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AN EVALUATION
OF THE
'B' ZONE GOLD DEPOSIT
DISTRICT OF KEEWATIN, N.W.T.

January 1980

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INTRODUCTION

This report deals with the evaluation of the 'B' Zone gold property, in the Northwest Territories. The report describes the exploration work done to date, the proposed programme of development for 1980 and the production possibilities for the property, including cash flow projections at various gold prices.

SUMMARY AND RECOMMENDATIONS

Prospection Limited has examined all the available data covering the 'B' Zone gold occurrence, including diamond drill records, geological information, underground investigations and metallurgical testing, all of which are covered in this report.

In the opinion of Prospection Limited the 'B' Zone has the potential as a profitable producer having an overall "break even" at about U.S.$200.00 per ounce of gold and a cash flow before taxes and financing cost of Can.$73 million in terms of gold at U.S.$500.00 per ounce.

Prospection recommends that the 'B' Zone be pursued vigorously with the aim of starting production as soon as possible. Prudence, however, mandates that before a production decision is taken the orebody be investigated underground by crosscutting and drifting to corroborate diamond drilling results.

Prospection's estimated cost of the underground investigations, presently scheduled for the period May through November 1980, is Can.$3,000,000. It may be possible to reach a production decision earlier than November 1980 but in any event the develop-

ment work should be completed as planned in order to develop ore for production.

Barring any unforseen problems the 'B' Zone is tentatively scheduled to start production in late 1981 at an additional capital outlay of $13,000,000.

CONCLUSIONS

The estimated cut and dilute gold ore reserves at the 'B' Zone are:

Drill indicated	-	185,000 tons @ 0.74 oz./ton Au
Geologically inferred	-	115,000 tons @ 0.74 oz./ton Au

These ore reserves occur within a strike length of 650 ft. to a maximum depth of 400 ft. beneath the surface and have an average true width of 12.6 ft.

About 87% of the indicated ore averages a true width of 19.6 ft. and this coupled with an average dip of about 50° and expected good ground conditions should result in favourable mining recoveries and costs.

Metallurgical tests indicate that the gold is free milling and that final recoveries of 90% should be easily attainable with normal cyanidation and "carbon in pulp" recovery.

Considering the location it is proposed to mine and mill the ore on an 8 month per year basis to avoid winter. The orebody is considered suitable to sustain a 200 ton per day production rate, resulting in 44,000 tons of ore as mill feed per year and a yearly output of 30,000 ozs. of gold.

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The following estimated expenditures would be required to put the 'B' Zone mine into production:

1980 Programme	$ 3,000,000
Mining	2,000,000
Milling	4,800,000
Plant & Admin.	2,800,000
Engineering, Supervision & Contingencies	3,400,000
	$16,000,000

It is estimated that the operating costs will be:

Mine	$32.00 per ton
Milling	$35.00 per ton
Other	$32.00 per ton
Total	$99.00 per ton

resulting in a yearly expenditure of $4,360,000. Provision for an additional $2,000,000 to cover extraordinary expenses during the start-up period has been provided in the cash flow estimates.

Based on the foregoing the cumulative cash flow over the 8.6 years estimated life of the mine, before taxes, is as follows:

Gold Price	Cash Flow
U.S.$450	Can.$61,150,000
U.S.$500	" $73,410,000
U.S.$550	" $85,350,000
U.S.$600	" $97,370,000

CASH FLOW ESTIMATES

(in millions 1980 Canadian Dollars
before tax and financing considerations)

	1980	1981	1982-87	1988
Gold @ U.S.$450				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.00	15.95	9.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(8.00)	11.59	6.61
Total Cash Flow - Can.$	61.15			
Gold @ U.S.$500				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.40	17.76	10.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(7.60)	13.40	7.61
Total Cash Flow - Can.$	73.41			
Gold @ U.S.$550				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.90	19.50	11.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(7.10)	15.14	8.61
Total Cash Flow - Can.$	85.35			
Gold @ U.S.$600 (Jan.9, 1980)				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	5.30	21.27	12.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(6.70)	16.91	9.61
Total Cash Flow - Can.$	97.37			

"Break even" point after all costs U.S.$200.00 per oz. Au

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LOCATION

The property is located in the southern part of the District of Keewatin in the Northwest Territories.

As shown on the location map overleaf, the 'B' Zone is 240 km. west of Eskimo Point and 400 km. northwest of Churchill both on Hudson Bay and 500 km. from Lynn Lake, Manitoba.

PROPERTY AND OWNERSHIP

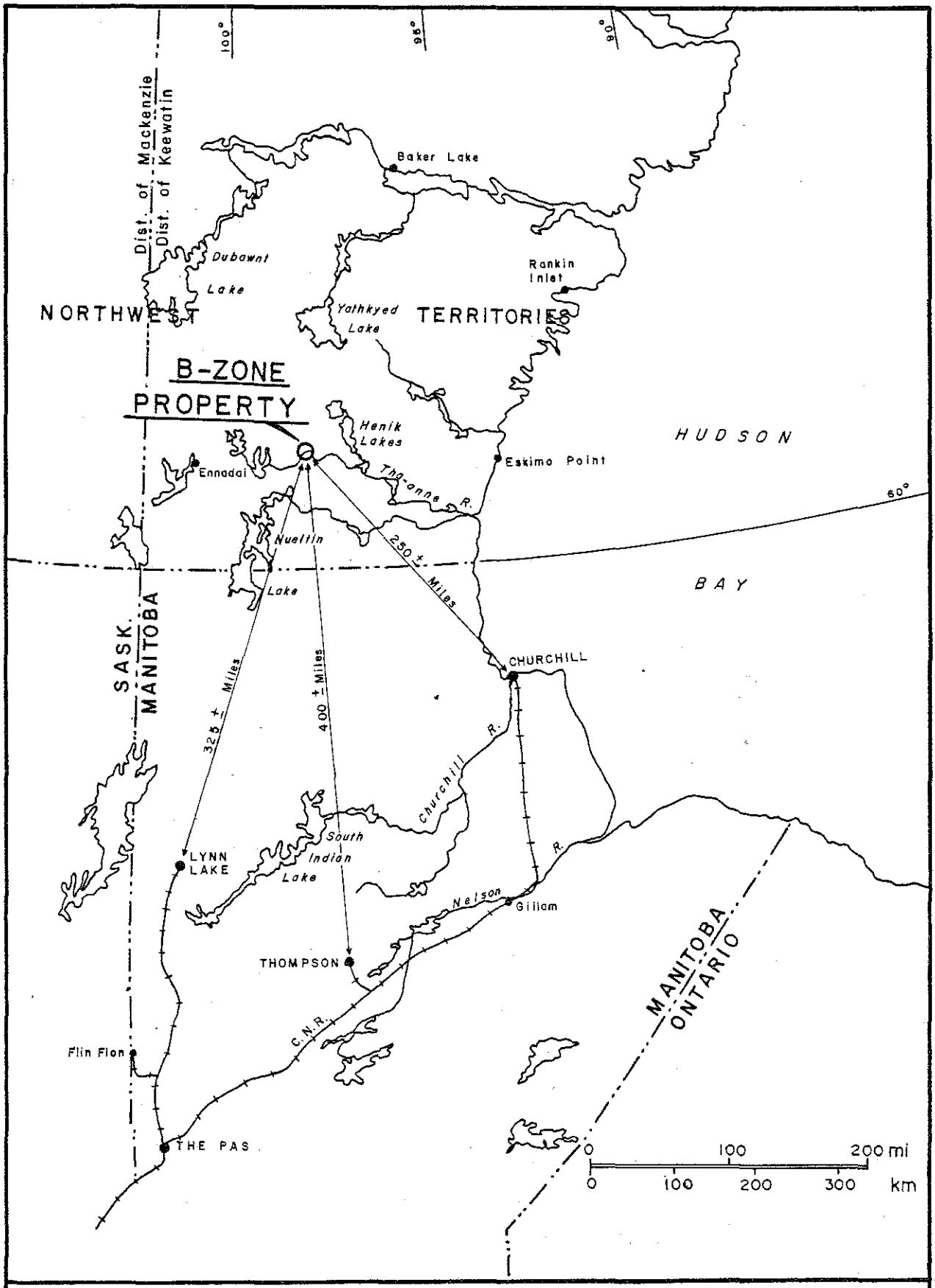
The claims on which the 'B' Zone is located are shown on the map overleaf. The ground held covers the possible extensions of the mineralized zone, the airport and camps at Cullaton Lake and the Kognak River.

The claims of interest covering the 'B' Zone are registered as AIR 1-12, DWE 1-17 and GILT 1-15, GILT 17-22 and GILT 25-29.

Ownership at present is as follows:

O'Brien Energy and Resources Ltd.	44.0%
Consolidated Durham Mines Ltd.	35.4%
Royex-Sturgex Mining Ltd.	18.0%
Selco Explorations Co. Ltd.	2.6%

Under agreement, Royex-Sturgex can be abated by expenditures on the property by O'Brien (and Consolidated Durham Mines Ltd.) to a 10% interest. In addition, Selco holdings also can be abated to what can result in an 89% holding by O'Brien (and Consolidated Durham).



B-ZONE, CULLATON LAKE
DISTRICT OF KEEWATIN, N.W.T.

LOCATION

An agreement between O'Brien Energy and Resources Ltd. and Consolidated Durham Mines Ltd., provides for equal participation in the 'B' Zone after an additional expenditure by Consolidated Durham of $243,156 as of January 1, 1980.

ACCESS

The property can be reached by air, having a 4,000 ft. airstrip suitable for Hercules aircraft and a lake 1,000 ft. from the airstrip capable of handling any type of float plane. A 2-mile road connects the airport to the mine site and camp.

Staging areas for aircraft are Churchill, Thompson and Lynn Lake, all in northern Manitoba. Each is serviced by regular scheduled air service, road and rail.

Investigations were made by experienced transport contractors who proposed winter transport overland at approximately 40% of Hercules air transport costs due to the favourable terrain for trucking between Churchill and the mine site.

HISTORY

The 'B' Zone was discovered by prospectors for Selco Exploration Company Limited in 1961. Development of the discovery by trenching, drilling and geophysical work followed from 1962 to 1964 in a programme involving expenditures of approximately $1 million.

Selco considered an underground programme but this was reportedly deferred due to the low price of gold at the time.

The title of the property was permitted to lapse, at which time it was re-staked and optioned to O'Brien Gold Mines Ltd.

O'Brien commissioned geological studies of the property and developed additional ore with a diamond drilling programme in 1973. Development of underground ore was started in 1975 with a ramp driven to a depth of 50 ft. below surface.

