

22,911.28



This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of

\$ 22,911.28

*D.B. Crano*  
Resident Geologist or  
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

*[Signature]*  
Commissioner of Yukon Territory

REPORT ON  
INTERPRETATION OF GRAVITY DATA ON  
PORKER CLAIMS, HULSE LAKE  
YUKON TERRITORY  
(60°, 126°, N.W.)

for  
Peter E. Walcott & Associates Ltd.  
(on behalf of  
Archer, Cathro & Assoc. Ltd.)

VANCOUVER

by



Paterson, Grant & Watson Limited  
Toronto

JANUARY 1975



Claims Surveyed: PORKER 1 - 48

Survey Dates: August 7 - October 4, 1974

06/337



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SUMMARY

A re-examination of gravity data over Porker Claim at Hulse Lake, .Y.T. has been undertaken by us with a view to defining target areas of potential economic interest. After giving close attention to elevation and terrain effects, and by minimizing these to the best of our ability, we have prepared a residual gravity map which we believe shows only gravity features which have their origins within the bedrock. Three of the anomalies which appear in this map in our view have definite prospective interest, and merit some sort of follow-up investigation.



INTRODUCTION

In accordance with our telephone agreement of December 5th, we have undertaken a re-examination of gravity data at Hulse Lake, Y.T., which you obtained for your client, Archer, Cathro and Associates, Limited of Vancouver.

The maps and other data which you sent to us reached us on December 16th, and we commenced working on the project during that same week.

On January 29th, we requested Archer, Cathro and Associates by telephone to send us additional geological information to facilitate our final interpretation. These data arrived at our offices on February 3rd.

Our instructions, according to our understanding, were to examine the gravity data for evidence of possible massive sulphide mineralization, and wherever possible, to estimate volumes, depths and tonnages.



DESCRIPTION OF THE AREA

The area that is covered by this survey, known as Porker Claims, is a rolling tract of land measuring approximately 11,200 feet NS by 9,600 feet EW, and is centred roughly at 60° 31'N, 127°51'W. It is underlain entirely by late Precambrian sediments of coarse clastic to argillaceous textures, calcareous in part, which have been subjected to low grade regional metamorphism generally, and which locally have undergone marked hydrothermal alteration. A north-trending zone of siderite-limonite gossans and highly silicified metasediments traverses the area. Some quartzite breccia has been encountered by drilling along this zone, indicating possible faulting. The rocks appear to be abundantly mineralized in places.



GRAVITY SURVEY

The survey specifications and the procedures that were used in acquiring the data and in preparing the Bouguer gravity map are described in the report which you supplied to Archer, Cathro and Associates, a copy of which you have also forwarded to us. In order to make our report fully self-contained, we have taken the liberty of reproducing your report in an appendix.

It appears obvious that a high degree of correlation exists between the Bouguer gravity values and the elevations. This was verified in some profiles and scatter diagrams which we prepared during our early appraisal of the data. Until this correlation is removed, it is virtually impossible to perceive those features in the gravity map which might have economic significance. Accordingly, much of our effort has been directed toward a better separation of subsurface from topographic effects in the gravity data.



DESCRIPTION OF TECHNIQUES USED

An exact approach to the problem of eliminating topographic effects would be to calculate these effects by digital techniques at each gravity station. To do this, however, would require having a much more detailed topographic survey than is available. It would also be very expensive. Accordingly, we opted for using simpler, less accurate, but much less expensive methods.

The first step that we undertook was to re-examine carefully the elevation factor (more specifically, the Bouguer density value) that was used in reducing the data. We did this on several of the survey lines. It appeared that lowering the density from 2.6 g/cc to 2.4 g/cc effected some improvement in certain parts of the area, notably over the high ground near the northeast corner, and accordingly we re-calculated all of the gravity values using the lower density value. We did not contour the new set of gravity values, however, because although in some regions they appeared to be less correlated with the elevations than the original set, in others they appeared to be more strongly correlated than before; and



in any event, they still contained an unacceptable degree of roughness. Moreover, we disliked using a Bouguer density value as low as 2.4 g/cc in an area of altered Precambrian sediments.

The re-calculation of the Bouguer gravity values was a useful exercise nonetheless, because it enabled us to see at a glance which features in the original data are most susceptible to change (either up or down) with changes in our assumption of Bouguer density. Those which have a high degree of sensitivity to changes in the Bouguer correction are automatically suspect. More than likely these are associated with surficial causes, be they glacial deposits or bedrock elevation changes. By comparing the two sets of Bouguer gravity profiles we were able to eliminate many of the smaller wrinkles, and at the same time we were able to determine an "uncertainty envelope" which permitted us to perform a certain amount of smoothing without risking loss of significant information.

The second step was a little unorthodox. The scatter diagrams referred to earlier revealed that the Bouguer gravity values and the elevations were strongly correlated, but that the correlation was non-linear. This is not surprising if one considers that terrain effects generally increase with elevation above the datum base, usually being greatest at summits of hills and least in broad valleys. Accordingly, we tried adding a quadratic



( $h^2$ ) term to the elevation correction, the purpose of which was to take out the bulk of the terrain effect. The coefficient of this term was determined empirically from the data. Fig. 1 illustrates how this technique was effectively able to eliminate most of the terrain effect on lines 140N and 148N that is caused by the large hill of quartzite, and how an anomaly of possible subsurface origin was retrieved which might otherwise have been lost in the negative feature. This process was applied to the data north of line 124N only. One must take special care in using such ad hoc procedures not to apply them too far from the particular data set from which they have been determined. We felt that south of line 124N, the topographic surface was sufficiently smooth that special procedures of this kind were unnecessary.



## RESULTS

The results of the work just described are presented in Figs. 2 and 3 (map pocket). The first (Fig. 2) shows contours of the generalized, regional Bouguer gravity field which we were able to develop after removing the bulk of the elevation and terrain effects from the data. This gravity pattern relates to large-scale and very probably deep-seated regional geologic changes, and is of no direct exploration interest. Also shown in Fig. 2 are profiles of the residual gravity features which withstood the tests described earlier, and which we therefore believe are likely to be caused by density changes occurring beneath the bedrock surface. Not shown in Fig. 2 are residual negative features which in our opinion are related to elevation changes (particularly those of a laterally restrictive kind), and which are therefore suspected of being surficial in origin. Fig. 3 presents the residual gravity anomalies in contour form.

Figs. 2 and 3 show a number of things. The disposition of residual anomalies along fairly well-defined loci suggests that structure may have played a role in the localization of



denser materials. Based upon the geological map supplied to us, we have little hesitation in sketching a linear, north to northeasterly trending structure through the central part of the area, which probably represents a fault or a contact zone. This zone is indicated by a small drop in gravity (often less than 0.3 milligal) which is sharply localized on most of the E-W lines, and which we suspect may be due to a local reduction in the density of the bedrock caused by brecciation or mylonitization accompanied by leaching.

With somewhat less assurance, we have drawn three other structural lines based upon the gravity residuals. All of these appear as lines of contact between materials having small but significant differences in their formation bulk densities. There is, as far as we are aware, no direct evidence for these contacts other than in the gravity data. All three occur in areas where there is very little outcrop.

In addition to the general pattern of the residual gravity contours, there is a number of specific features which merit discussion. Anomalies A, D, and F. These three residual anomalies, ranging in amplitude from 0.6 to about 1 milligal, lie on a well-defined arc passing across the northwest corner of the survey area. The anomalies are generally broad and smooth. Analysis of these features has failed to produce any reasonable estimates of the



depths or the densities of the anomalous materials. Our calculations tend to indicate depths well in excess of 150 feet; and if these estimates are even roughly correct, the volumes of rock must be such (allowing for reasonable values of the excess density) that it appears unlikely that they are expressions of sulphide mineralization. We accordingly put a low priority on these anomalies unless they can be supported by additional geophysical work. The reconnaissance gravity data by themselves do not qualify these features as definite economic prospects.

Anomaly B. In our opinion, this is a feature having decidedly interesting potential. Analysis indicates that this anomaly fits reasonably well to a tabular body dipping to the east (at about  $50^{\circ}$ - $60^{\circ}$ ), with a moderate strike length (roughly 800 feet), a depth extent of roughly 400 feet, and a depth of burial of about 55-70 feet. The true thickness is indicated to be in the range 100--140 feet and the excess density around 1.2 - 1.4 gm/cc.

Assuming an average bulk density of 2.6 gm/cc for the surrounding sediments, the indicated bulk density of the anomalous material would be 3.8 - 4.0 gm/cc, which corresponds with a rock that is 40% - 50% sulphides by volume. The data are not sufficient to work out a probable tonnage with any confidence, but using the approximate figures we have just given it would appear that



the total mass could be in the vicinity of  $4 \times 10^6$  tons, and larger than this if the body has a longer strike length than we have estimated. We wish to stress that the figures we have given can be regarded only as very crude, being the best that we can obtain from very limited data upon which we have done some smoothing. The most uncertain of our estimates are the depth extent and the thickness, although the range of the latter is constrained somewhat by our estimate of 165 - 175 gm-ft/cc for the product of excess density and thickness, which estimate we consider to be reasonably good.

Anomaly C has similar characteristics to Anomaly B. It fits to a tabular body that is roughly 800 feet in length, dipping  $60^\circ$ - $70^\circ$  to the east, with a depth extent of roughly 400 feet and a depth of burial of about 100-130 feet. The true thickness is indicated to be approximately 150-200 feet, and the excess density in the range 1.5 - 1.8 g/cc, giving a net bulk density of 4.1 - 4.4 g/cc, or a sulphide equivalent of 50% - 60% by volume. Based on these figures (which admittedly are rather crude), the total mass could be in the vicinity of  $7 \times 10^6$  tons.

