BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

REPORT ON

GRAVITY SURVEY IN THE LEIGH CREEK AREA, SOUTH AUSTRALIA.

REPORT NO. 16/1949

GEOPHYSICAL SERIES ~~NO. 8/1949~~

by

G. H. van Erkelens.

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS.

REPORT ON

GRAVITY SURVEY IN THE LEIGH CREEK AREA, SOUTH AUSTRALIA.

REPORT NO. 16/1949

GEOPHYSICAL SERIES NO. 8/1949

LEIGH CREEK COALFIELD - GRAVITY SURVEY

PROGRESS REPORT FOR PERIOD MAY - JUNE 1949

REPORT NO. 16/1949 (GEOPHYSICAL SERIES NO.8/1949)

PLAN NOS. G17-15, 16, 17 & 18.

This report covers gravity surveys carried out by the Bureau of Mineral Resources, Geology and Geophysics in the Leigh Creek Area of northern South Australia between May 10th and June 23rd, 1949.

Field work was carried out by the writer using a Heiland Gravimeter No.58. Three separate areas were investigated namely, one north of Lyndhurst, the Southern Basin near Copley and the Telford Basin. The work on them differed in character and will be described under separate headings.

LYNDHURST AREA.

A grid of stations at half mile intervals had been prepared over an area of approximately 15 square miles situated from 7 to 12 miles north of Lyndhurst and extending west from Mundy Creek for a distance of three miles.

The area can be reached by a track through the Lyndhurst racecourse and continuing in a northerly direction past peg O16 at the southern boundary and peg Y17 at the northern boundary of the area.

Fifty-five stations were observed between the 10th and 31st of May, 1949, fieldwork being suspended owing to rain from the 17th to 20th. In addition, a number of stations along the Mt. Fitton Road were re-observed to check the scale value of the instrument against values previously obtained by the Bureau and by the South Australian Department of Mines.

The meter was mounted in a Chevrolet Sedan equipped with a gear box to give an extra low gear for use in difficult country.

The results were reduced at Head Office, Melbourne, to the datum of the previous surveys in the area and a map prepared (See Plate G17-15) showing station values and gravity contour lines of 1 milligal interval. To tie in with the South Australian Department of Mines gravity survey, station O16 was repeated several times.

There is no anomaly on the area which can be attributed to the presence of a coal basin and consequently no testing is recommended.

SOUTHERN BASIN, COPLEY, S.A.

The area is centred around the town dam at Copley. At the request of the South Australian Department of Mines a 200 ft. grid has been pegged over an area 1400 x 1400 ft. Extensions were added to the existing grid as shown on the plan (Plate G17-16). The main road from Copley to Hawker runs through the centre of the area.

Ninety-eight (98) stations were observed between the 3rd and 12th of June, 1949. The gravity station at the 373 mile peg near the railway crossing at Copley was used as a base station. This station is tied to the pre-existing network of gravity stations and the results were reduced to the same datum.

/2..

The results are shown on Plan G17-16 and clearly define the extent of the basin. North-south and east-west gravity profiles were observed in detail with a view to isolating any anomalies which could be due to coal seams of appreciable thickness. The profiles, shown on Plate G17-17, are however, devoid of any feature which could be ascribed to coal seams. It is estimated from the magnitude of the gravity anomaly (6 milligals) that the Triassic sediments attain a maximum thickness of between 1200 and 1300 feet in the centre of the basin. However, this thickness is considerably greater than indicated by a bore (No.5) which was drilled in 1918 near the centre of the basin. This bore reached a total depth of 781 feet and is reported to have entered Pre-Cambrian basement rocks at a depth of 677 feet. No satisfactory explanation can be offered for the difference between the bore evidence and the gravity interpretation.

TELFORD BASIN.

The work done on this area extended that which has previously been carried out by the Bureau and described in B.M.R.G.G. Report No.80/1948, Geophysical Series No.14/1948.