TOPOGRAPHY

The local terrain is generally flat, moss covered, with scarce vegetation and broken by occasional rounded outcrops of rocks or small lakes and rivers. As the property is located at the tree limit there are occasional groups of small trees found in sheltered areas.

Permafrost underlies the area to a depth which has not been established.

The climate is typical of the region with relatively low precipitation, especially in the summer months and temperatures which are mild in the summer and extremely cold in the winter. The Kognak River flows approximately 5,000 ft. to the south of the 'B' Zone through rapids with a sufficiently large volume to suggest that a low head hydraulic turbine may be used in the summer months to generate electricity.

There is little wild life in the area. However, some Caribou have been noticed on the north-south migration.

There is no local Eskimo population in the immediate area. However, a source of local labour may be available from settlements on the east coast of Hudson Bay.

FACILITIES ON SITE

At present the 'B' Zone is serviced by a 4,000 ft. gravel airstrip suitable for Hercules aircraft and a 2-mile road which connects it to the mine site.

At the mine site there is a camp (ATCO), approximately 1,000 ft. from the mine portal, suitable for year-round habitation by approximately 25 men. Adjoining the camp is a large ATCO fold-away building equipped with shop facilities, the main 400 kilowatt Caterpillar generator and two 900 cubic feet per minute Atlas Copco compressors. The building is also suitable for the winter storage of all mine equipment.

The mine equipment on site consists principally of two scooptrams of 2 cubic yard capacities and a 3-boom Jumbo drill. There is also some miscellaneous equipment, including two tractors and a Bombardier snow cat.

In addition to the principal camp there are two other smaller camps, one at Cullaton Lake, close to the airstrip and suitable for 10 men, and another larger one at the Kognak River to the south.

At present there is an 80,000 gallon capacity tank farm for fuel at the airport (with approximately 25,000 gallons of diesel fuel in storage) and an inventory of pipe, spare parts, drill steel, oils, etc., available in storage.

GEOLOGY

Regional[1]

The property lies within the Churchill Structural Province of the Canadian Shield in what is termed the Kaminak Sub-province, comprising a Precambrian aged greenstone belt which extends from the Saskatchewan border to Rankin Inlet. The oldest rock units are intercalated volcanic and sedimentary formations of Archean age belonging to the Henik Group. Within the ancient clastics of this succession there are iron formations, one of which includes the 'B' Zone deposit.

An intrusive event occurred later in the Archean bringing forth magmatic granites and granodiorites. This event metamorphosed the Henik Group rocks to various degrees.

The Montgomery Lake Group consists of Aphebian conglomerate, quartzite and siltstone and unconformably overlies the older Henik Group rocks. The Hurwitz Group which unconformably overlies the Montgomery Lake Group is composed of conglomerate, orthoquartzite, slate, shale, argillite, dolomite, greywacke, arkose and impure quartzite. This clastic unit is intruded by gabbro sills.

A later intrusive introduced additional granites along with gabbro and diabase dykes.

Regional metamorphism is commonly of low to medium grade. Near some plutons there is evidence of contact metamorphism.

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[1] Based on material taken from reports by C. E. Page (Nov.1976).

Local Geology[2]

The Archean rocks, including the mafic lavas together with greywacke, tuff, argillite and iron formations are part of a regional basin structure with a N.N.E. axis. This is exemplified from the attitudes of the volcanic rocks in the area located north of Griffin Lake, 10 miles to the west of the property.

A rather broad 6 to 12 mile assemblage of clastic sediments, flanking the volcanic pile north of Griffin Lake on the east, has a general N.N.W. strike with dips to the west.

Relatively narrow bands of pillow lava have been encountered in this clastic assemblage which hosts the 'B' Zone deposit. These bands display good pillows indicating formational tops to the west.

The bulk of the clastic sediments is composed of greywacke and argillite. Detailed studies of these units, in the vicinity of the 'B' Zone, indicate that they combine to form turbitide sequences deposited by turbidity currents.

Graded bedding and load structures from the turbitide sequences indicate formational tops to the west.

This assemblage, consisting of turbitides, pillow lavas and iron formations, is compatible to a subaqueous regeosynclinal environment.

The volcanic and clastic units of the Henik Group are flanked by younger Aphebian aged rocks of the Hurwitz Group. The Hurwitz Group in the area is dominantly composed of orthoquartzite,

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[2] C. E. Page (Dec.1979).

slate, shale, dolomite, greywacke, and impure quartzite. The extreme competence of the orthoquartzite accounts for much of the faulting in the area.

Two periods of folding and extensive faulting are recognized in the younger Aphebian sediments. The main fold axis represented by anticlinal and synclinal structures in the Cullaton Lake and Griffin Lake basins has an apparent trend of N.66°W.

The general conformity, in part, of the Archaen rocks to the Cullaton and Griffin Lake basin structures indicates that the older Archaen basin has been modified by the later folding.

The post-Proterozoic tectonic period (Hudsonian orogeny) represents the most extensive period of structural deformation the area has undergone. The N.50°E. attitude of foliation apparent in every rock type in the area is a reflection of this period of deformation.

The Deposit(1)

The 'B' Zone deposit, District of Keewatin, Northwest Territories, consists of gold occurring with sulphides in an Archean iron formation.

The banded iron formation is made up principally of four distinct mineralogical facies, carbonate, oxide, sulphide and silicate, hosted by a thick volcaniclastic sedimentary assemblage. The gold is confined to the strata-bound sulphide facies with an average cut and dilute grade of 0.74 oz. Au/ton. Gold mineralization has a direct affinity with the pyrite and pyrrhotite units of the sulphide facies and it is suggested that the gold,

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(1)Report by C. E. Page (Nov.1976).

sulphides, volcanics and iron formation all result from the same volcanic genesis. The petrographic and structural evidence to date indicates that the gold and sulphides are pre-metamorphic and pre-deformation in age. Re-mobilization and concentration of the gold within the sulphide facies occurred during tectonic activity which introduced barren quartz veins and veinlets to the iron formation.

Gold Mineralization

Information obtained from surface and underground diamond drilling and from the decline indicates that the gold is associated principally with sulphide mineralization. Mineralization strikes generally north-south for 500 ft. and dips between 33° and 57° to the west, to a drilled depth of 400 ft.

The principal area of gold mineralization is found in what seems to be a roll in the iron formation which in turn has given the vein an arcuate shape on strike and possibly created the environment for gold deposition.

The vein seems to be divided into two principal areas which partially overlap. One outcrops at surface to the north and west and the other starts downward from a depth of 200 ft. and is located more to the southeast. There is a strong indication that both zones were one vein but displaced horizontally by a fault.

EXPLORATION TO-DATE

To-date the 'B' Zone has been investigated by surface trenching, 68 surface diamond drill holes (40,000 ft.), a 348.5

ft. decline down to 50 ft. beneath surface, twenty-five 40-ft. flat diamond drill holes drilled from the decline and a number of underground channel samples.

Surface trenching on the outcrop which now lies over the portal of the decline originally indicated mineralization at the 'B' Zone.

Out of the total 68 surface diamond drill holes, 39 were drilled by Selco Exploration Co. and 29 by O'Brien, for a total of 40,000 ft. Twenty-four of these holes intersected ore grade gold mineralization (i.e. minimum grade of 0.25 oz. per ton over 4 ft.). Half of those 24 holes were drilled by each company and the arithmetic average assay of intersections by each company differed by only 2% from each other.

It is significant that the O'Brien 1973 holes, which were drilled as "fill ins", corroborated the results of the Selco programme of 10 years earlier.

In 1975 a decline with dimensions 9 x 15 was driven from south to north intersecting the gold vein in the brow above the portal. The decline was continued a further 270 ft. to a vertical depth of 50 ft. beneath the surface. The ramp is mostly below the footwall of the vein but it intersects it at depth in the last five rounds.

The decline was chip and channel sampled on the face and walls after each round and carefully mapped.

In 1977 an underground diamond drill programme of 25 holes with a total length of 962 feet was conducted proving the

continuity of the vein from the portal to the bottom of the ramp and corroborating earlier surface diamond drilling information.

Since 1977 the property has been on a standby basis maintained in good shape with the decline kept dry.

In addition to the 'B' Zone, several interesting showings have undergone preliminary work in the immediate area which warrant further investigation.

ORE RESERVES

Summary

Reserves developed to date are principally in the form of drill indicated ore blocked out by surface diamond drilling. A lesser tonnage of inferred ore of lower grade has been developed by the decline and by underground diamond drilling from it.

These two types of reserves have been treated separately in this report as the ore blocked out by surface drilling will be extracted by underground methods whereas the ore blocked out by the decline will probably be mined by an open pit.

Underground Ore Reserves - Drill Indicated
Cut & diluted: 185,000 tons @ 0.74 oz./ton Au

Underground and Open Pit Ore Reserves - Inferred
Cut & diluted: 115,000 tons @ 0.74 oz./ton Au

Detailed development of these ore reserves is presented as follows.

Underground Ore Reserves - Drill Indicated

Underground ore reserves are based on information derived from 24 diamond drill holes (BQ) and the vertical extension to surface has been corroborated with information obtained from the decline.

The drilling in effect blocks out the ore in the equivalent of a 75 ft. x 75 ft. pattern which affords ample detail to be able to qualify the ore as "indicated".

The measurement of the reserves for this report has been done by "areas of influence"; that is, the veins have been projected on to one plane and the influence of each hole has been assigned by taking its boundary halfway to the adjacent holes, (see Appendix Drawings 1 and 2). The areas thus derived multiplied by the calculated true width of the corresponding diamond drill hole intersection result in the volume assigned to the drill hole.

The method used by Prospection resulted in an almost identical tonnage to an independent ore estimate performed using sections.

Although the host mineralization is sulphide in iron formation, a conservative 11 cubic feet per ton was used as the tonnage factor in lieu of actual measured specific gravity of ore.

Calculation of the reserves in the two deposit zones is shown on pages 16 and 17 following.

