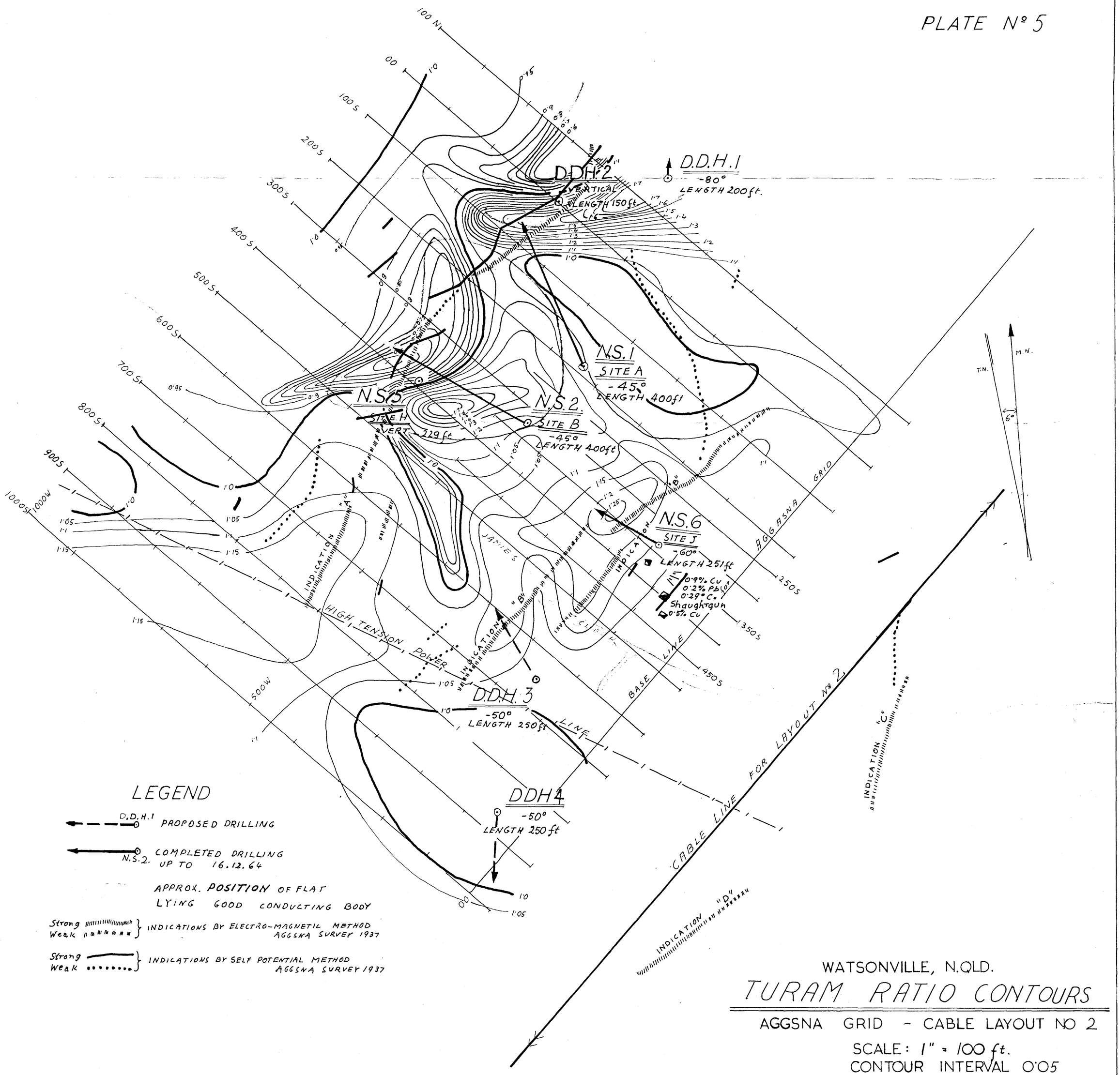
TURAM RATIO CONTOURS

B.M.R. GRID - CABLE LAYOUT No 1.

SCALE
1" = 100 FT.

CONTOUR INTERVAL 0·05
FREQUENCY USED 660 C.P.S

PLATE Nº 5



LEGEND

D.D.H.1 PROPOSED DRILLING

N.S.2. COMPLETED DRILLING UP TO 16.12.64

APPROX. **POSITION** OF FLAT LYING GOOD CONDUCTING BODY

Strong / Weak — INDICATIONS BY ELECTRO-MAGNETIC METHOD AGGSNA SURVEY 1937

Strong / Weak — INDICATIONS BY SELF POTENTIAL METHOD AGGSNA SURVEY 1937

WATSONVILLE, N.QLD.

TURAM RATIO CONTOURS

AGGSNA GRID ~ CABLE LAYOUT NO 2

SCALE: 1" = 100 ft.
CONTOUR INTERVAL 0·05
FREQUENCY USED 660 c.p.s.

PLATE Nº 6

CABLE LINE FOR LAYOUT Nº 3

D.D.H.1
-80°
LENGTH 200FT.

D.D.H.2
VERTICAL
LENGTH 150 FT.

D.D.H.5
-60°
LENGTH 350 FT.

N.S.1.
SITE A
-45°
LENGTH 400FT.

D.D.H.6
-45°
LENGTH 425 FT.

EASTER MONDAY

T.N. M.N.