Seven additional traverses were surveyed on the western edge of the basin comprising approximately 90 stations at 200 feet intervals. Field work started on the 16th June and ended on the 23rd June.

Ties to the previous gravimetric survey of the basin were made at stations G.S.11, W5 and W16 and the results were reduced to the same datum.

A map (G17-18) superceding map G17-11 was made incorporating the information of this survey. Gravity profiles were constructed along the traverses which show that the edge of the basin extends further to the north-west near traverses D and E than was previously thought. This seems to be the result of a flattening of the basement towards the north-west.

The profiles do not appear to show any anomalies due to coal as was shown on the profile along traverse G.S. station 1 - 11 (See map G17-5).

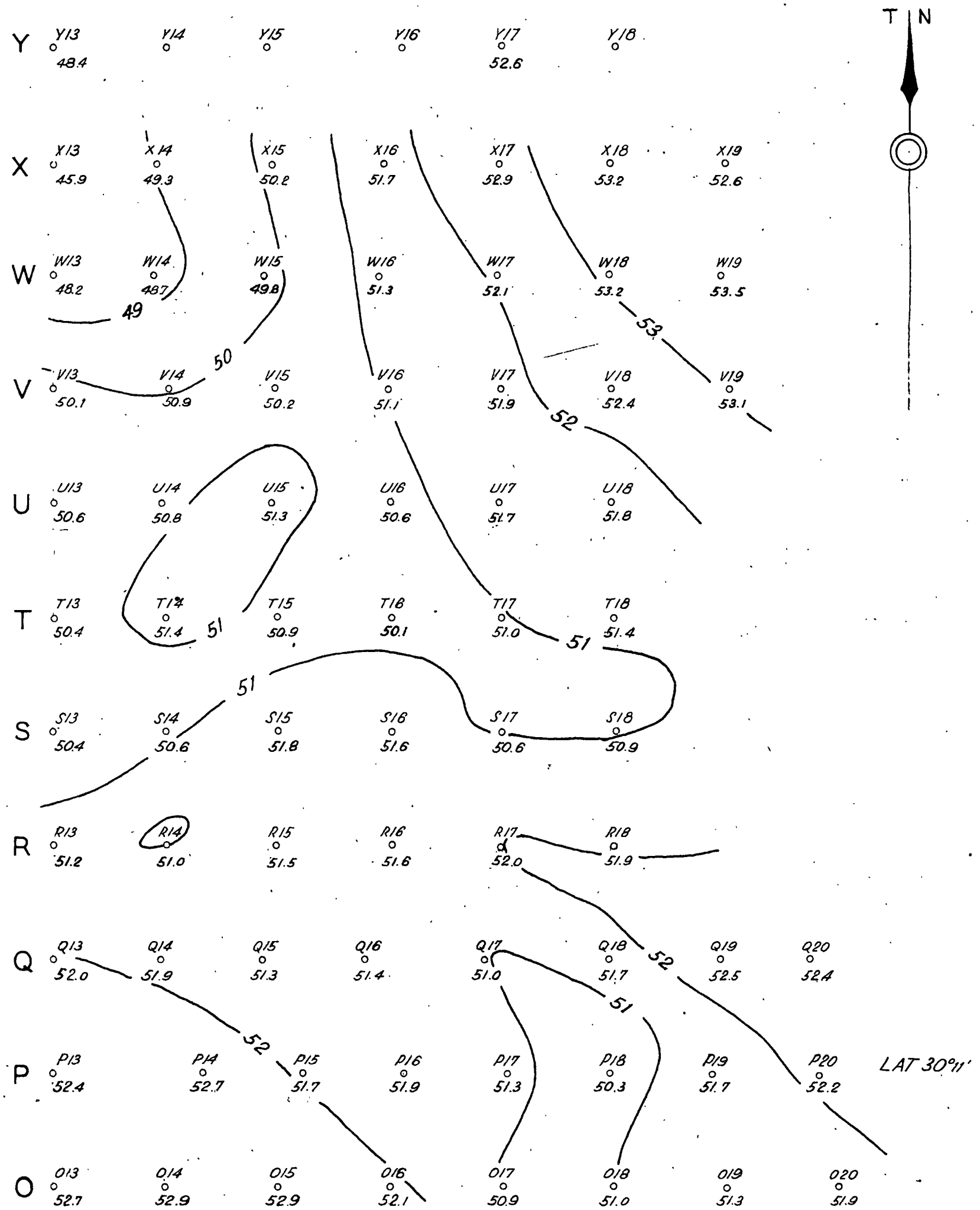
CONCLUSION.