Ore Reserves - Eastern Zone
(Drill Indicated)

Block	Grade Oz./Ton	True Width ft.	Area sq.ft.	Volume cu.ft.	Volume x Grade	Cut Grade	Volume x Cut Grade	Hole Number
Q	0.54	9.4	7,280	68,432	36,953	0.54	36,953	240 25W
R	0.54	3.0	6,840	20,520	11,081	0.54	11,081	33
S	1.75	41.6	5,000	208,000	364,000	1.41	293,280	240 40W
T	0.84	10.4	6,100	63,440	53,290	0.84	53,290	34
V	2.11	4.0	7,100	28,400	59,924	1.41	40,044	2
W	0.81	10.0	10,180	101,800	82,458	0.81	82,458	250 25W
X	0.56	2.4	5,750	13,800	7,728	0.56	7,728	250 40W
Y	2.80	20.7	5,170	107,019	299,653	1.41	150,897	23
Z	0.46	3.6	5,700	20,520	9,439	0.46	9,439	265 40W
	1.46	10.6	59,120	631,931	924,526	1.08	685,170	

or 57,450 Tons

Dilute grade: 0.91 oz. gold per ton

Dilute tonnage: 68,300 tons

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Ore Reserves - Western Zone
(Drill Indicated)

Block	Grade oz./Ton	True Width ft.	Area sq.ft.	Volume cu.ft.	Volume x Grade	Cut Grade	Volume x Cut Grade	Hole Number
B	0.51	8.0	7,000	56,000	56,000	0.51	28,560	3
C	0.74	18.0	7,000	126,000	91,980	0.73	91,980	20
D	0.45	6.0	5,560	33,360	15,012	0.45	15,012	265 15W
E	0.82	4.0	3,000	13,200	10,824	0.82	10,824	30
F	0.48	2.7	2,450	6,615	3,175	0.48	3,175	280 10W
G	0.38	3.4	3,770	12,818	4,870	0.38	4,870	280 5E
H	0.56	22.0	6,780	149,160	83,530	0.56	83,530	16
I	1.01	4.0	6,530	26,120	26,381	0.94	24,553	32
J	3.08	6.0	6,090	36,540	112,543	0.94	34,348	275 25W
K	0.78	2.0	3,680	7,360	5,740	0.78	5,740	29
L	0.56	29.5	5,650	166,675	93,338	0.56	93,338	265 25W
M	0.84	11.3	6,600	74,580	62,647	0.84	62,647	19
N	0.87	40.5	6,190	250,695	218,105	0.87	218,105	26
O	2.28	28.8	4,280	123,264	281,042	0.94	115,868	280 40W
P	0.59	6.5	5,920	38,480	22,703	0.59	22,703	275 40W
	0.94	13.8	80,800	1,120,867	1,060,450	0.73	815,253	

or 101,897 Tons

Dilute grade: 0.64 oz. gold per ton

Dilute tonnage: 116,600 tons

Cut-off Grade

A grade of 0.25 oz. per ton over an average minimum core length of 4 ft. was used at the cut-off grade in estimating the ore reserves for underground mining.

Treatment of Erratics

Sound practice in gold reserve estimations dictates the consideration of erratics. In most mines, however, the local experience influences the treatment but at the 'B' Zone there is no gold mining within 500 miles. Therefore any treatment, such as cutting to "so many" ounces per ton, would be purely arbitrary.

In calculating the reserves, 142 individual assays of drill hole intercepts were used and the distribution of these is as follows:

Grade in oz./ton	Number	% Distribution
0 to 0.49	44	31.0
0.50 to 0.99	33	23.2
1.00 to 1.49	19	13.4
1.50 to 1.99	12	8.5
2.00 to 2.49	14	9.8
2.50 to 3.19	12	8.5
3.20 to 4.60	5	3.5
6.06	1	0.7
6.30	1	0.7
7.90	1	0.7
	142	100.0%

The distribution indicates that there may be erratics in ranges above 3.20 oz./ton. It is however noteworthy that almost all the assays above 3.20 oz. were taken from wider

intersections, which would indicate a trend involving high assays rather than isolated occurrences.

Considering the nature of the ore and the distribution of assays discussed above, Prospection has considered it prudent to treat possible erratics by cutting blocks rather than individual assays. The resulting effect is similar to cutting to 1 oz. per ton (this was confirmed by separate calculations). The method used is outlined as follows.

The ore zones were divided into two separate zones and the method of averaging/re-averaging was employed to compensate for erratics. That is, the average grade of each separate zone was calculated using uncut grades and subsequently the grade of each block within the zone was reduced to the average of the zone.

The resulting cut (undilute) grade is as follows:

	Tons (undilute)	Grade oz./ton	Contained oz. of Au
Uncut	159,000	1.13	179,670
Cut	159,000	0.86	136,740

Dilution

Considering the applicable mining methods, it is expected that an overbreak or dilution of 1 ft. on each wall will reduce the grade of the mill feed. This total allowance of 2 ft. reduces the grade and increases the tonnage by 16%, as follows:

	Tons	Grade oz./ton	Contained oz. of Au
Cut - undilute	159,000	0.86	136,740
Cut - dilute	185,000	0.74	136,740

Potential or Geologically Inferred Ore

The foregoing ore reserve estimates make no provision for drill inferred ore reserves or what may otherwise be termed geologically potential ore outside the drilled area.

The tonnage to-date has been outlined in a vein which is "open" at depth, to the south and north, and to surface. A part of this inferred ore is in a position that will make it amenable to open pit mining and has been outlined in the ramp.

If a reasonable extension of the ore is taken 50 ft. beyond the present known limits to the south and north and to depth, using the present ore reserve parameters the tonnage in the 'B' Zone would be expanded by 80,000 tons, exploitable by underground methods.

In addition, the decline has proven the extension of the upper underground reserves to surface. Twenty-five drill holes from the ramp have delineated the arcuate form and have corroborated the width and grade close to surface which had previously been projected from the upper 3 blocks (B, D and F, at 0.49 oz./ton undilute), resulting in an open pit tonnage potential of 35,000 tons.

In summary, in the opinion of Prospection Limited an additional 115,000 tons of inferred ore (with a grade similar to

the drill indicated) may be available but requires additional work to be upgraded into the indicated category.

Ore Widths

It is important to emphasize the influence that wider areas of ore will have upon the mining operation of the 'B' Zone.

About 87% of the indicated ore is located in areas where the vein is 8 ft. or wider, averaging in effect 19.4 ft. (all expressed in true widths), which indicates that stopes will average about 25 ft. horizontally in width permitting full mechanization.

In addition, these wide vein areas should result in a cut and dilute grade about 10% higher than average.

The implication is that the first years of mining should give the lowest mining costs with the attendant higher grades.

EXPLORATION AND DEVELOPMENT - 1980 PROGRAMME

It is the opinion of Prospection Limited that before a production decision is taken the underground ore reserves should be further developed in order to upgrade the indicated ore to the category of proven by confirming continuity and persistence characteristics. As well, further extensions of the ore at depth and along strike should be explored to increase the drill indicated category to the target 300,000 tons.

In the opinion of Prospection Limited, further surface fill-in drilling on the present reserves will not appreciably improve the quality of the reserves. Continuity and persistence can best be tested by crosscutting to and drifting in the ore to corroborate the diamond drilling. On the other hand the extension of the known reserve is best accomplished by diamond drilling. Additionally, some underground detail drilling will be required to guide the development.

For the above reasons Prospection recommends that the decline which was initiated in 1975 should be continued as planned to develop the ore down to 400 ft. beneath the surface. The location of the ramp should be in such a position that maximum use can be made of the workings during production.

Details of the development programme ramp are contained in drawings in a report by William Hill, 1974. The decline would be driven at -20% for approximately 1750 ft. and 1850 ft. of crosscutting and drifting would outline the ore, for a total development footage of 3600 ft.

Provision is made for 10,000 ft. of underground diamond drilling to drill the ore in detail and explore its downward extension. Provision is also made for 5,000 ft. of surface drilling to explore the ore extensions along strike.

The cost of the programme is as follows:

Development		
Contract Labour	$626,000	
Supplies	338,000	$ 964,000
Diamond Drilling		
Contractor: Underground	$150,000	
Surface	150,000	$ 300,000
Administration & Support		
Management Services	$300,000	
Catering Expense	120,000	
Company Personnel	70,000	
Equipment	300,000	
Fuel (purchase)	104,000	
Aircraft Standby (Cessna)	50,000	
Airlift (Hercules)	180,000	
Air Service (DC-3)	130,000	
Travel & Other	210,000	$1,464,000
		$2,728,000
Contingency		273,000
	Total	$3,011,000
	Say	$3,000,000

This programme will have a duration of 7 months, from May through November. May and November will be months of mobilization and demobilization, leaving 5 months of actual exploration and development from June through October.

It is planned that enough information will be obtained by mid-programme (August) to justify a decision for production.

PRODUCTION CONSIDERATIONS

Summary

A decision to proceed to production could be made as early as August 1980. The cash flow estimates are based on this favourable outcome of the 1980 programme. Project planning, engineering and equipment purchasing are scheduled for the latter part of 1980. Pre-production development, plant and mill construction are scheduled for 1981, with full production to be reached by September 30, 1981.

The operating schedule will be based on 3 crews: 2 on site and 1 off site on a rotating basis. For those on site, the work schedule will normally be on a 2 shift basis: two 10 hour shifts in the mine and two 12 hours in the mill, 7 days per week. The crews could be rotated on a 6 week cycle or possibly a 3 week cycle if that is more appropriate.

A payroll of 100 (mine - 40, mill - 30, plant and admin. - 30) is estimated including contractors, with 67 on site and 33 off site at any one time.

Cost estimates are based on 200 tons per day milling capacity and 44,000 tons per year over 8 months, as follows:

Project Capital Costs

		$ x 1000
Mining equipment		1,000
Pre-production development		1,000
Mill Construction		2,400
Mill ancilliary construction		2,400
Power house & equipment		1,000
Camp, office, warehouse		1,000
Freight & general expense		800
		9,600
Engineering & Supervision 20%		1,920
		11,520
Contingency 15%		1,728
	Total	13,248
	Say	13,000

Of the $13,000,000, $4,000,000 would be expended in 1980 and the remaining $9,000,000 in 1981.

Project Operating Costs

		$ per ton
Mining		32.00
Milling		35.00
Plant & Admin.		32.00
	Total	99.00
Annual Cost		$4,360,000

In 1981 an operating cost of $3,000,000 is provided for to cover additional development and start-up expense, as well as 2 months normal operating expense.

Mining and Development

The disposition of the ore will dictate a variety of mining methods ranging from open stope or cut-and-fill in the steeply dipping areas, to cut-and-fill or possibly panel-slice

in the flatter dipping areas, depending on ground conditions. The development will be planned to provide initial production from the wider ore sections utilizing an open stope method, if ground conditions permit. Production will be hauled to surface in trucks via the ramp. The pace of development will be set to maintain three years' primary development in advance and one year's stope preparation in advance, to assure adequate quantities of mill feed. We have estimated 1,600 ft. of pre-production development for 1981 plus an additional 1,750 ft. included in the operating cost for a total of 3,350 ft. in 1981. Fill-in diamond drilling will be done as required to guide the development.