Anomaly E fits to a very long (about 2,000 feet), steeply dipping (about  $80^\circ$ E -  $90^\circ$ ) tabular mass which lies at a fairly shallow level (about 40-60 feet) and which has only a moderate depth extent (approximately 200 feet). The indicated thickness is about 150 feet, more or less, and the excess density is



about 1.3 - 1.7 g/cc. The anomaly does not maintain a continuous amplitude along its strike, which suggests that the denser rocks are formed into discrete tabular masses or lenses. The indicated volumes and densities of these lenses, the pattern of their occurrence, and above all, their proximity to known outcroppings of siderite induce us to suggest that Anomaly E may be the expression of a vein or veins of siderite, possibly with pyrite. We give it a distinctly lower rating than either Anomaly B or Anomaly C, barring supportive indications from other geochemical or geophysical work.

Anomaly G occurs in at the crest of a large, limestone-capped hill where the terrain effect is strong. It also occurs only on one survey line. We feel that because of its location and because of the lack of supporting evidence on other lines, a quantitative analysis is unjustifiable.

Anomaly H. Like Anomaly G, this anomaly also registers only on one survey line. However, it does not occur in a topographic environment that would make it suspect, and its amplitude appears to make it definitely worth consideration. We have fitted this feature to a tabular mass having rather a short strike length (about 400 feet) but a considerable depth extent (roughly, 600 feet), with a very shallow westward dip (of about  $30^{\circ}$ ). The depth of burial appears to be about 40 to 60 feet,



the true thickness about 80 to 100 feet, and the excess density about 1.0 to 1.4 g/cc. This would imply a sulphide fraction of 40% - 50% by volume, and a total mass in the vicinity of  $2 \times 10^6$  tons or more. Of course, we have only guessed at the strike length of this body. Perhaps some effort should be made to see if it extends farther to the south than we have supposed.



RECOMMENDATIONS

We are of the opinion that anomalies B and C, and possibly also H, are worth further investigation. Since the economic targets in this area are stratabound sulphide bodies of the Pb-Zn type, induced polarization would appear to be the logical follow-up method. Should an induced polarization survey be carried out, we would suggest that two additional lines also be run over anomalies A and E.

Respectfully submitted,

PATERSON, GRANT & WATSON LIMITED



FRASER S. GRANT, Ph.D., P.Eng.  
Consulting Geophysicist



NORMAN R. PATERSON, Ph.D., P.Eng.  
Consulting Geophysicist



APPENDIX A



A REPORT

ON

A GRAVITY SURVEY

Quartz Lake Area, Yukon Territory

FOR

ARCHER CATHRO & ASSOCIATES LTD.

Vancouver, British Columbia

BY

Peter Walcott & Associates Ltd.

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INTRODUCTION

Between August 7th and October 4th, 1974, at the request of Archer Cathro & Associates Ltd., Peter E. Walcott & Associates Limited carried out a gravity survey over part of a property located in the Watson Lake Mining District of the Yukon Territory on behalf of their client.

The survey was carried out over east west lines which were turned off every 800 feet from a north south baseline, and which were chained and picketed at 100 foot intervals.

Measurements of relative gravity were made every 100 feet along the picket lines using a CG-2 gravity meter. In addition elevations at each of the gravity stations were obtained using a Sokkisha TM-20C theodolite and rod.

The data was then processed and presented in profile and contour form on Maps W-185-1 to ..... that accompany this report.

PROPERTY, LOCATION AND ACCESS

The property is located in the Watson Lake Mining District of the Yukon Territory and consists of the following claims:

<u>Claim Name</u>	<u>Grant No.</u>	<u>Expiry Date</u>
PORKER 1 - 12	Y73646 - 57	July 18th, 1974
" 13 - 48	Y73658 - 93	July 19th, 1974
" 40, 51, 53, 55, 56	Y73961 - 65	August 8th, 1974
" 50F, 52F, 54F	Y73966 - 68	August 8th, 1974

The claims are situated on the south side of Quartz Lake some 50 miles northeast of the settlement of Watson Lake, Yukon Territory.

Access is obtained by means of float plane from Watson Lake.

PURPOSE

The purpose of the survey was to try and locate by the gravimetric method the presence of any mineralized deposits on the property, possible occurrences of which are suggested by the 2 million ton MacMillan deposit, some 2 to 3 miles to the west, and by the favourable geological environment.

PREVIOUS WORK

Previous work on the property consisted of geological mapping and prospecting and geochemical surveying, the results of which are documented in reports by the staff of Archer Cathro & Associates Ltd.

GEOLOGY

The reader is referred to the forementioned reports by the staff of Archer Cathro & Associates Ltd.

APPENDIX B

Personnel employed on survey.

PERSONNEL EMPLOYED ON SURVEY

<u>NAME</u>	<u>OCCUPATION</u>	<u>ADDRESS</u>	<u>DATES</u>
Peter E. Walcott	Geophysicist	Peter E. Walcott & Assoc. 605 Rutland Court, Coquitlam, B.C.	Sept. 11th - Oct. 4th, 1974
G. MacMillan	Geophysical Operator	"	Sept. 11th - Oct. 4th, Oct. 25th- Dec. 4th, 1974
L. Perreault	"	"	Aug. 7th - 31st, Sept. 15th - Oct. 4, 1974
R. Heckmann	"	"	Aug. 8th - Aug. 19th 1974
R. Livingstone	Helper	"	Aug. 7th - Aug. 27th, 1974
S. Scurvey	"	"	Sept. 11th - Oct. 4th 1974
P. Charlie	"	"	"



# Paterson, Grant & Watson Limited/Consulting Geophysicists

Suite 2306, The Simpson Tower, 401 Bay Street, Toronto, Ontario, Canada M5H 2Y4  
Telephone: (416) 868-0888 Cables: Norquest

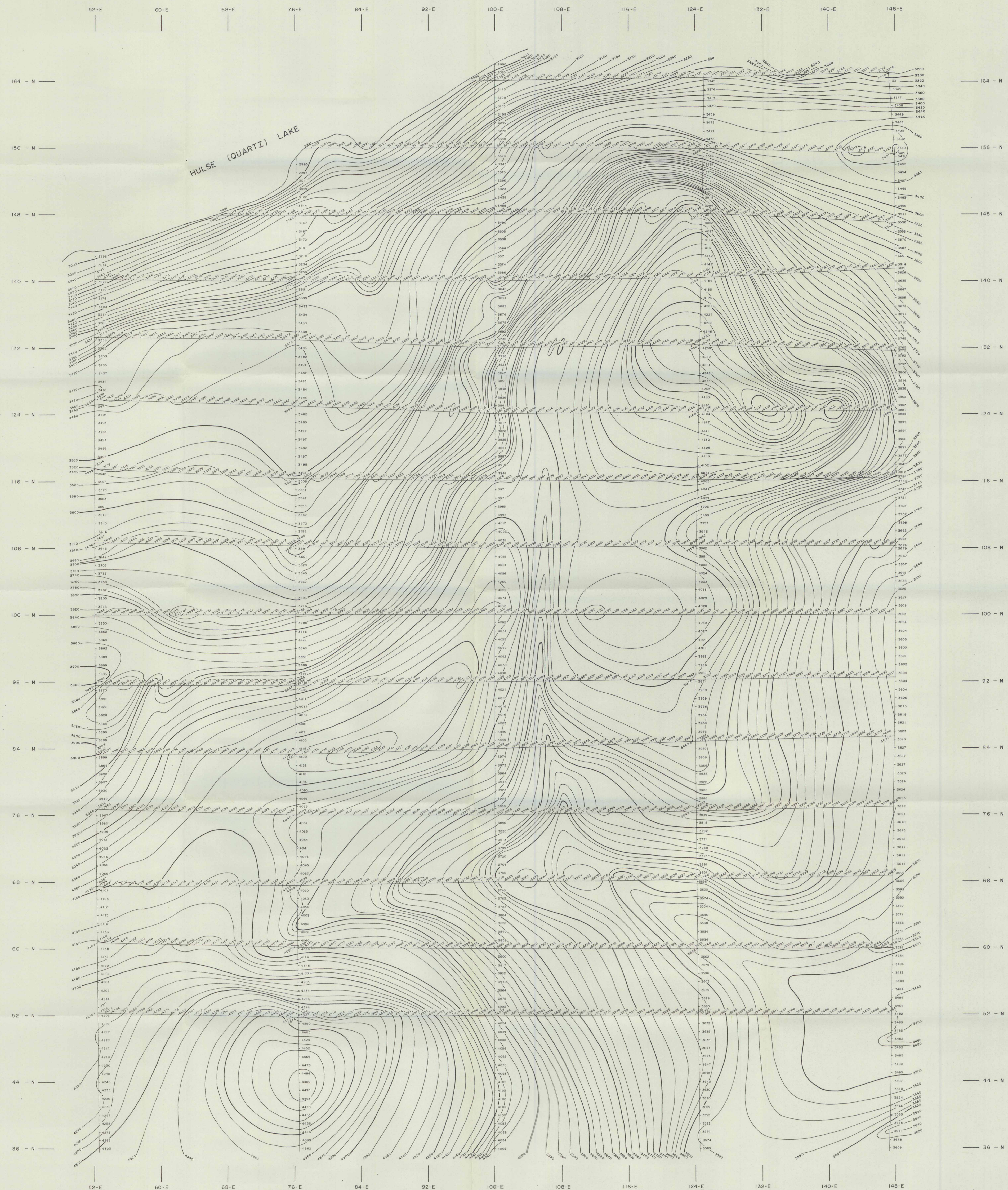
## C E R T I F I C A T I O N

I certify the following:

1. That I am a registered Professional Engineer of the Province of British Columbia.
2. That I am a graduate in Engineering Physics of the University of Toronto (1950), and hold a Master of Applied Science (Geophysics) degree from UBC (1952) and a Ph.D. (Geophysics) from the University of Toronto (1955).
3. That I have practised my profession continuously since 1950.
4. That I am a resident of Toronto, Ontario and conduct my business at 401 Bay Street, Toronto, Ontario, M5H 2Y4.
5. That I have not personally visited the property described in this report but have studied the data and concur with the statements and conclusions drawn in the report.