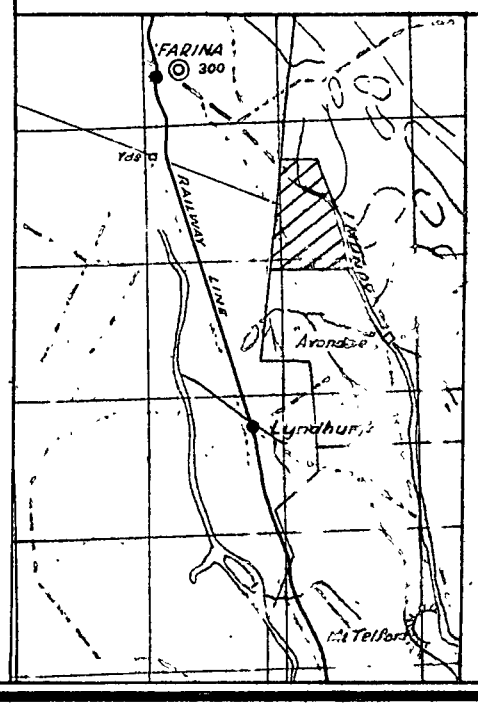
Although the gravity survey of 15 square miles extent in the area north of Lyndhurst failed to reveal any anomalies which might be due to coal basins it has served a useful purpose in narrowing down the area to be prospected for further coal reserves. The survey is to be extended shortly to the sandhill belt north-west of Lyndhurst and when this is completed a total area of approximately 250 square miles of possibly coal bearing country will have been prospected.

The work on the Southern and Telford basins will prove of considerable value in planning drilling to test the marginal area for shallow coal.

Original signed by
Mr. van Erkelens.

(G. H. van Erkelens)
Geophysicist.





GEOPHYSICAL SURVEY AT LEIGH CREEK S. A.