Mining Capital Costs

The cost of additional mining equipment is estimated as follows:

Additional Mining Equipment		$ x 1000
Vehicles - underground & surface		75
Grader		50
Scooptrams & trucks (2 each)		400
Ventilation		150
Drills & spares		50
Slushers, scrapers, etc.		100
Pumping		50
Miscellaneous equipment & Tools		100
	Total	975
	Say	1,000

This will provide sufficient capacity to carry on both mining and development at full pace.

Pre-production Development Provision	1,000

Mining Operating Costs

The operating cost, based on a recent report by William Hill (Oct.1979), is estimated as follows:

			$ per ton
Labour & Supervision			22.73
Parts & Supplies	- Drill	1.39	
	- Blast	0.67	
	- Muck	0.25	
	- Ground Support	1.29	
	- Timber	1.94	
	- Fuel	0.38	
	- Haul	0.71	
	- Development	1.67	
	- Miscellaneous	0.97	9.27
Total Operating Cost			32.00

Milling

Tests to date at Lakefield Laboratories supervised by R. F. Down and A. H. Ross & Associates indicate that the 'B' Zone ore is amenable to treatment resulting in recoveries of over 90% by conventional cyanidation and "carbon in pulp" recovery of the gold.

The 10 tests at bench scale also indicate that the grinding required for liberation is not excessive, i.e. about 70% to 80% -200 mesh. Furthermore reagent consumption appears to be reasonable as the gold appears to be "free" in a non-metallic gangue and not intimately associated with sulphides.

It is presently planned that the concentrator will be of a nominal 200 tons per day capacity which at 90% efficiency

in 8 months operation per year is estimated to treat 44,000 tons and yield 30,270 ozs. of gold "loaded" at 400 ozs. per ton of carbon. The carbon would be shipped out in containers for refining.

Milling Capital Costs

The cost of construction of a 200 tons per day plant, based on preliminary studies by A. H. Ross & Associates (Dec.19, 1977) and updated for inflation and capacity, is estimated at $2,400,000. Ancilliary services such as tailings disposal, water supply, pollution control, coarse ore stockpile, etc., have been estimated to cost an additional $2,400,000.

The principal items in the mill are shown as follows with their corresponding cost:

		$ x 1000
Crushing & screening		630
Grinding & mucking		784
Leaching & solution storage		307
Carbon in pulp system		83
Tailings disposal		18
Reagent system		65
Building		507
Direct Plant Costs		2,394
	Say	2,400

Milling Operating Costs

The cost of operation of the 200 tons per day plant, based on preliminary estimates of A. H. Ross & Associates (Dec.1977) and updated for inflation and capacity, is as follows:

	$ per ton
Supervisory & operating labour	9.48
Operating supplies	5.42
Maintenance, labour & supplies	2.00
Reagents	2.13
Power	7.95
Fuel	4.17
Water	0.13
Analytical Services	0.53
	31.81
Contingency 10%	3.19
Total Operating Cost	35.00

Plant and Administration

Provision is made for expanding the existing camp facility to accommodate 75 men and to provide for office, warehouse and laboratory space. As well, a power house installation of 1500 kva capacity is provided for together with additional compressor and boiler capacity. An investigation will be made to determine the feasibility of obtaining hydro power using low head, high volume turbines. Provision is also made for freight, travel and administrative expense. The existing shop would be expanded into the space formerly occupied by the existing power plant.

Plant & Administration Capital Costs

The costs in this area are estimated as follows:

Plant & Administration	$ x 1000
Camp, office, warehouse, etc.	1,000
Power house & Equipment	1,000
Freight & general expense	800
Total	2,800

Plant & Administration Operating Costs

The operating cost, based on a recent report by William Hill (Oct.1979), is estimated as follows:

	$ x 1000
Power (mine & camp only)	2.50
Ventilation, heating (mine)	1.50
Management & engineering	4.20
Plant & Office	5.10
Camp Expense	6.00
Travel & aircraft	4.20
Freight	7.00
Railhead office & miscellaneous	1.50
Total Operating Cost	32.00

CASH FLOW ESTIMATES

(in millions 1980 Canadian Dollars
before tax and financing considerations)

	1980	1981	1982-87	1988
Gold @ U.S.$450				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.00	15.95	9.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(8.00)	11.59	6.61
Total Cash Flow - Can.$	61.15			
Gold @ U.S.$500				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.40	17.76	10.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(7.60)	13.40	7.61
Total Cash Flow - Can.$	73.41			
Gold @ U.S.$550				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	4.90	19.50	11.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(7.10)	15.14	8.61
Total Cash Flow - Can.$	85.35			
Gold @ U.S.$600 (Jan.9, 1980)				
Development & Exploration	(3.00)	-	-	-
Capital Expenditures	(4.00)	(9.00)	-	-
Revenue	-	5.30	21.27	12.10
Operating Costs	-	(3.00)	(4.36)	(2.49)
Cash Flow	(7.00)	(6.70)	16.91	9.61
Total Cash Flow - Can.$	97.37			

"Break even" point after all costs · U.S.$200.00 per oz. Au

Basis of Cash Flow Estimates

The preceding estimates (page 31) are based on the following:

- Price ranges from U.S.$450.00 to U.S.$600.00 per troy ounce.
- Canadian dollar at U.S.$0.854.
- Mine production rate of 44,000 tons per year for 6.82 years or a total of 300,000 tons.
- Mine production grade of 0.74 oz. per ton Au and metallurgical recovery of 93%, yielding a gold production of 30,281 ozs. Au per year or a total of 206,515 ozs. over 6.82 years.
- Operating costs of $99.00 per ton, capital and extraordinary expenses of $18,000,000, a total of $47,700,000 on the 206,515 ounces.

The breakeven on all cost is:

Can.$47,700,000 - 206,515 ozs. = Can.$230.95 per oz. Au
= U.S.$197.25 " " "

say U.S.$200.00 per oz. Au

The gold price sensitivity is Can.$12 million change in revenue for a U.S.$50.00 per oz. change in the price of gold.

All of which is respectfully submitted.

PROSPECTION LIMITED.

William Hill, P.Eng.

R. J. Beggs, P.Eng.

REGISTERED PROFESSIONAL ENGINEER W. HILL PROVINCE OF ONTARIO

REGISTERED PROFESSIONAL ENGINEER R. J. BEGGS PROVINCE OF ONTARIO

Toronto, Canada
January 18, 1980.

CERTIFICATE OF QUALIFICATION

I, WILLIAM HILL, residing at R.R. #2, Rockwood, Ontario,

certify that:

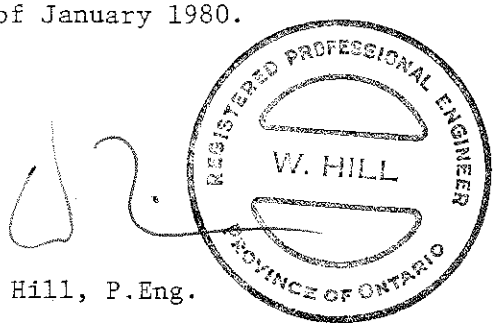
1. I am a mining engineer graduated from the University of Toronto with a degree of Bachelor of Applied Science in 1958 and have practised my profession since graduation.

2. I am a Registered Professional Engineer and Consultant of the Province of Ontario.

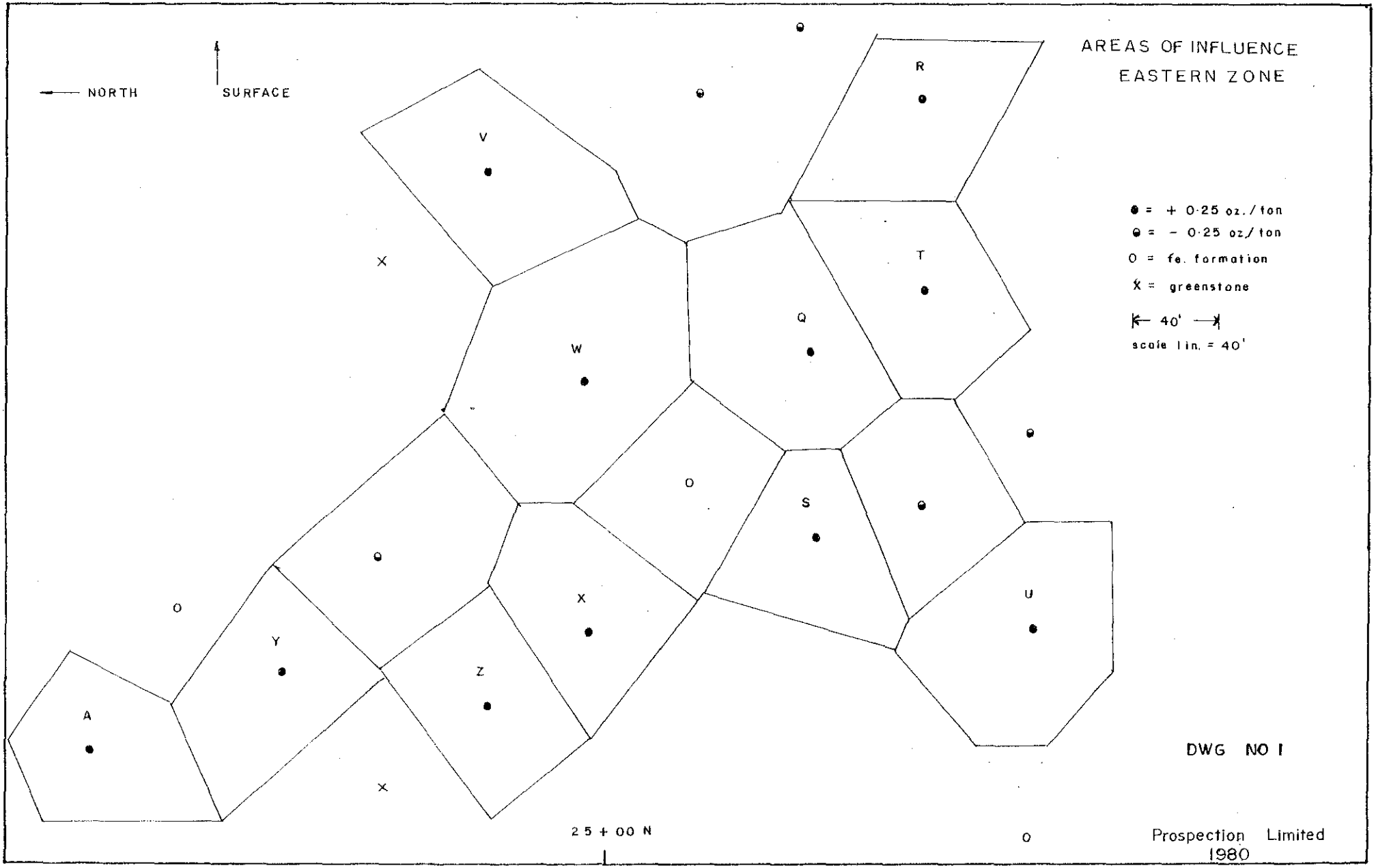
3. I have no interest in, nor do I expect to have interest in, directly or indirectly, O'Brien Gold Mines Ltd.