NORMAN R. PATERSON, Ph.D., P.Eng.  
Consulting Geophysicist

February 7, 1975

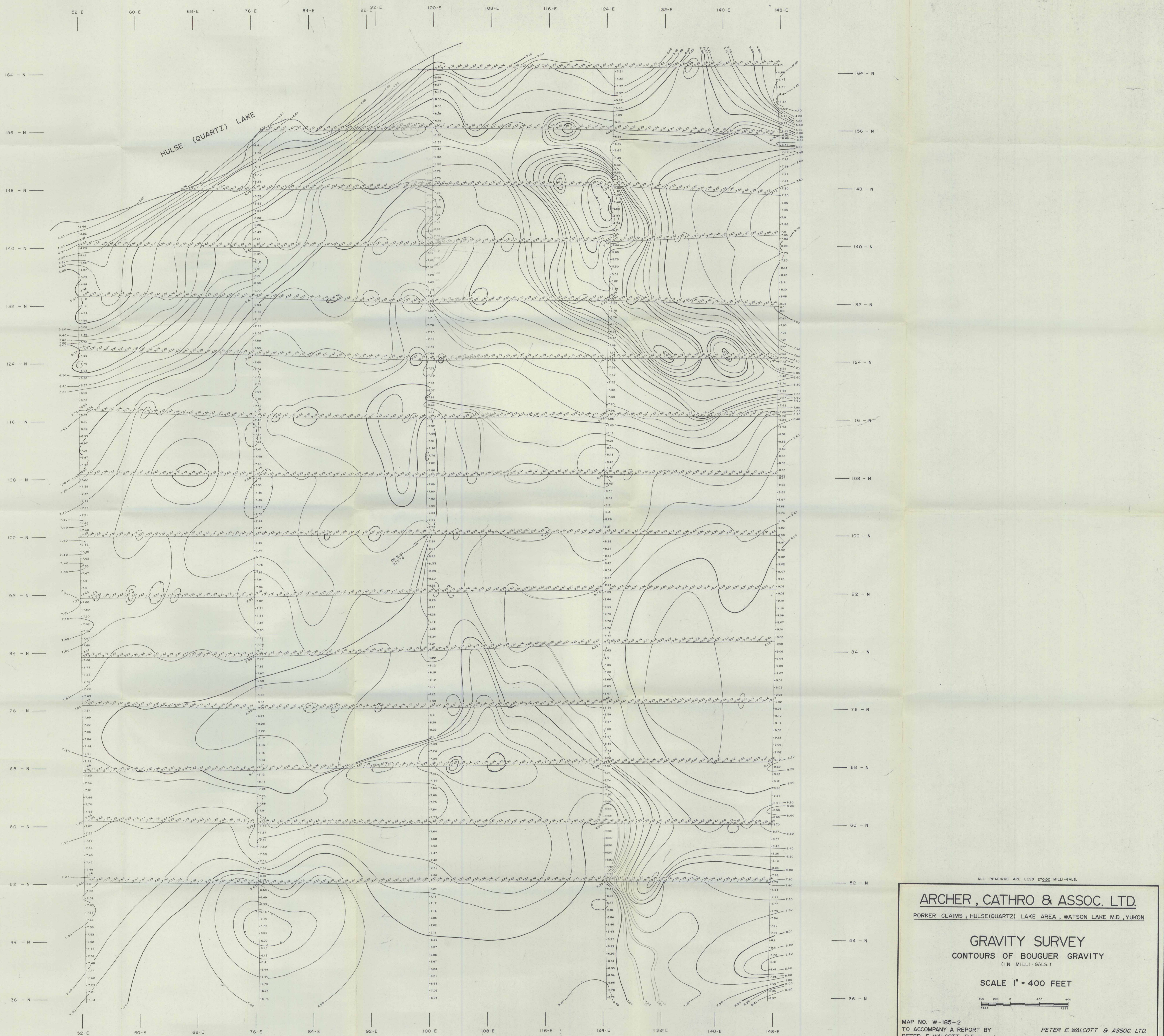


**ARCHER, CATHRO & ASSOC. LTD.**  
 PORKER CLAIMS; HULSE(QUARTZ) LAKE AREA; WATSON LAKE M.D., YUKON

**GRAVITY SURVEY**  
 CONTOURS OF SURFACE ELEVATION  
 ( IN FEET )

SCALE 1" = 400 FEET

MAP NO. W-185-1  
 TO ACCOMPANY A REPORT BY **PETER E. WALCOTT & ASSOC. LTD.**  
 DATED - DECEMBER, 1974 AUGUST - OCTOBER / 1974

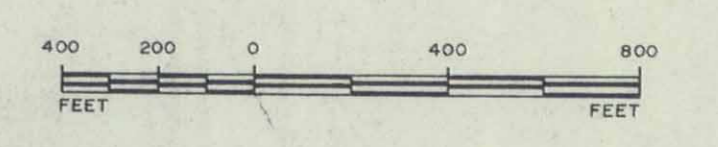


ALL READINGS ARE LESS 270.00 MILLI-GALS.

**ARCHER, CATHRO & ASSOC. LTD.**  
 PORKER CLAIMS; HULSE(QUARTZ) LAKE AREA; WATSON LAKE M.D., YUKON

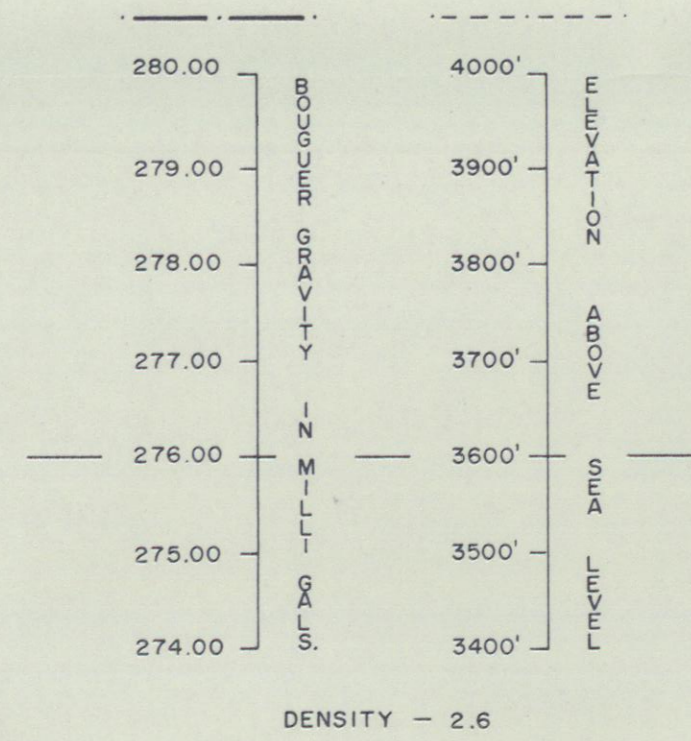
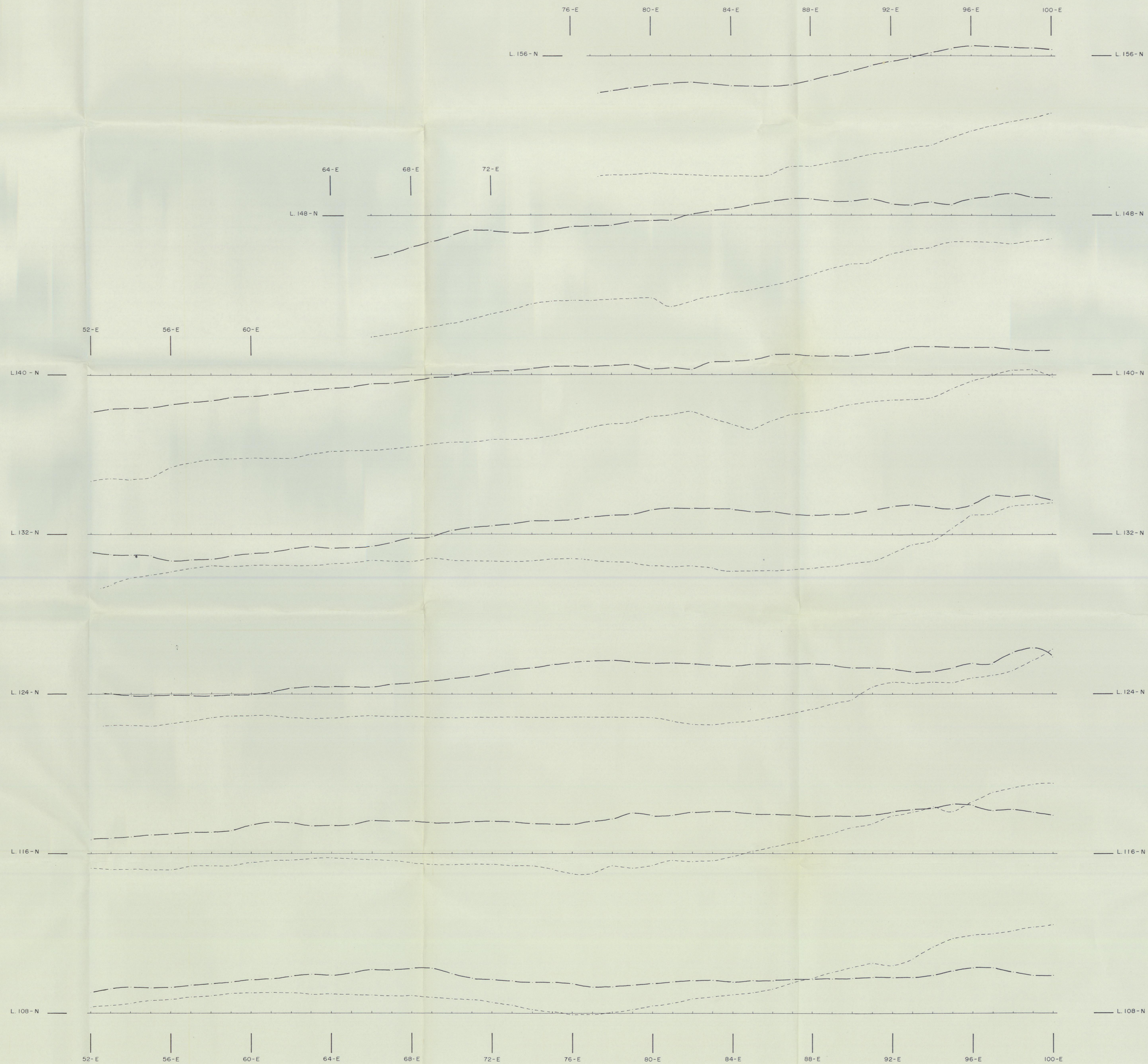
**GRAVITY SURVEY**  
 CONTOURS OF BOUGUER GRAVITY  
 (IN MILLI-GALS.)