AREA NORTH OF LYNDHURST

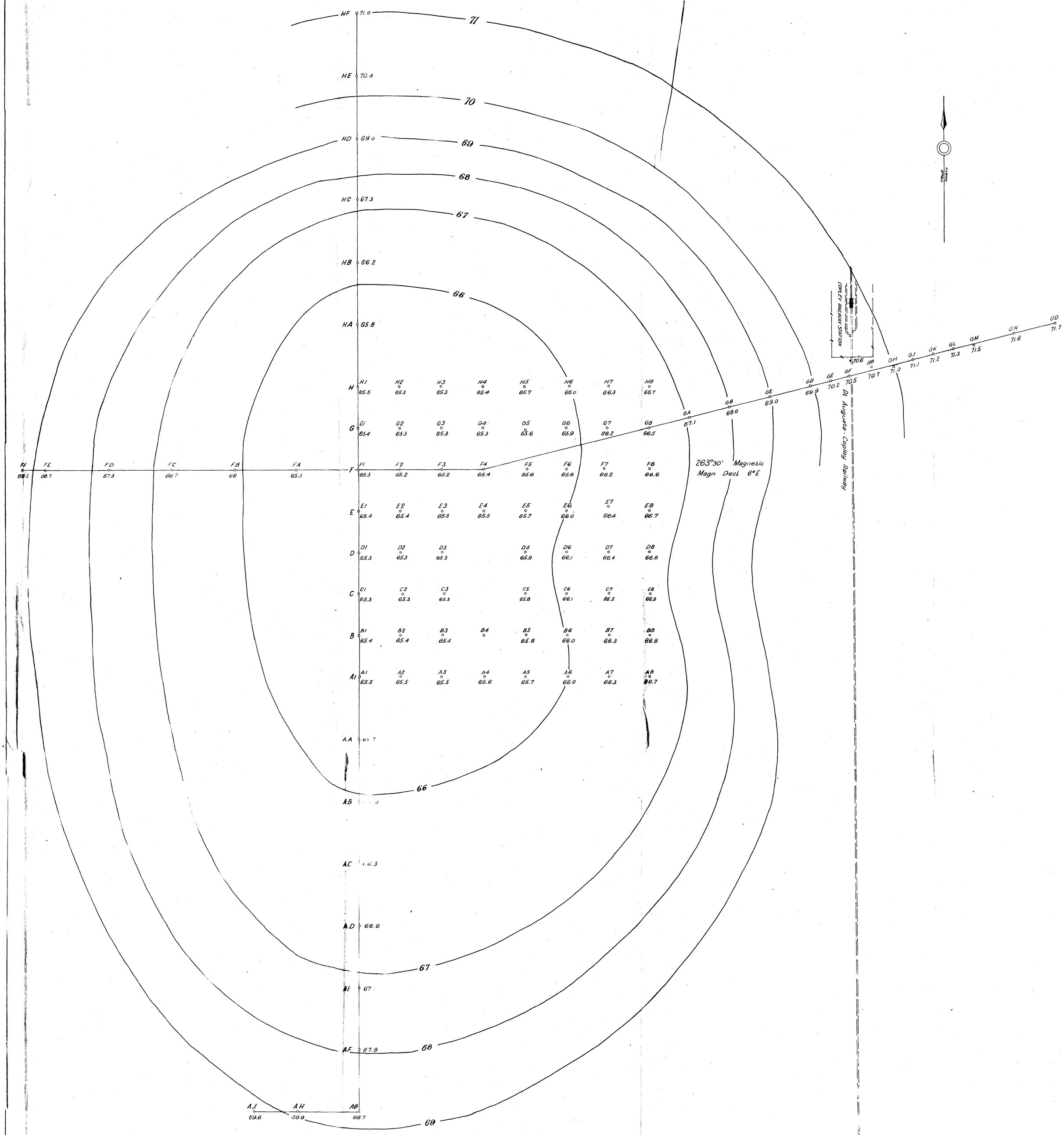
Scale

1/2 0 1/2 1 1½ Miles

Geophysicist

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics

G17-15



Scales