4. This report is based on data made available by O'Brien Gold Mines Ltd. and from information derived from visiting the property.

DATED at Toronto this 18th day of January 1980.



William Hill, P.Eng.


AREAS OF INFLUENCE
EASTERN ZONE
NORTH
SURFACE
● = + 0·25 oz./ton
● = - 0·25 oz/ton
O = fe. formation
X = greenstone
40'
scale 1 in. = 40'
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V
T
Q
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U
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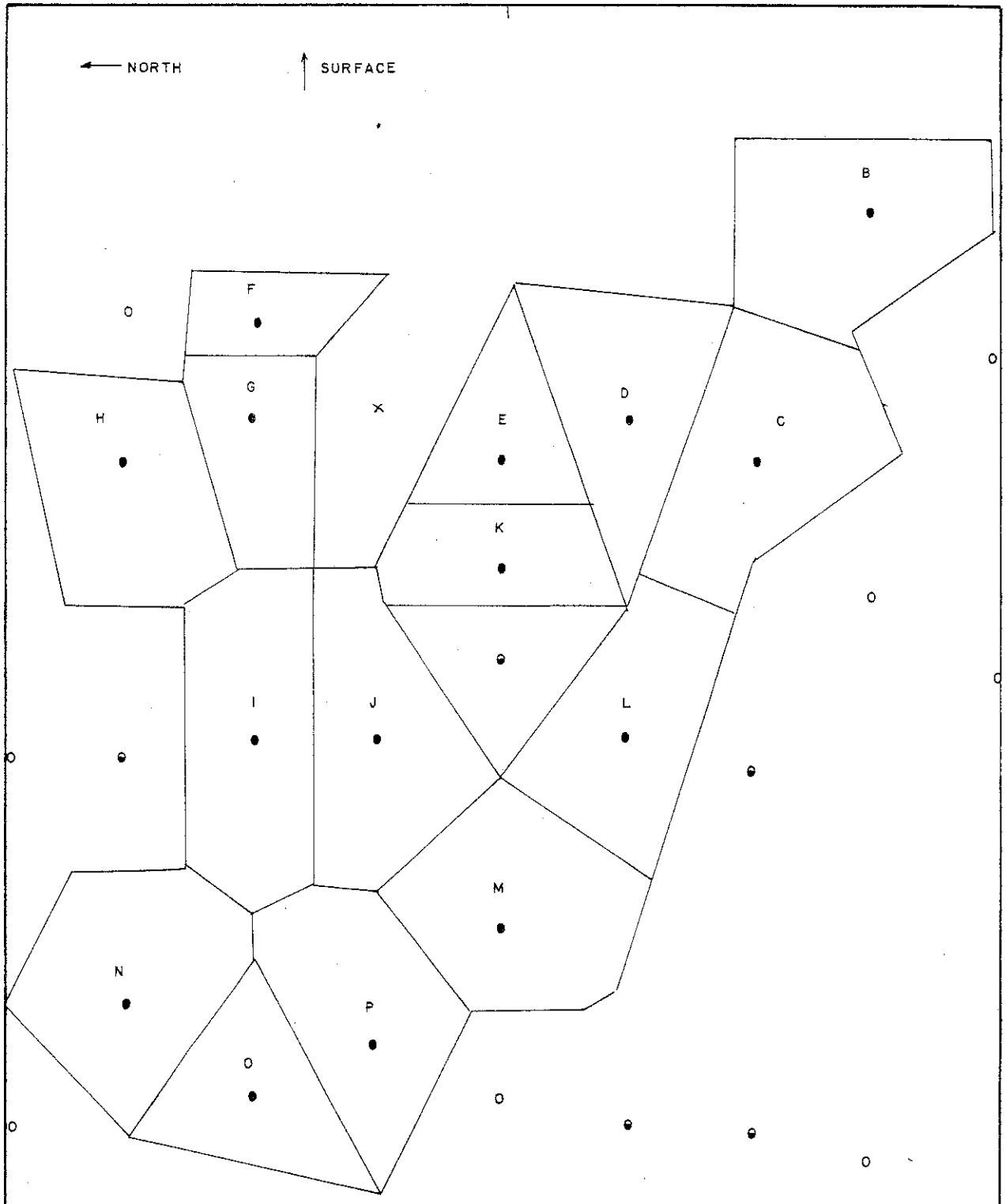
Y
Z
A
25 + 00 N
DWG NO 1
Prospection Limited
1980