SCALE 1" = 400 FEET



MAP NO. W-185-2  
 TO ACCOMPANY A REPORT BY  
 PETER E. WALCOTT, P.Eng.  
 DATED - DECEMBER, 1974

PETER E. WALCOTT & ASSOC. LTD.  
 AUGUST - OCTOBER / 1974



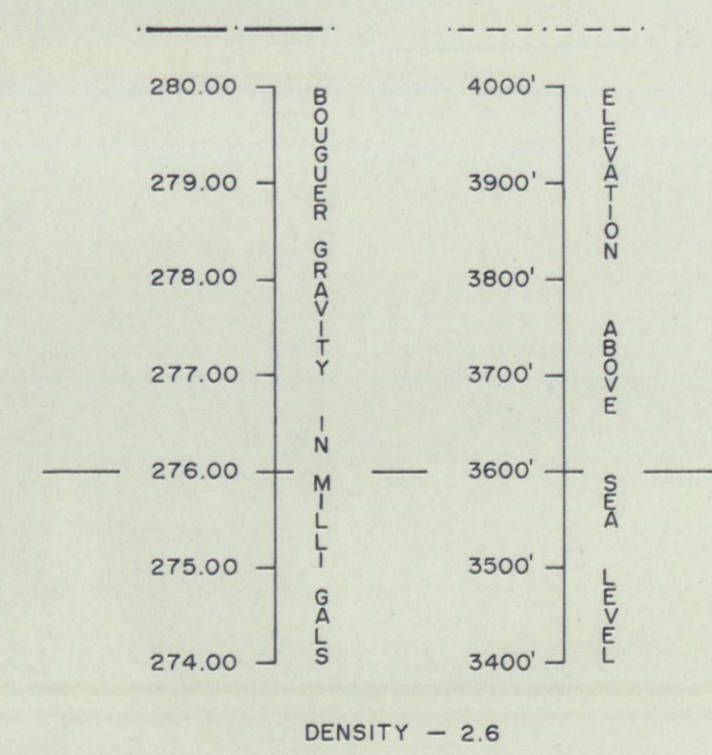
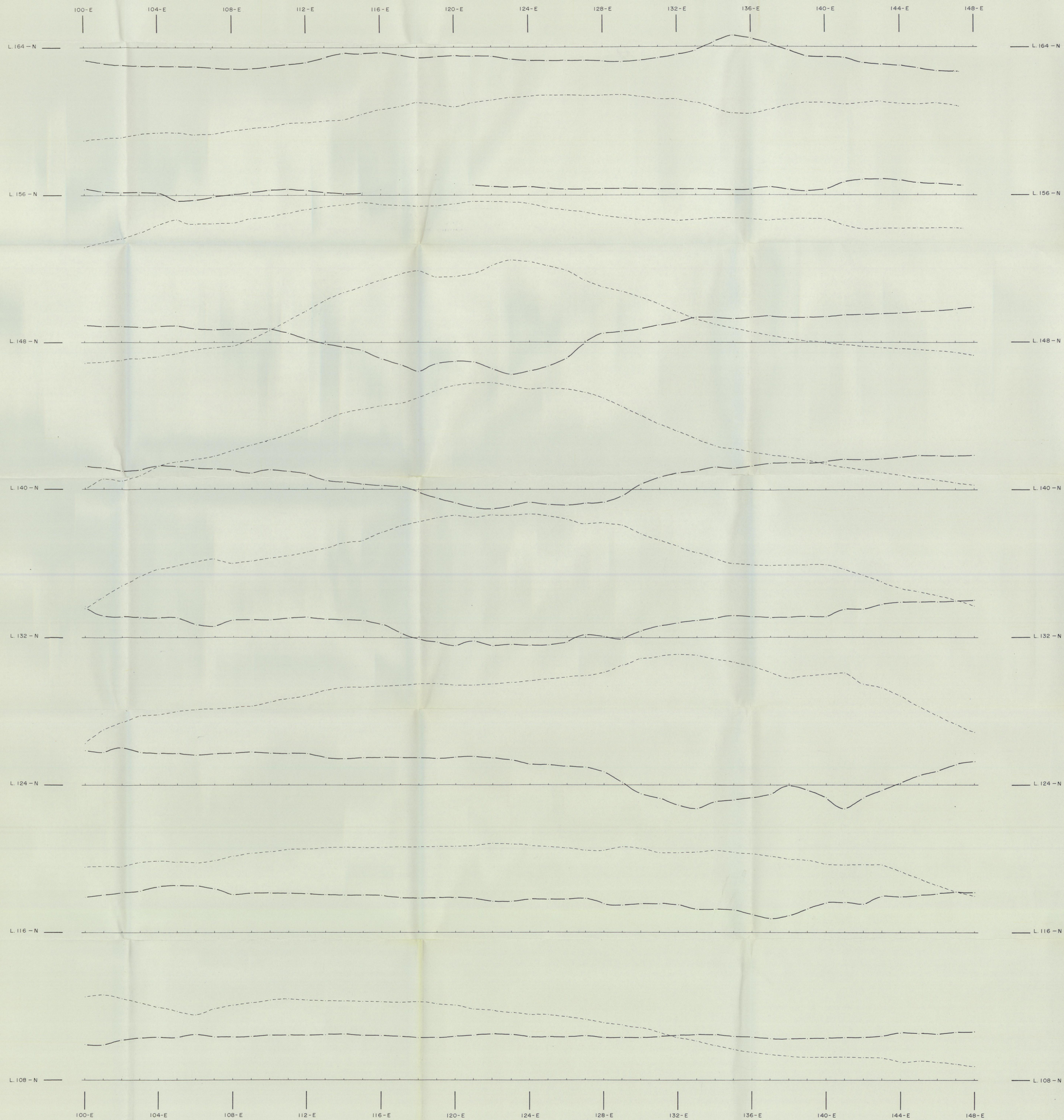
**ARCHER, CATHRO & ASSOC. LTD.**  
 PORKER CLAIMS ; HULSE (QUARTZ) LAKE AREA ; WATSON LAKE M.D. ,YUKON