400 0 400 800 00 1600 FEET

HORIZONTAL

VERTICAL

1 0 1 2 3 4 MILLIGALS

C.M. Ershelby

Geophysicist

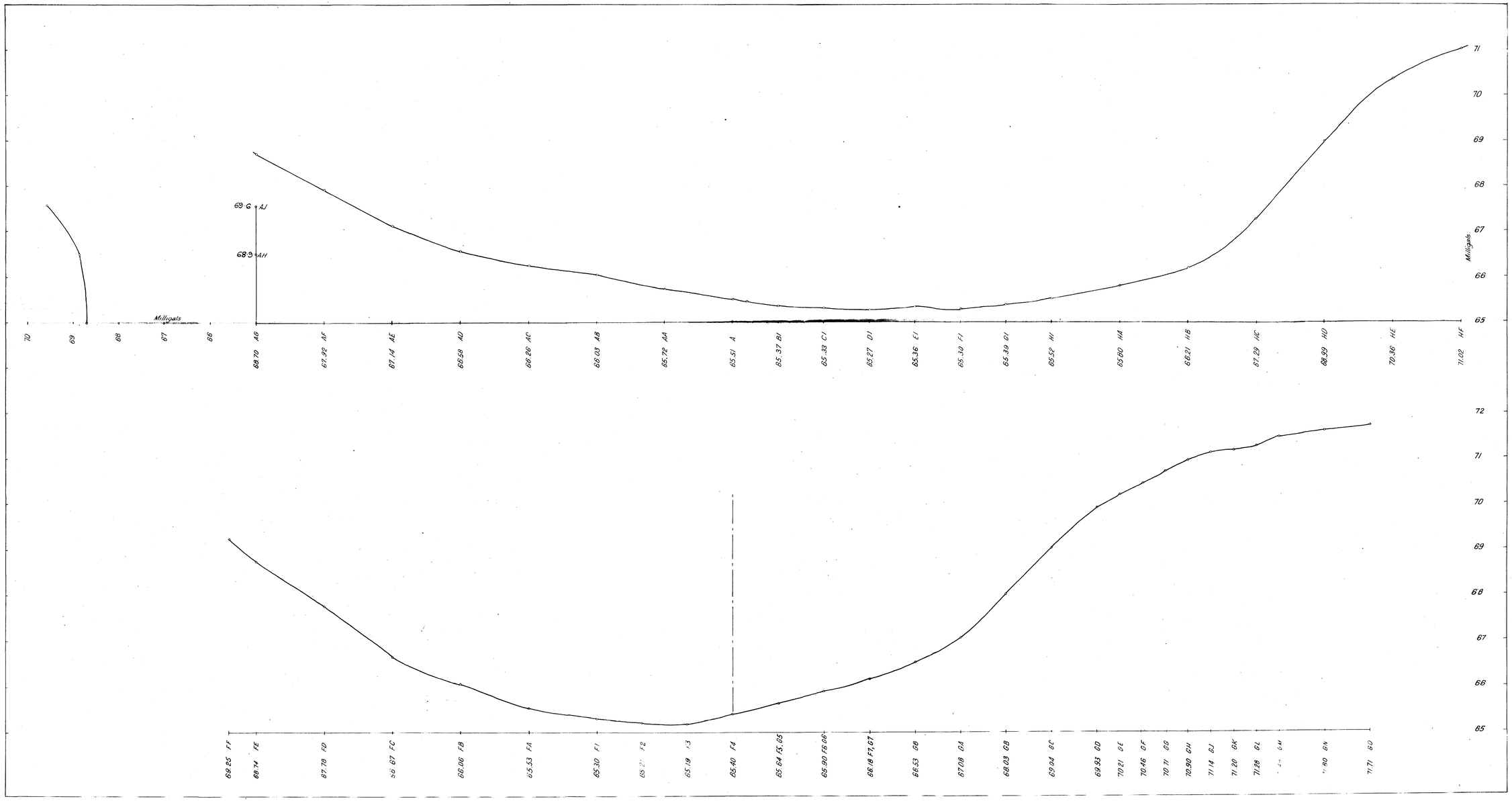
GEOPHYSICAL SURVEY AT LEIGH CREEK S.A.