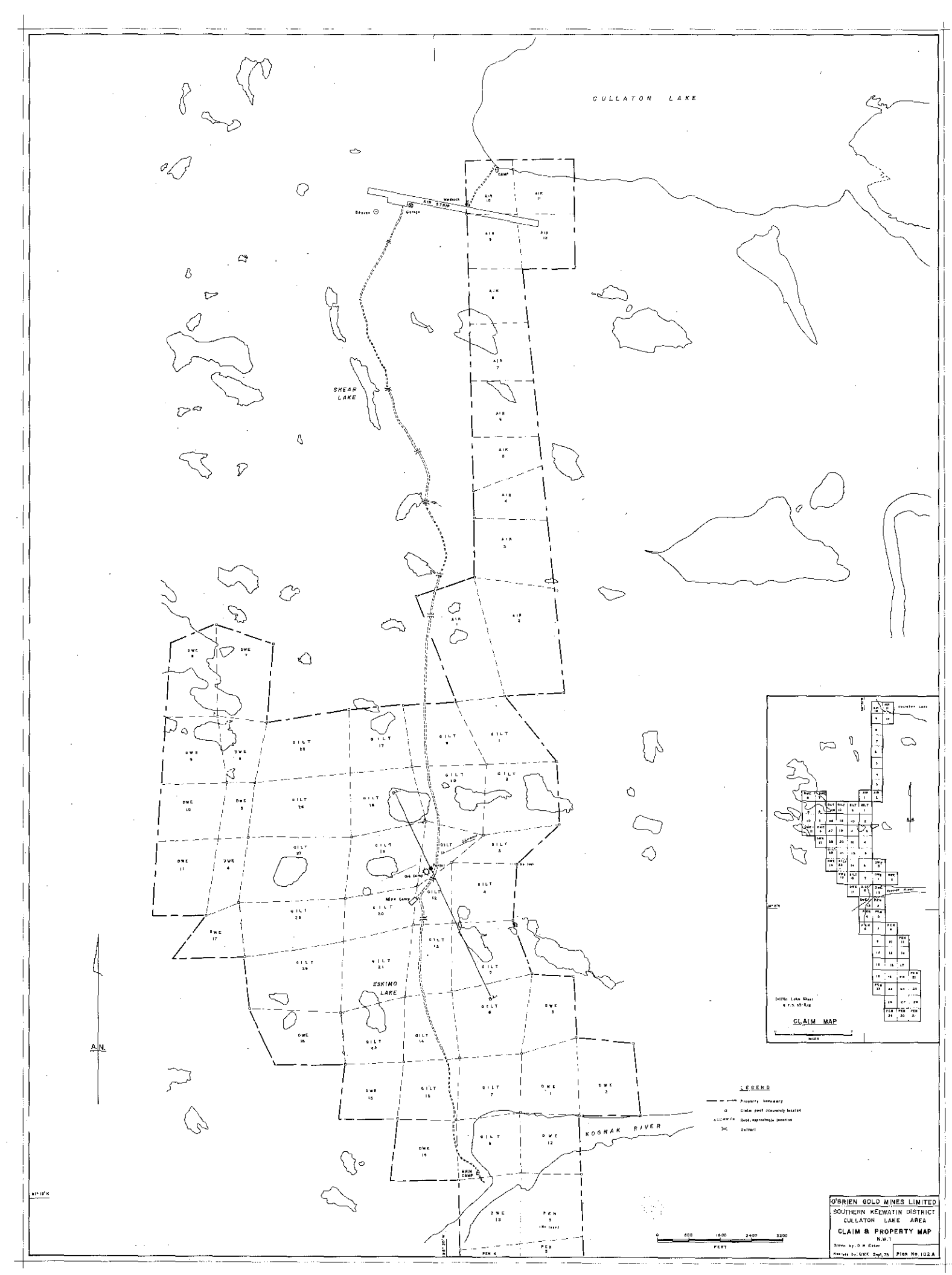


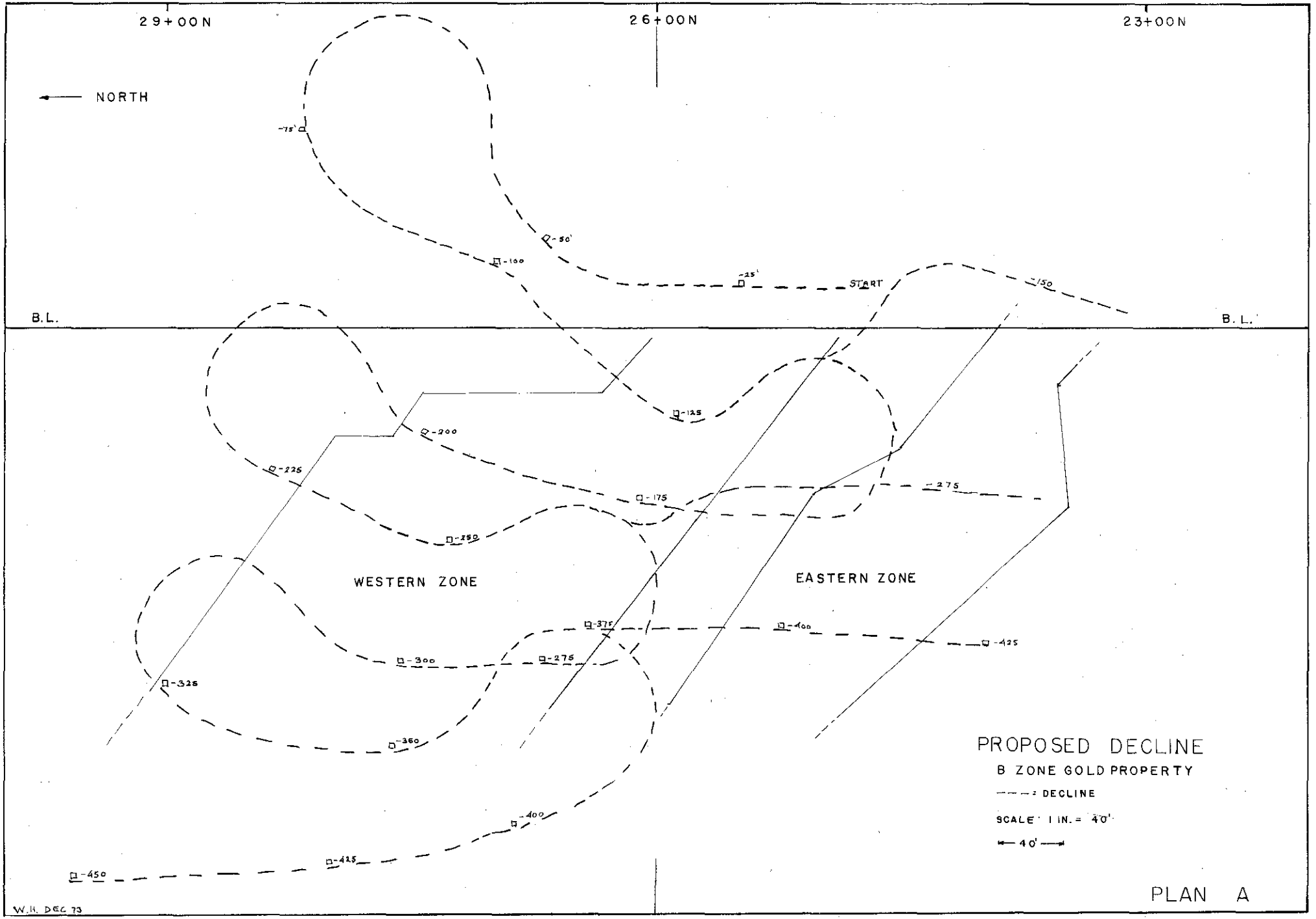
AREAS OF INFLUENCE
WESTERN ZONE

DWG NO 2

Prospection Limited
1980

27 + 00 N


CULLATON LAKE
CAMP
AIR STRIP
Wreck
Beacon
Garage
SHEAR LAKE
ESKIMO LAKE
KOGNAK RIVER
Mine Camp
Ore Dump
MAIN CAMP
A.N.
LEGEND
Property boundary
Claim post accurately located
Road, approximate location
Drill hole
0 800 1600 2400 3200
FEET
CLAIM MAP
MILES
O'BRIEN GOLD MINES LIMITED
SOUTHERN KEEWATIN DISTRICT
CULLATON LAKE AREA
CLAIM & PROPERTY MAP
N.W.T.
Drawn by: D.M. Elson
Revised by: D.W.K. Sept. 75
Plan No. 102A


29+00N
26+00N
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NORTH
-75'
-50'
-100
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-150
B.L.
B.L.
-125
-200
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-175
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WESTERN ZONE
EASTERN ZONE
-375
-400
-425
-300
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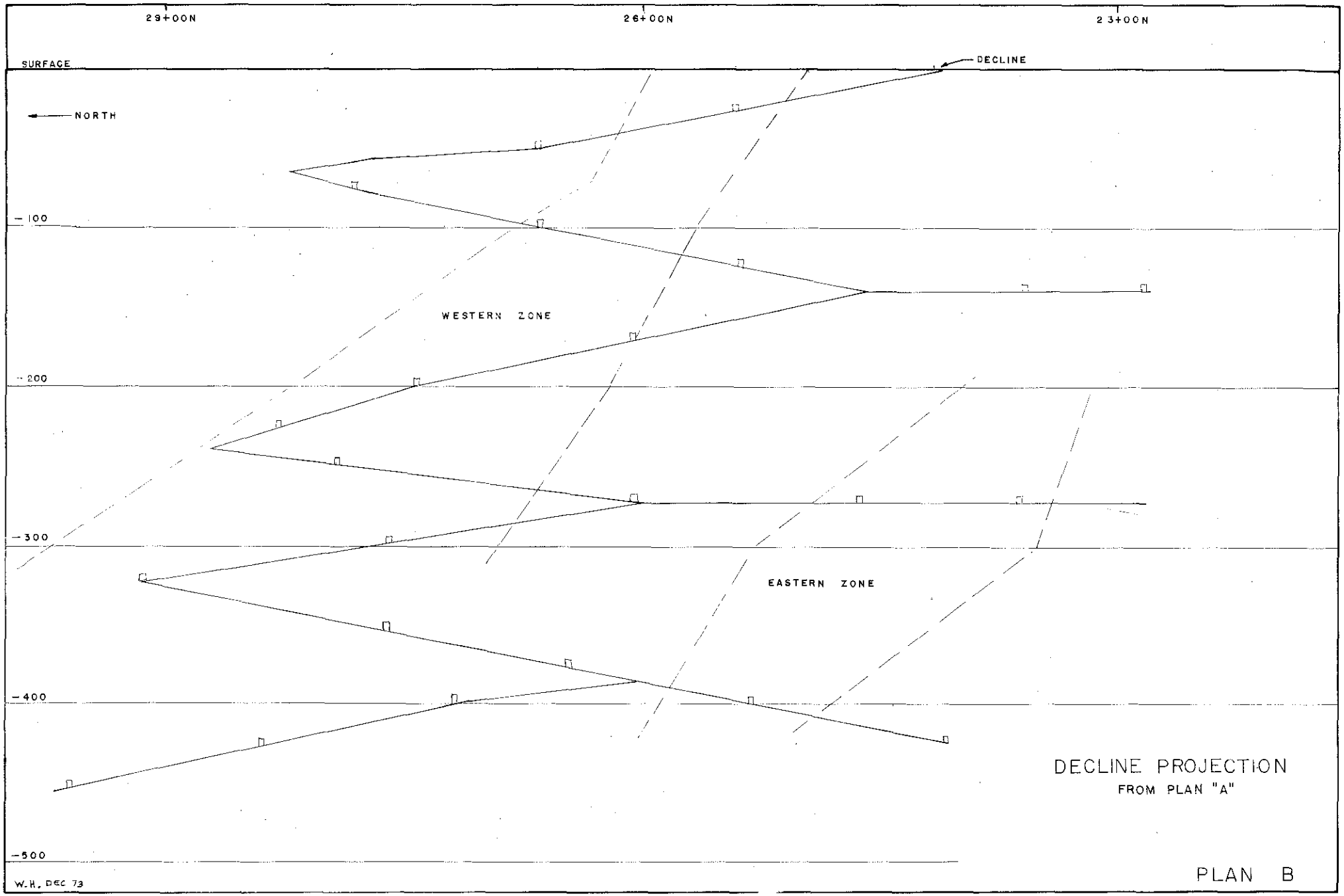
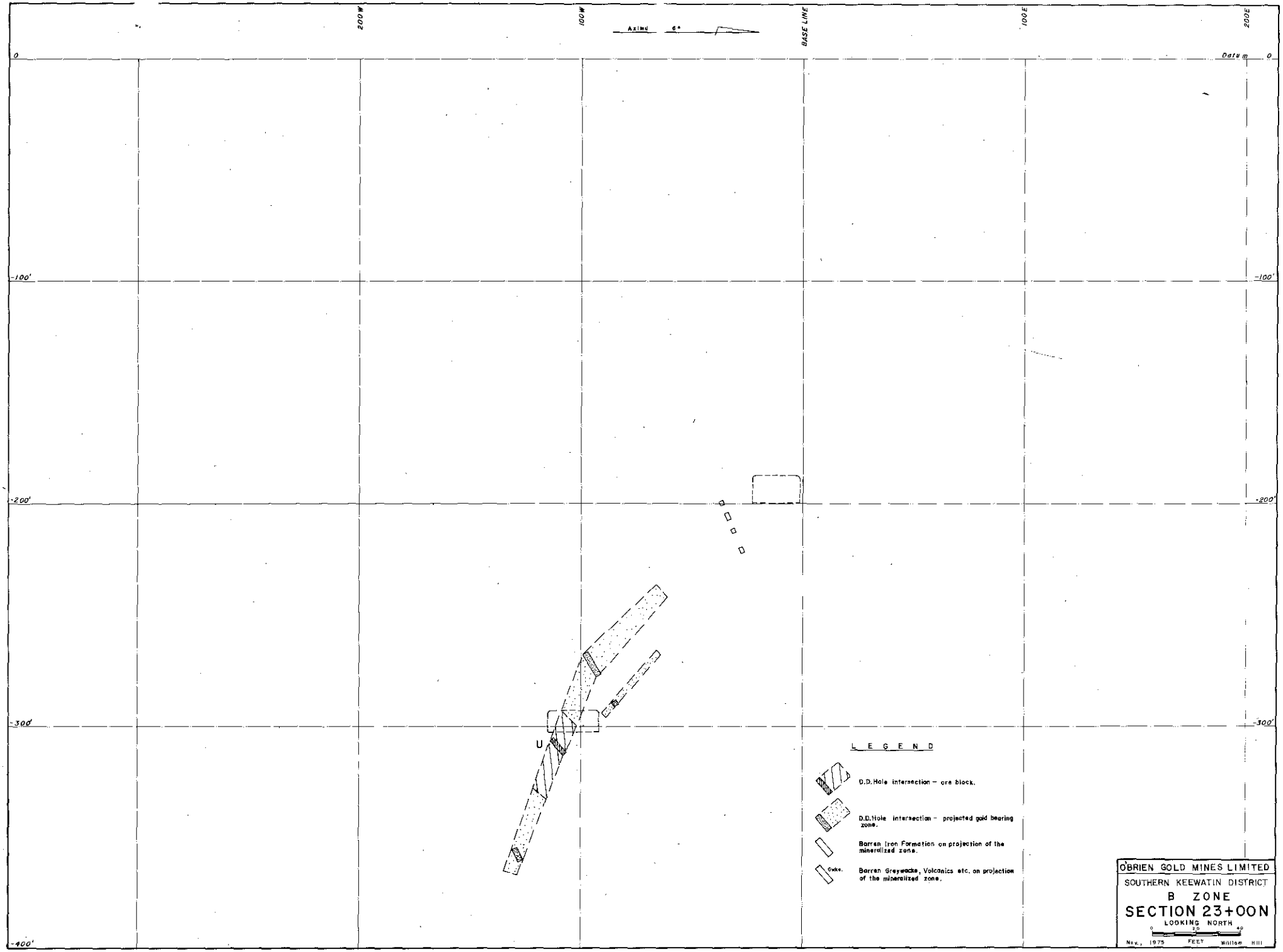
PROPOSED DECLINE
B ZONE GOLD PROPERTY
= DECLINE
SCALE 1 IN. = 40'
40'
W.R. DEC 73
PLAN A