**GRAVITY SURVEY**  
 PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE 1" = 200 FEET

MAP No. W-185-3  
 TO ACCOMPANY A REPORT BY **PETER E. WALCOTT & ASSOC. LTD.**  
 DATED - DECEMBER , 1974

AUGUST - OCTOBER , 1974

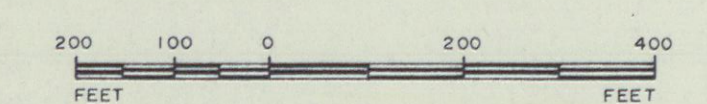


**ARCHER, CATHRO & ASSOC. LTD.**

PORKER CLAIMS, HULSE (QUARTZ) LAKE AREA, WATSON LAKE M.D., YUKON

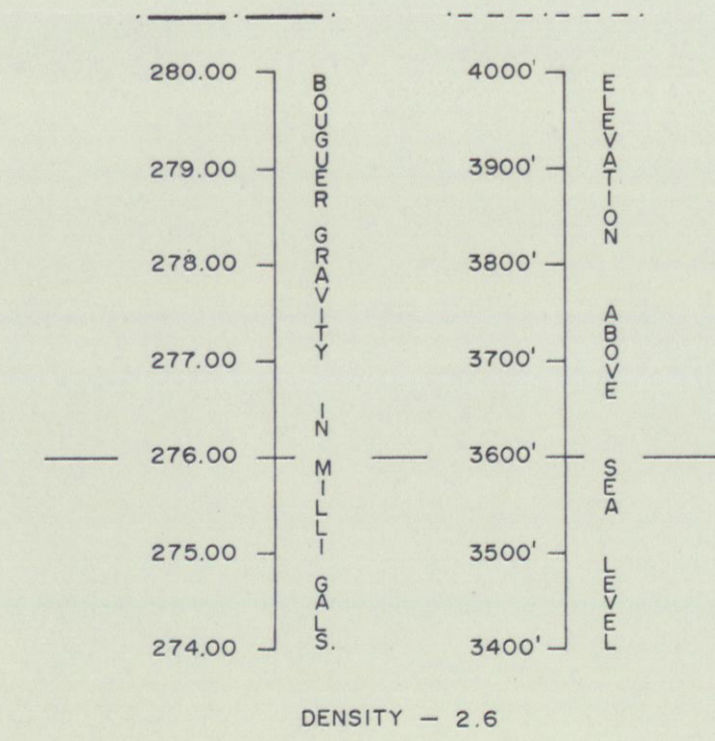
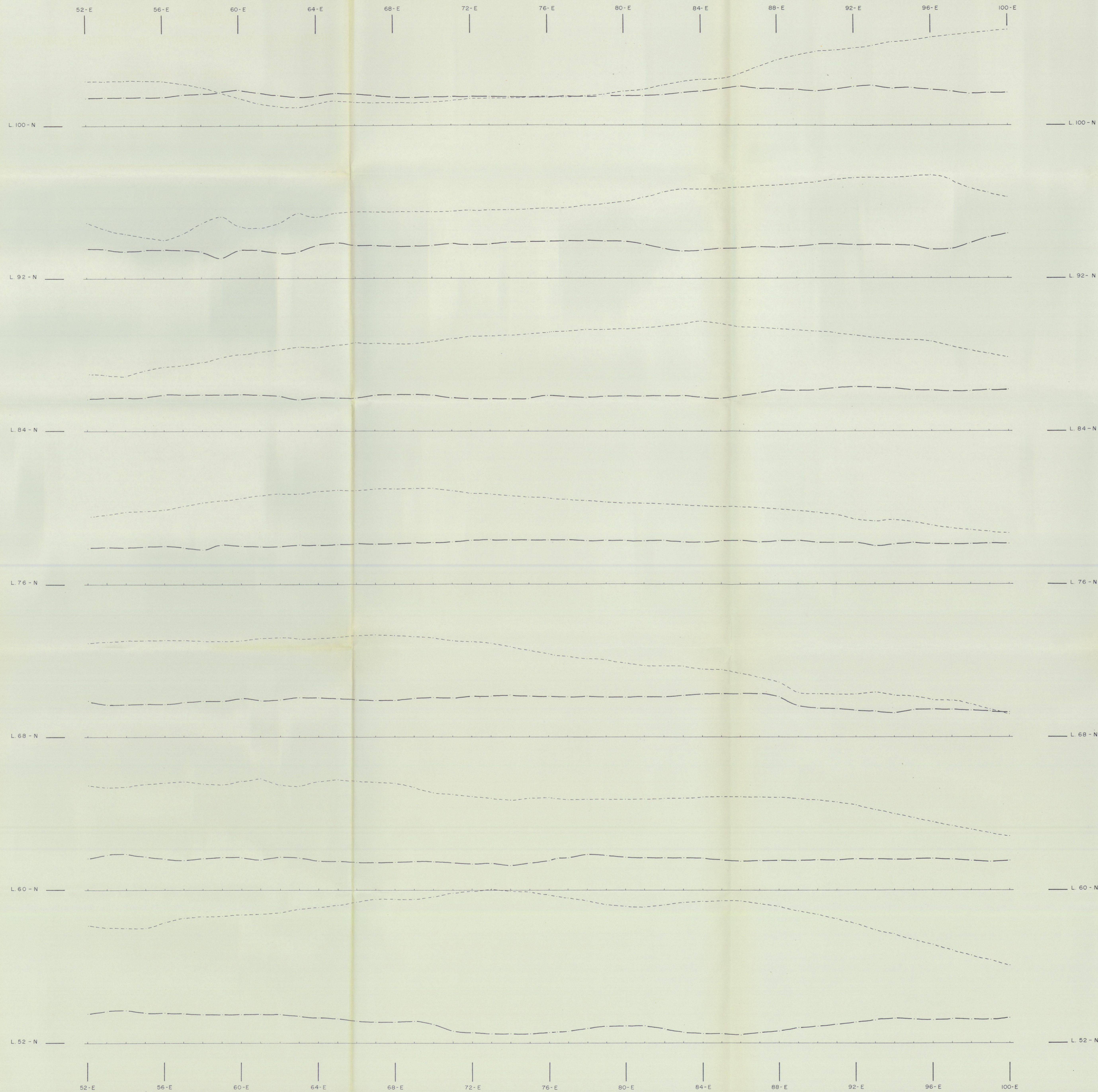
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**PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS**

SCALE 1" = 200 FEET



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PETER E. WALCOTT & ASSOC. LTD.  
 AUGUST - OCTOBER, 1974



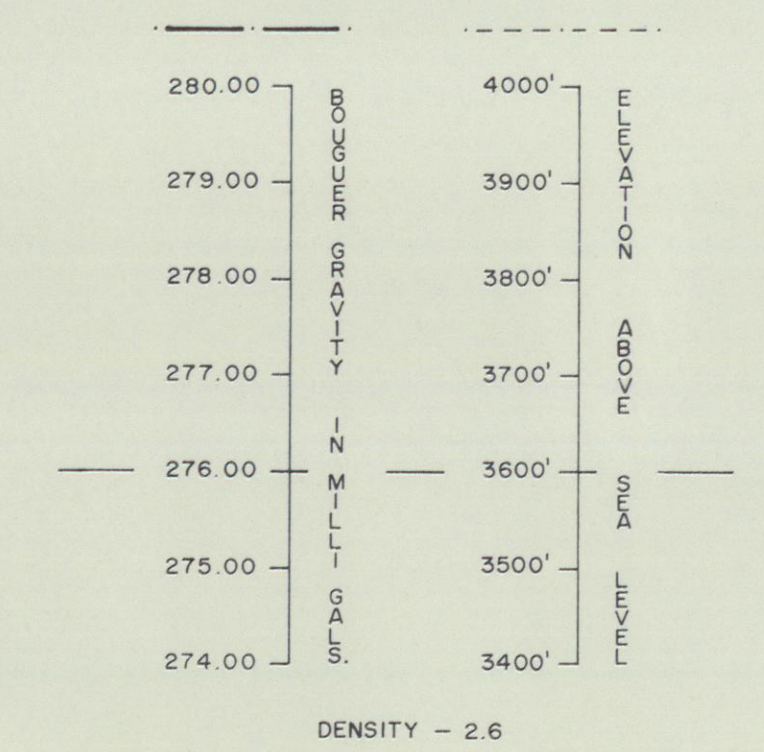
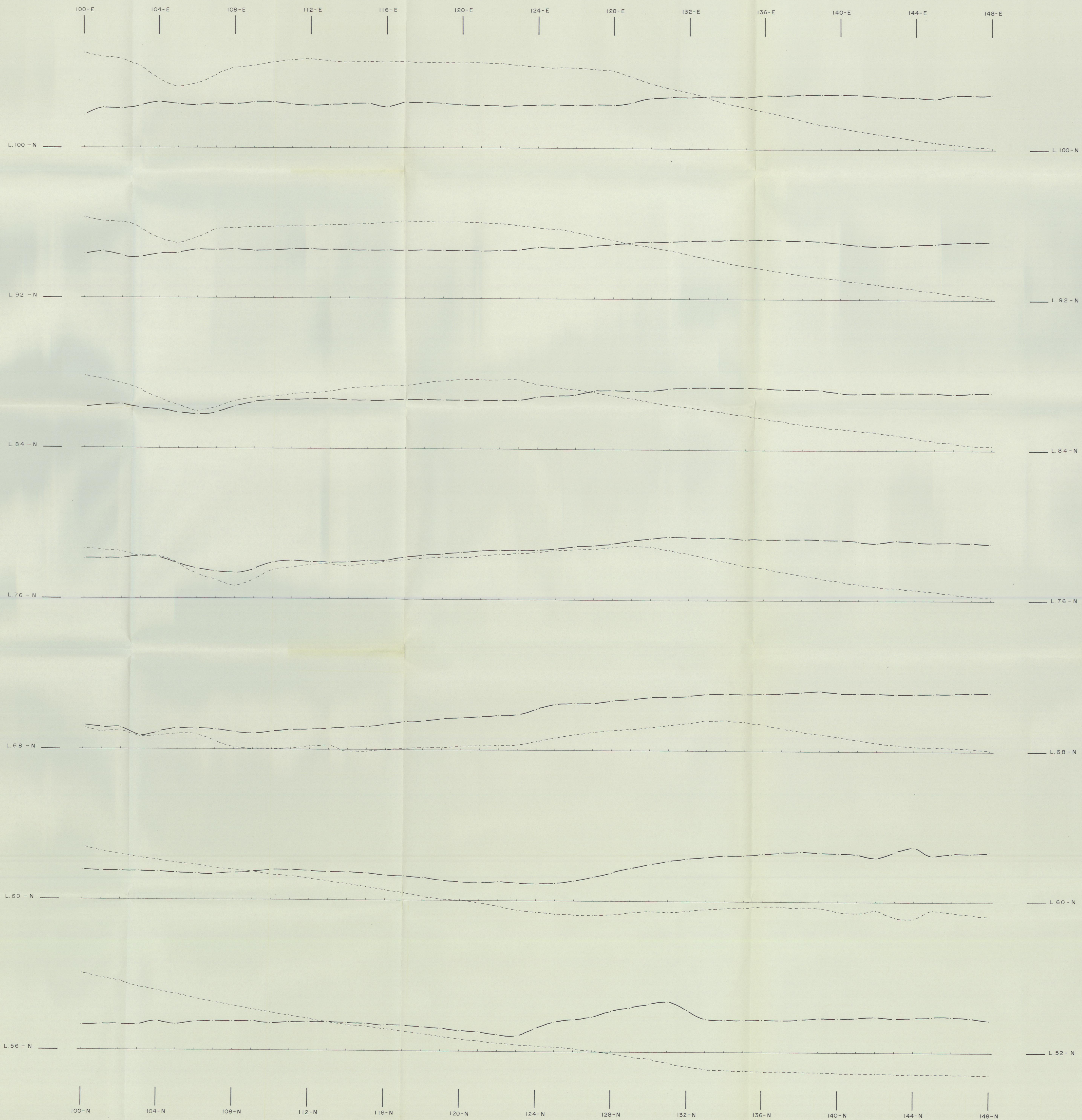
**ARCHER, CATHRO & ASSOC. LTD.**  
 PORKER CLAIMS, HULSE (QUARTZ) LAKE AREA, WATSON LAKE M.D., YUKON