SOUTHERN BASIN AREA

GRAVITY CONTOURS & STATION LOCATIONS

G17-16

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics



SCALES

HORIZONTAL: 400 0 400 800 1200 1600 FEET

VERTICAL: 1 0 1 2 3 4 MILLIGALS

Geophysicist

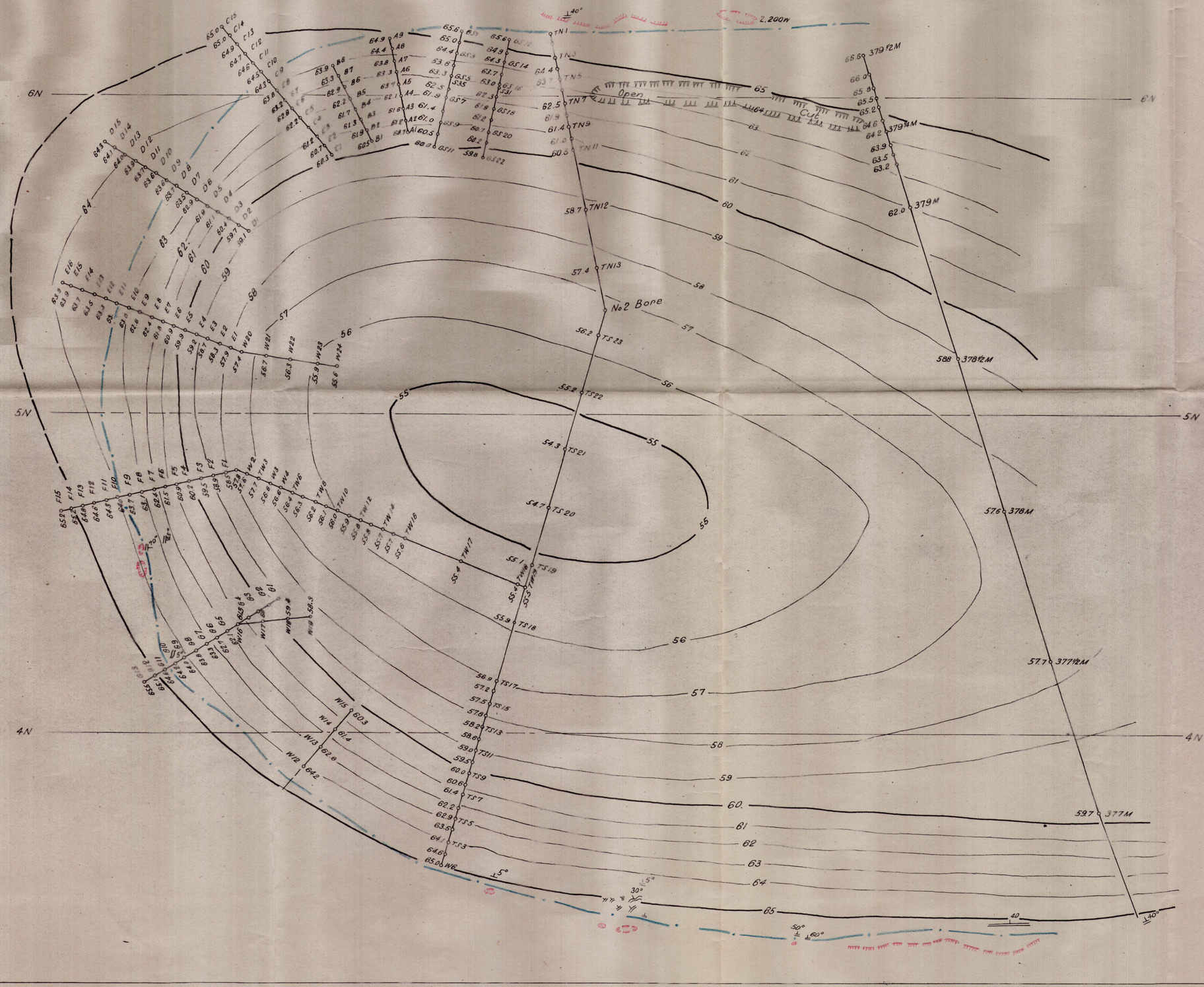
GEOPHYSICAL SURVEY AT LEIGH CREEK S.A

SOUTHERN BASIN

E-W & N-S GRAVITY PROFILES

G 17–17

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics.



LEGEND

Gravity Contours

Edge of Basin determined partly from outcrops and partly from gravity results

Outcropping Precambrian rocks

SCALE

1000 0 1000 2000 3000 Feet

Contour interval = 1 Milligal

Geophysicist

GEOPHYSICAL SURVEY AT LEIGH CREEK S.A.

TELFORD BASIN AREA

GRAVITY CONTOURS & STATION LOCATIONS

THIS DRAWING SUPERCEDES G17-11

G17-18

Geophysical Section, Bureau of Mineral Resources Geology & Geophysics