DECLINE PROJECTION
FROM PLAN "A"

PLAN B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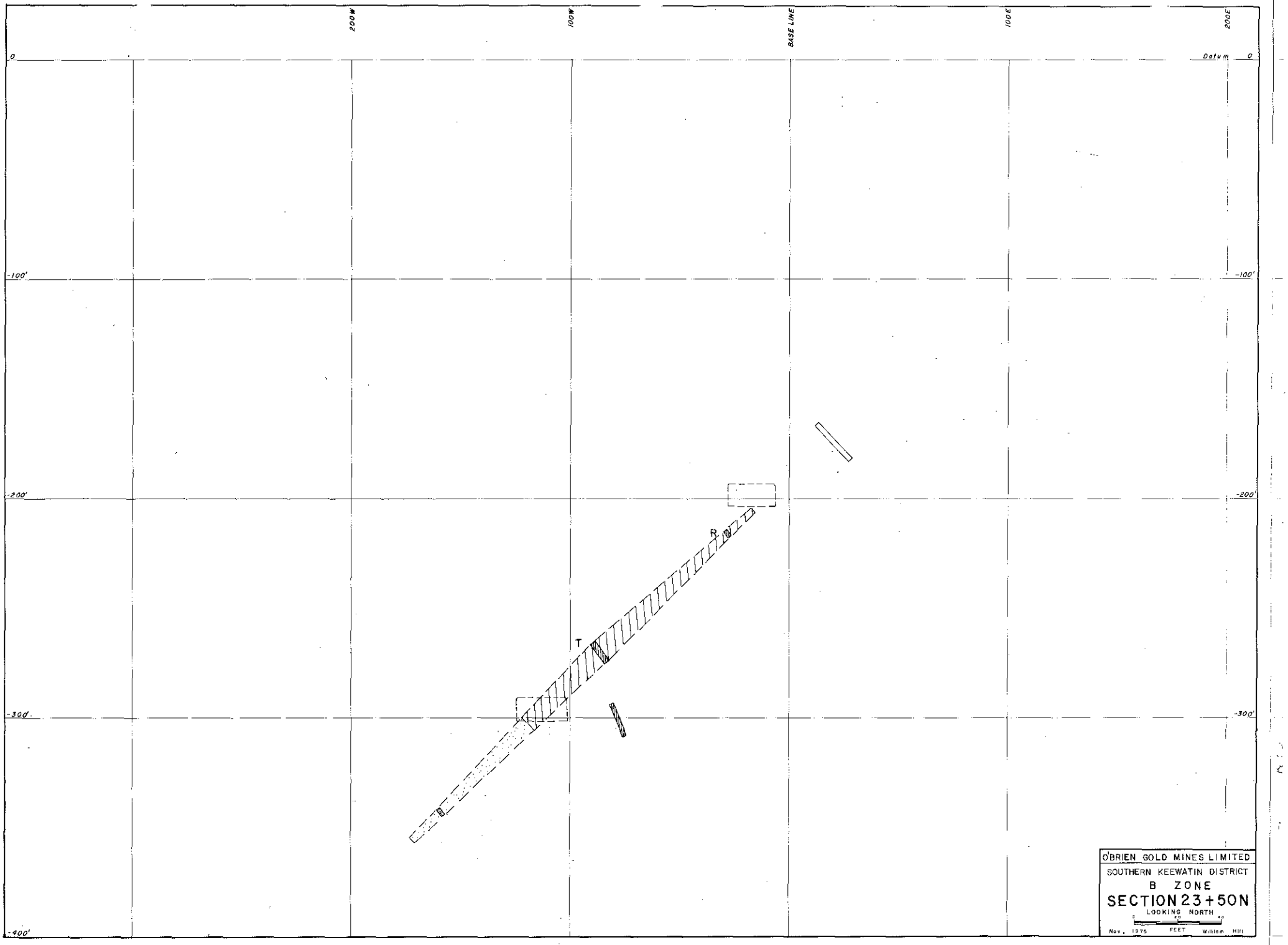
L E G E N D
D.D. Hole intersection – ore block.
D.D. Hole intersection – projected gold bearing zone.
Barren Iron Formation on projection of the mineralized zone.
Gwke.
Barren Greywacke, Volcanics etc. on projection of the mineralized zone.
O'BRIEN GOLD MINES LIMITED
SOUTHERN KEEWATIN DISTRICT
B ZONE
SECTION 23+00N
LOOKING NORTH
0 20 40
Nov., 1975 FEET William Hill