**GRAVITY SURVEY**  
 PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE 1" = 200 FEET

200 100 0 200 400  
 FEET FEET

MAP No. W-185-5  
 TO ACCOMPANY A REPORT BY **PETER E. WALCOTT & ASSOC. LTD.**  
 DATED - DECEMBER, 1974 AUGUST - OCTOBER, 1974



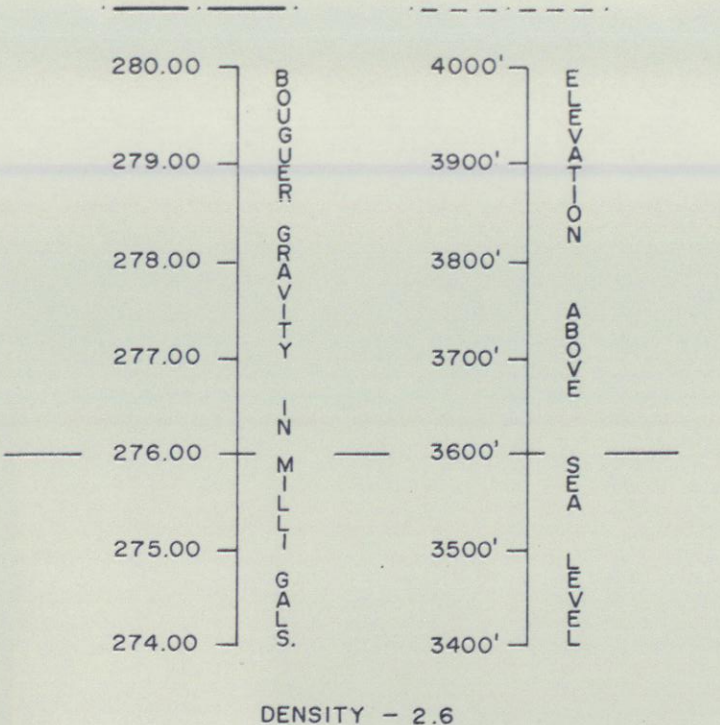
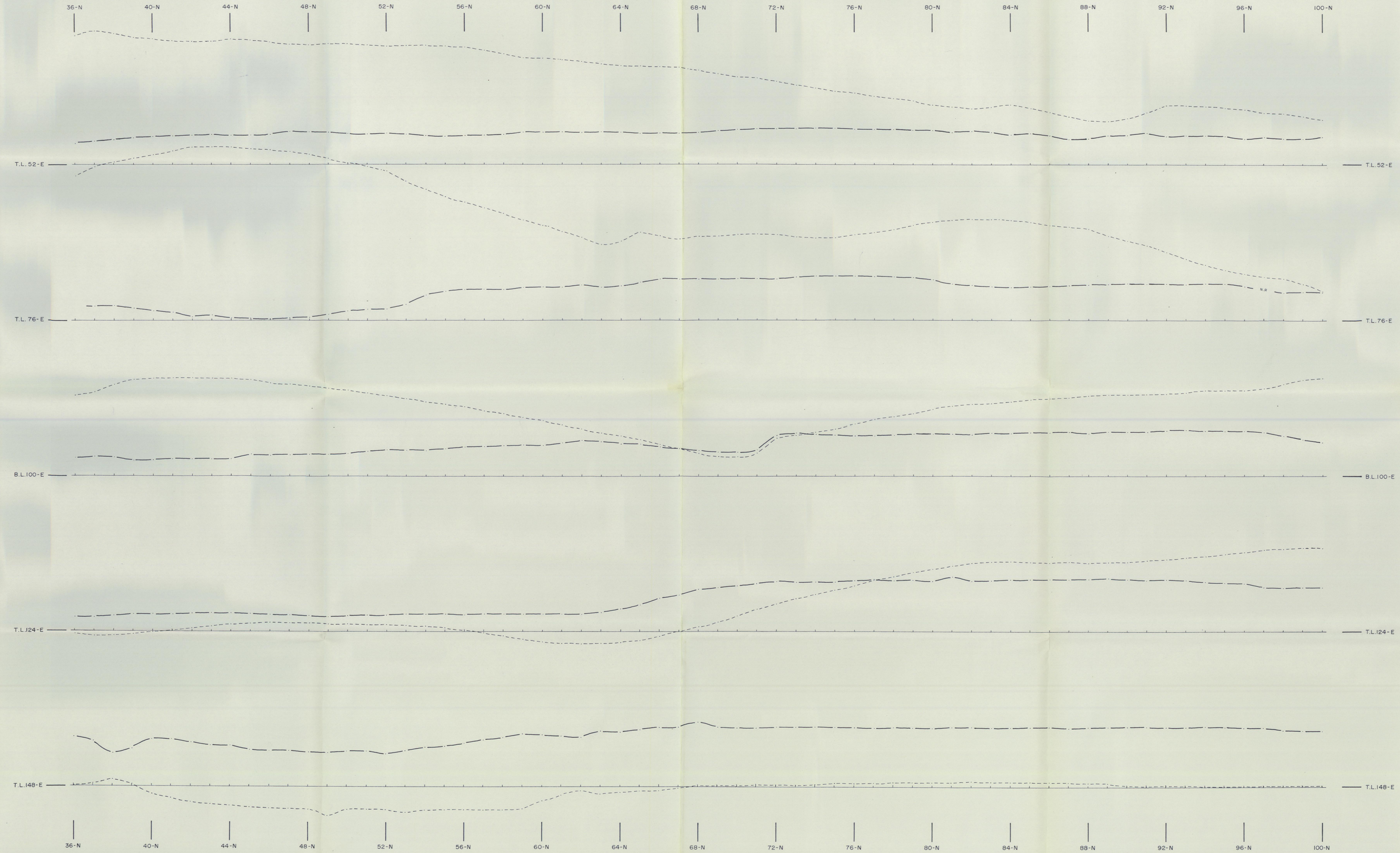
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 PORKER CLAIMS ; HULSE (QUARTZ) LAKE AREA ; WATSON LAKE M.D., YUKON

**GRAVITY SURVEY**  
 PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE 1" = 200 FEET

MAP No. W-185-6  
 TO ACCOMPANY A REPORT BY  
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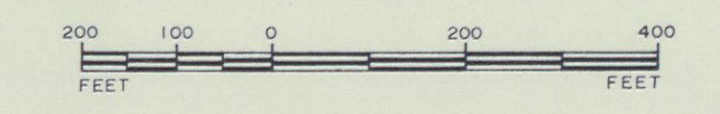
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 AUGUST - OCTOBER, 1974