LEGEND.

D.D.H.1 PROPOSED DRILLING.

COMPLETED DRILLING N.S.2 UP TO 16.12.64.

APPROX. POSITION OF FLAT LYING GOOD CONDUCTING BODY.

HIGH TENSION POWER LINE

WATSONVILLE, N. QLD.

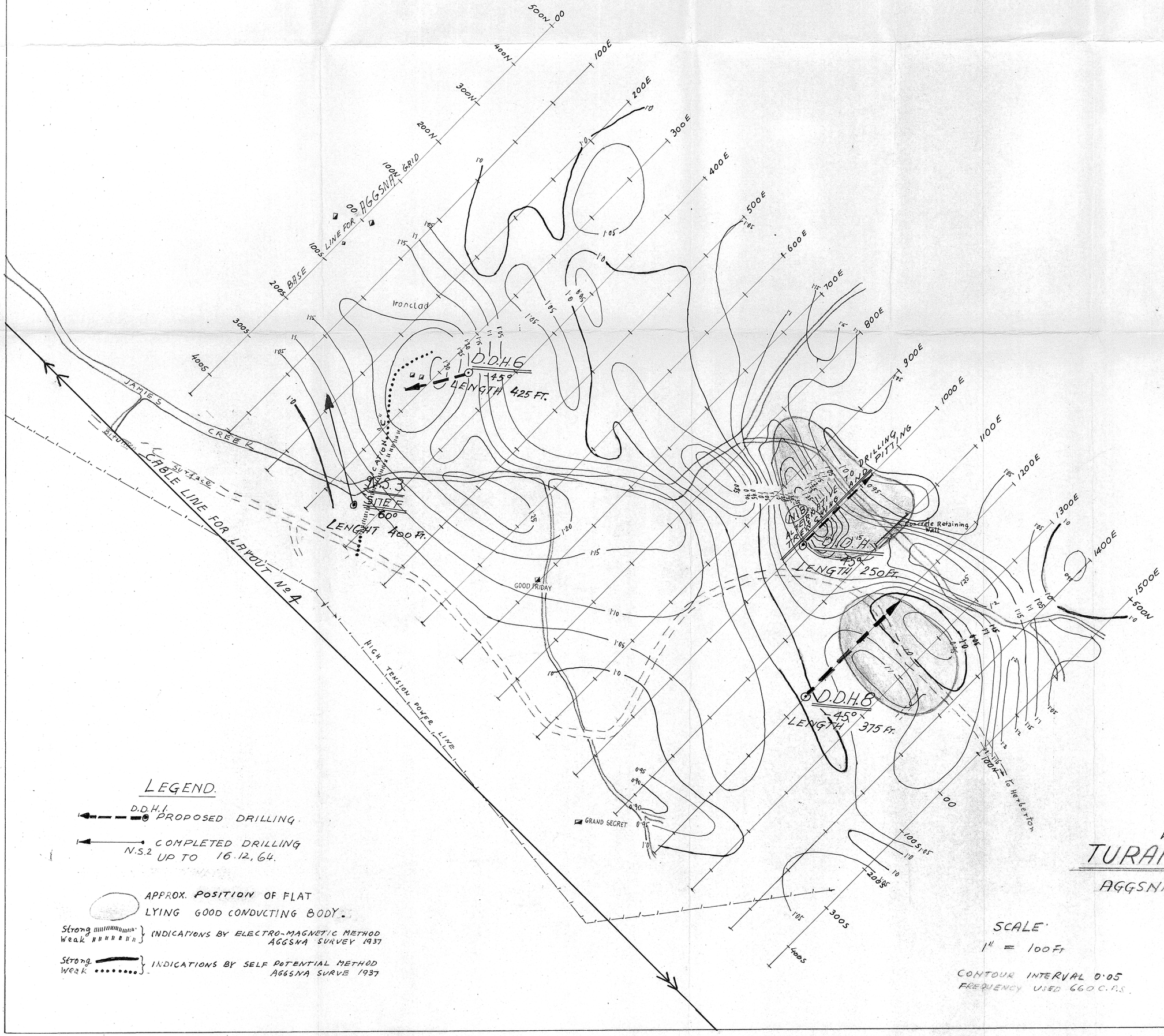
TURAM RATIO CONTOURS.

AGGSNA GRID - CABLE LAYOUT Nº3

SCALE
1" = 100Ft

CONTOUR INTERVAL 0·05
FREQUENCY USED 660 C.P.S.

PLATE No 7



LEGEND.

D.D.H.1 PROPOSED DRILLING.

N.S.2 COMPLETED DRILLING UP TO 16.12.64.

APPROX. POSITION OF FLAT LYING GOOD CONDUCTING BODY.

Strong, Weak } INDICATIONS BY ELECTRO-MAGNETIC METHOD AGGSNA SURVEY 1937

Strong, Weak } INDICATIONS BY SELF POTENTIAL METHOD AGGSNA SURVE 1937

WATSONVILLE, N. QLD.

TURAM RATIO CONTOURS

AGGSNA GRID - CABLE LAYOUT No 4.

SCALE:
1" = 100 Ft

CONTOUR INTERVAL 0·05
FREQUENCY USED 660 C.P.S.

PLATE 8

DRILLHOLE N.S.1.

COMPARISON OF GEOPHYSICAL AND DRILLING RESULTS