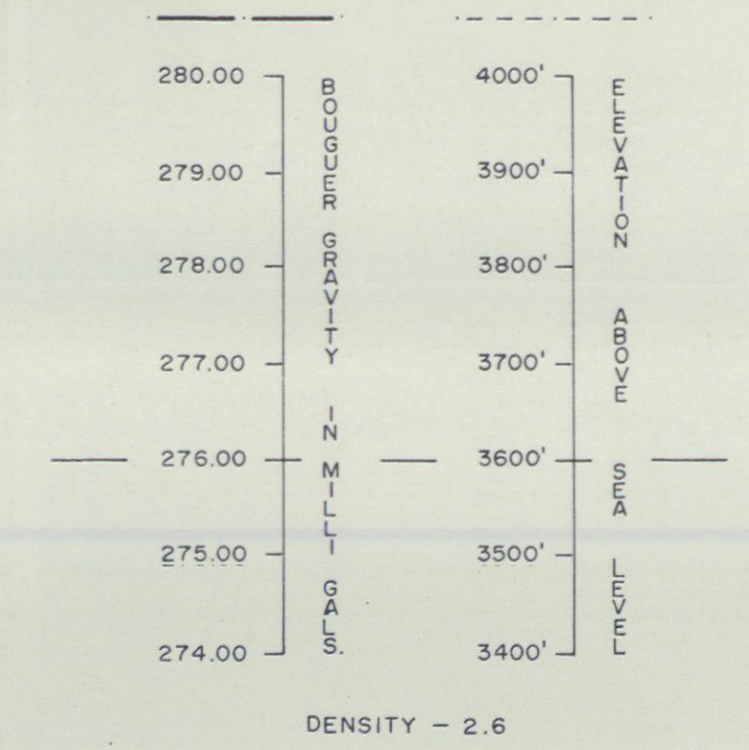
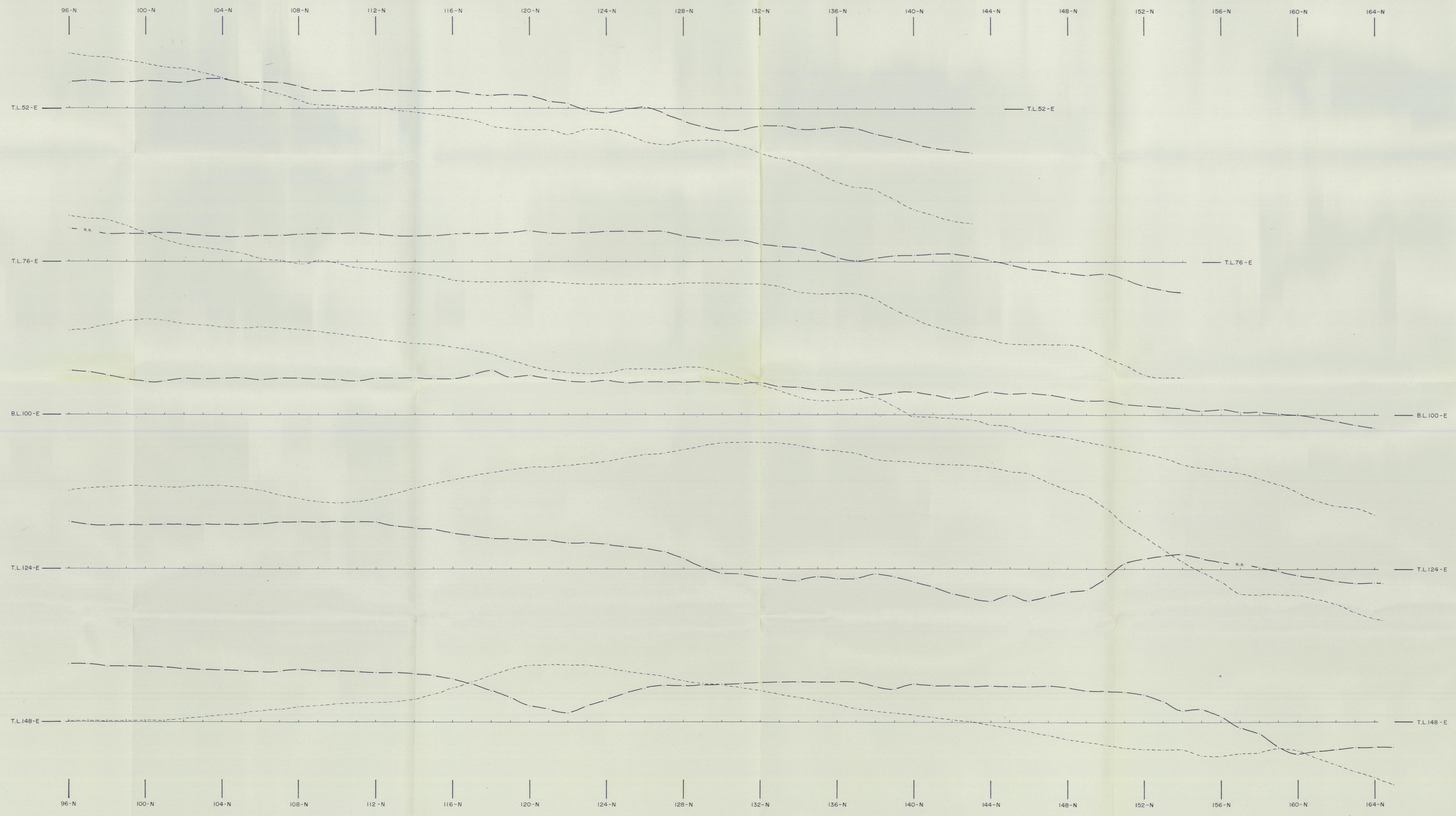
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 PORKER CLAIMS ; HULSE (QUARTZ) LAKE AREA ; WATSON LAKE M.D. ,YUKON

**GRAVITY SURVEY**  
 PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE 1" = 200 FEET



MAP No. W-185-7  
 TO ACCOMPANY A REPORT BY **PETER E. WALCOTT & ASSOC. LTD.**  
 DATED - DECEMBER , 1974  
 AUGUST - OCTOBER , 1974

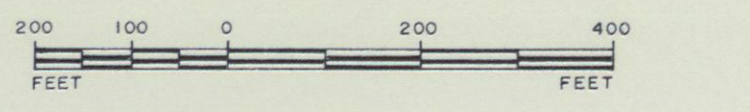


**ARCHER, CATHRO & ASSOC. LTD.**

PORKER CLAIMS ; HULSE (QUARTZ) LAKE AREA ; WATSON LAKE M.D., YUKON

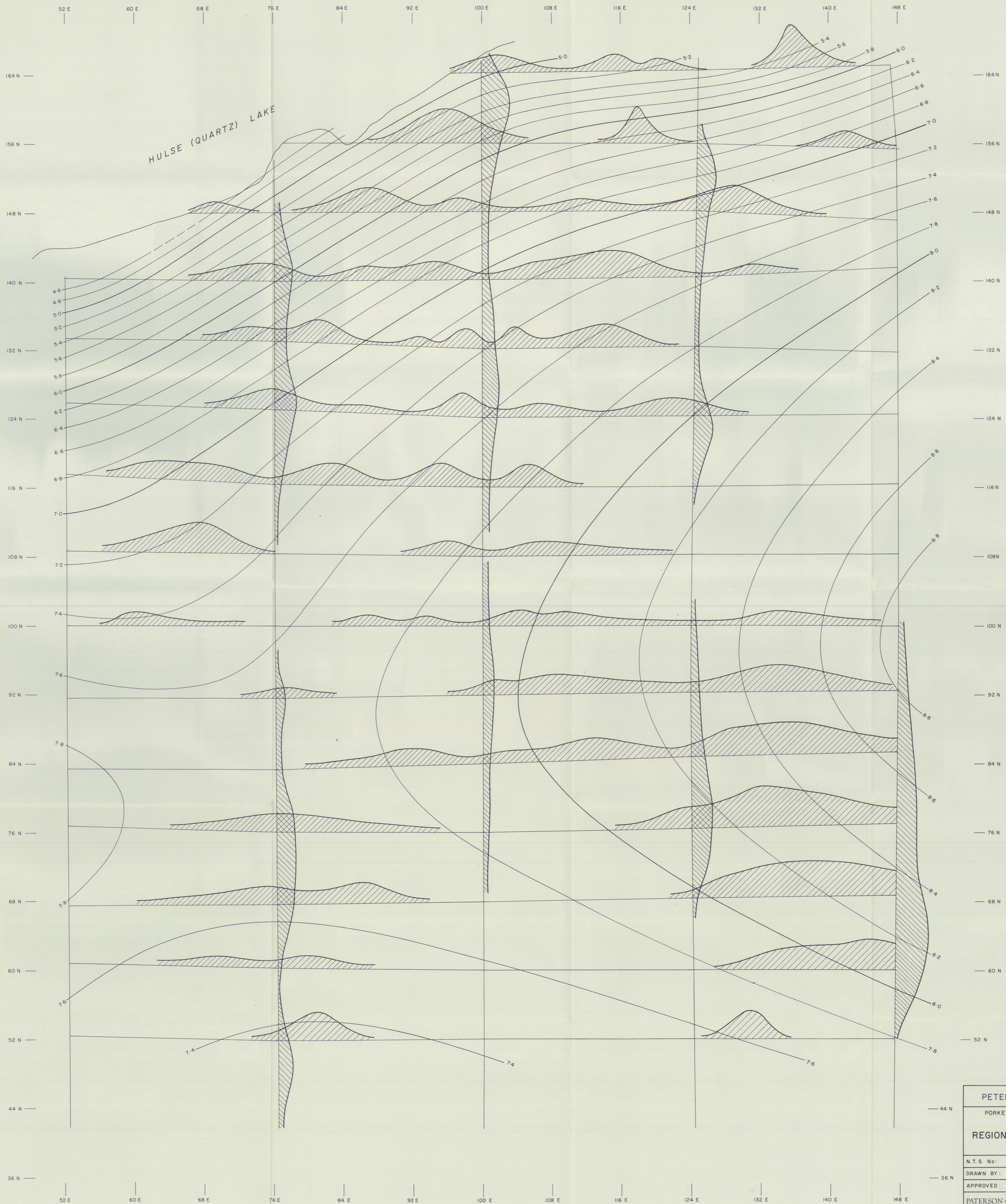
**GRAVITY SURVEY**  
 PROFILES OF BOUGUER GRAVITY & SURFACE ELEVATIONS

SCALE 1" = 200 FEET



MAP No. W-185-8  
 TO ACCOMPANY A REPORT BY  
 DATED - DECEMBER, 1974

PETER E. WALCOTT & ASSOC. LTD.  
 AUGUST - OCTOBER, 1974



Horizontal scale - 1" = 400'  
 Vertical scale - 1" = 1.0 mgal

FIG. 2

PETER E. WALCOTT & ASSOC. LTD.	
PORKER CLAIMS, HULSE (QUARTZ) LAKE AREA WATSON LAKE M.D. YUKON	
REGIONAL AND RESIDUAL GRAVITY	
CONTOUR INTERVAL - 0.2 mgal.	
N.T.S. No:	SCALE: 1" = 400'
DRAWN BY: A.H.	DRAWING No: P-118
APPROVED:	DATE: January 1975
PATERSON GRANT & WATSON LIMITED CONSULTING GEOPHYSICISTS, TORONTO, CANADA	

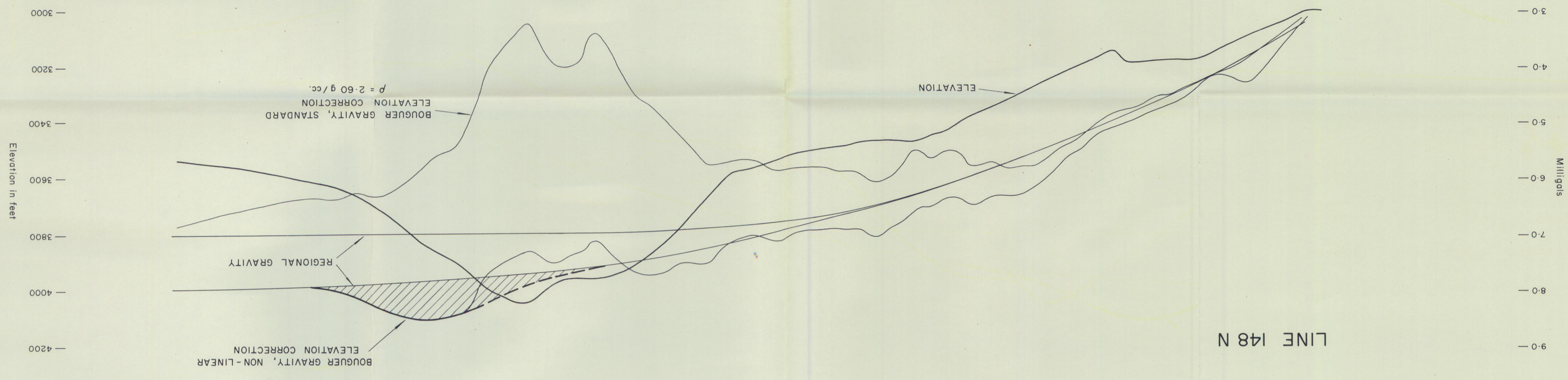
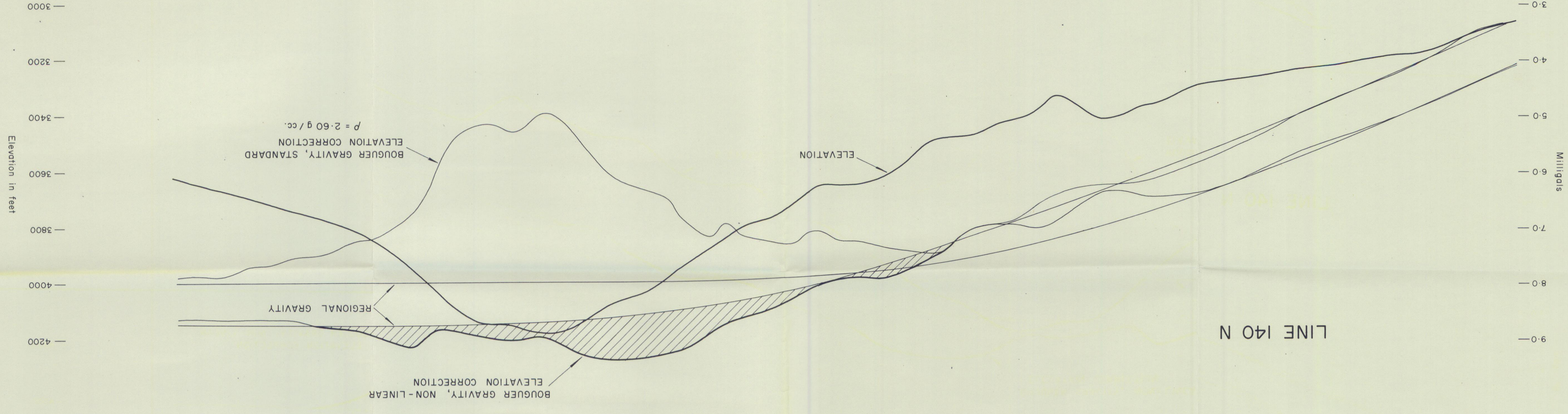
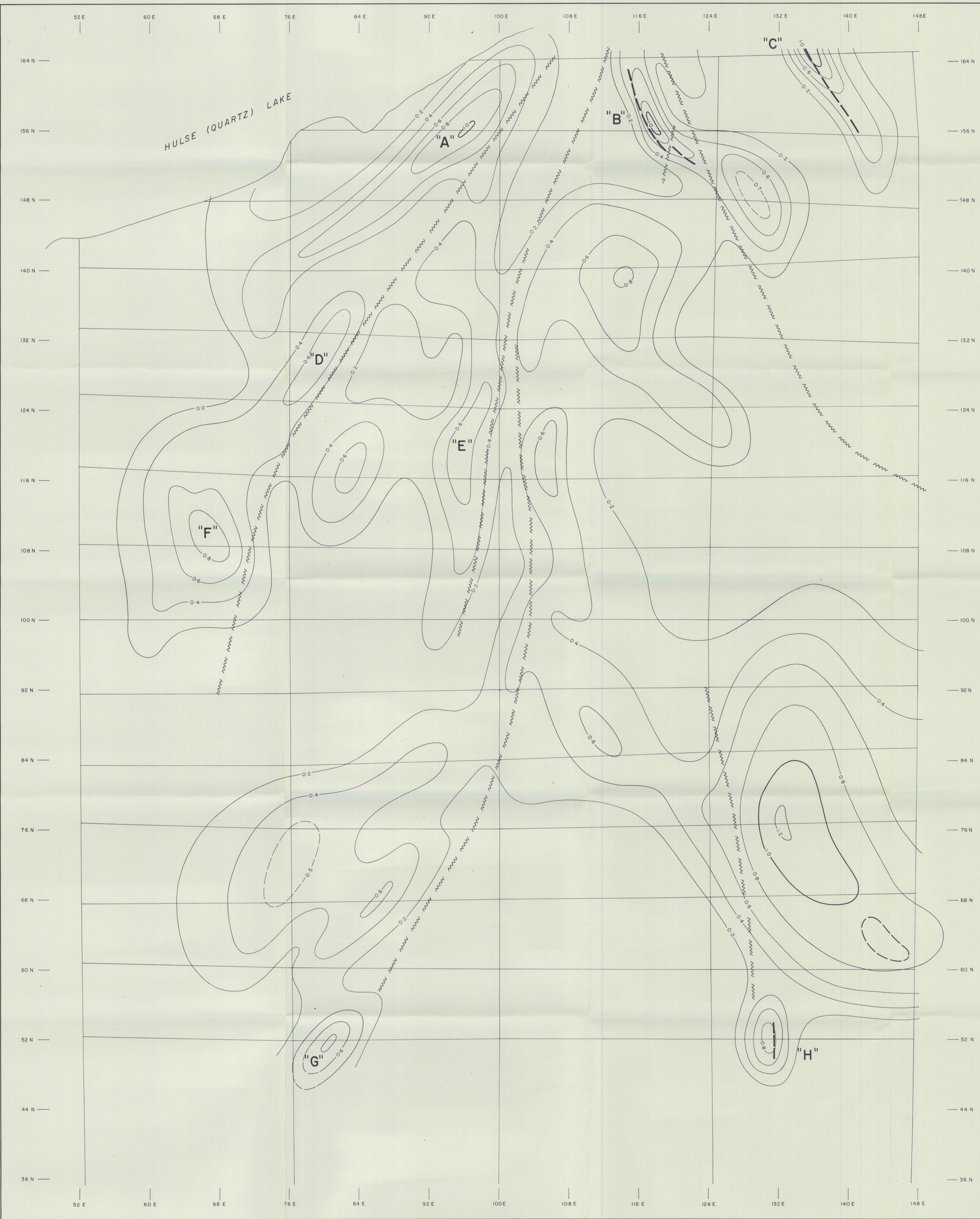


FIG. 1.



LEGEND

- Possible fault or contact
- Trace of anomalous mass (approximate)

FIG. 3

<b>PETER. E. WALCOTT &amp; ASSOC. LTD.</b>	
PORKER CLAIMS, HULSE (QUARTZ) LAKE AREA WATSON LAKE M.D. YUKON	
<b>RESIDUAL GRAVITY</b>	
CONTOUR INTERVAL - 0.2 mgal.	
N.T.S. No:	SCALE: 1" = 400'
DRAWN BY: A.H.	DRAWING No: P-118
APPROVED:	DATE: January 1975
PATERSON GRANT & WATSON LIMITED CONSULTING GEOPHYSICISTS, TORONTO, CANADA	