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

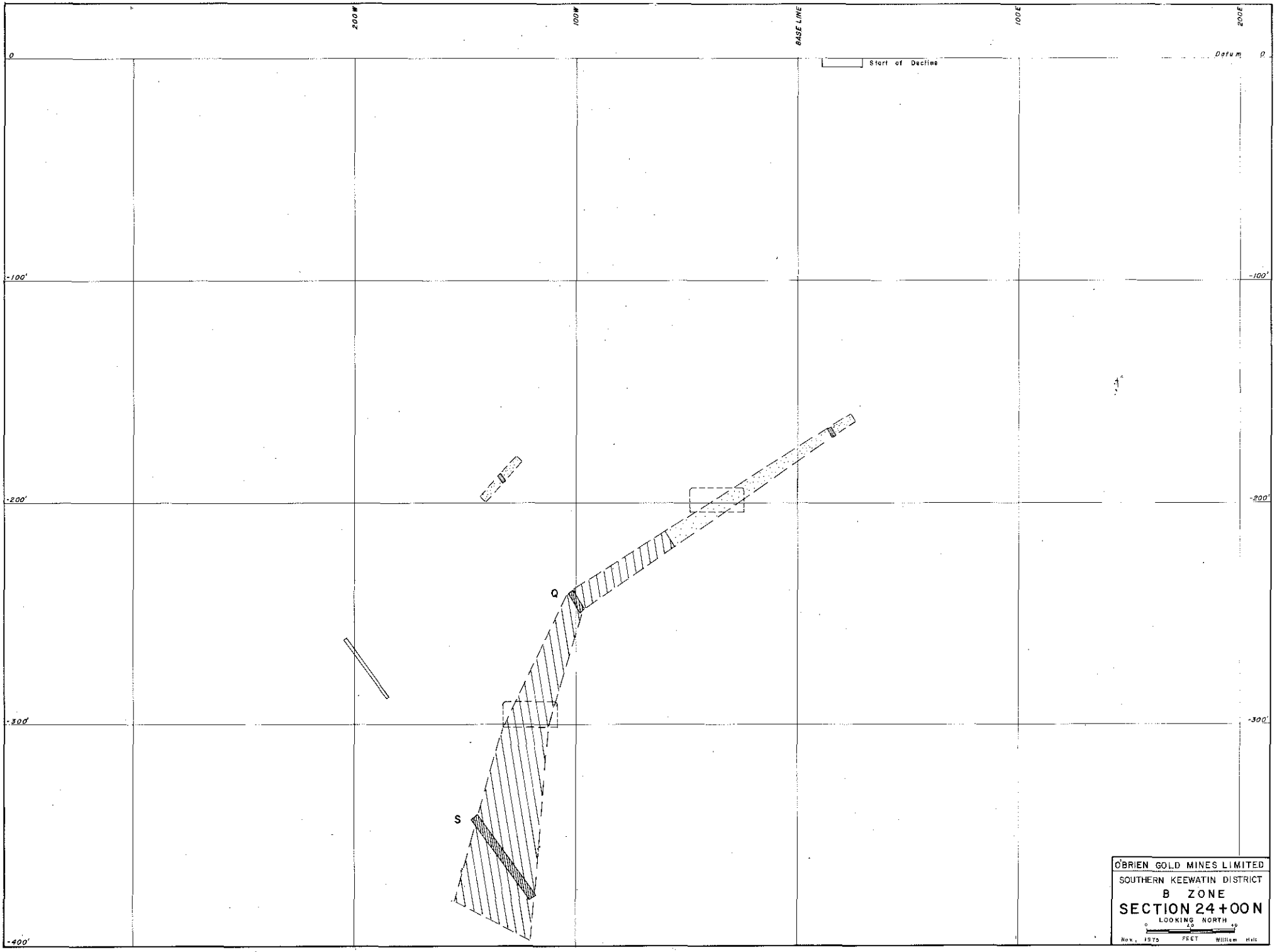
SECTION 23+50N

LOOKING NORTH

0 20 40

FEET

Nov., 1975 William Hill



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

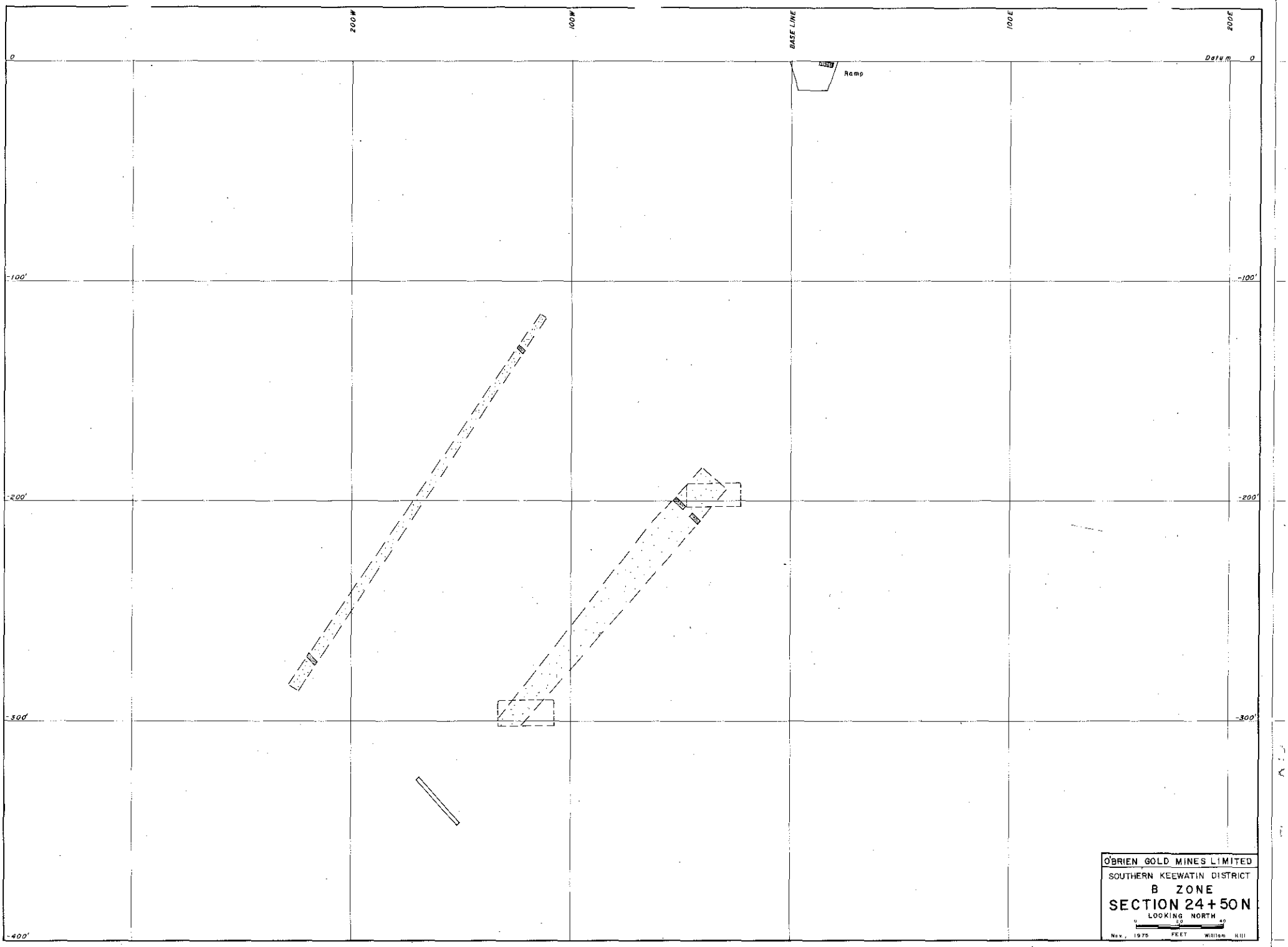
B ZONE

SECTION 24+00N

LOOKING NORTH

0 20 40

Nov., 1975 FEET William Hall



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

SECTION 24+50N

LOOKING NORTH

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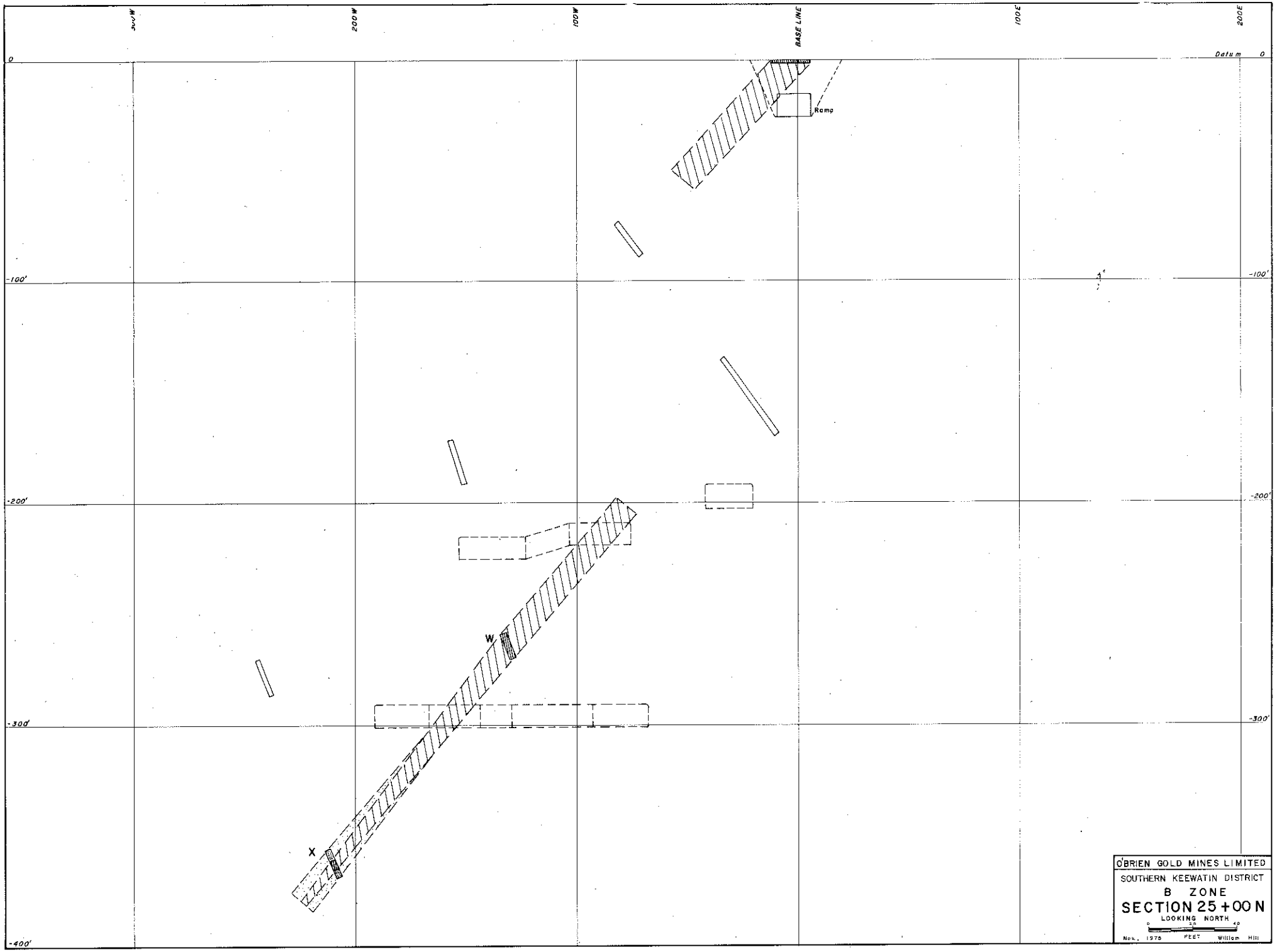
Nov., 1975 William Hill



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

SECTION 25+00 N

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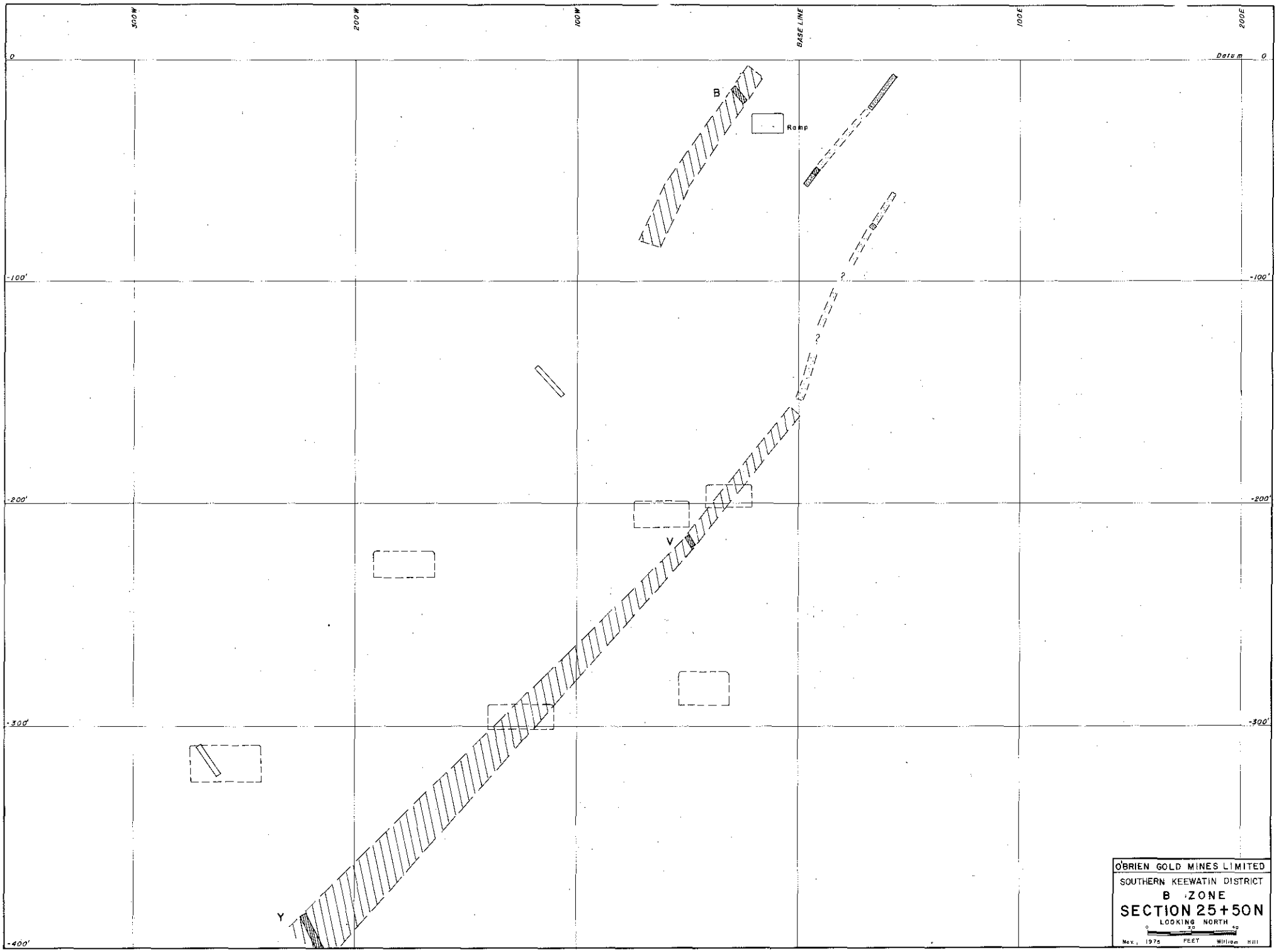
Nov., 1975 FEET William Hill



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

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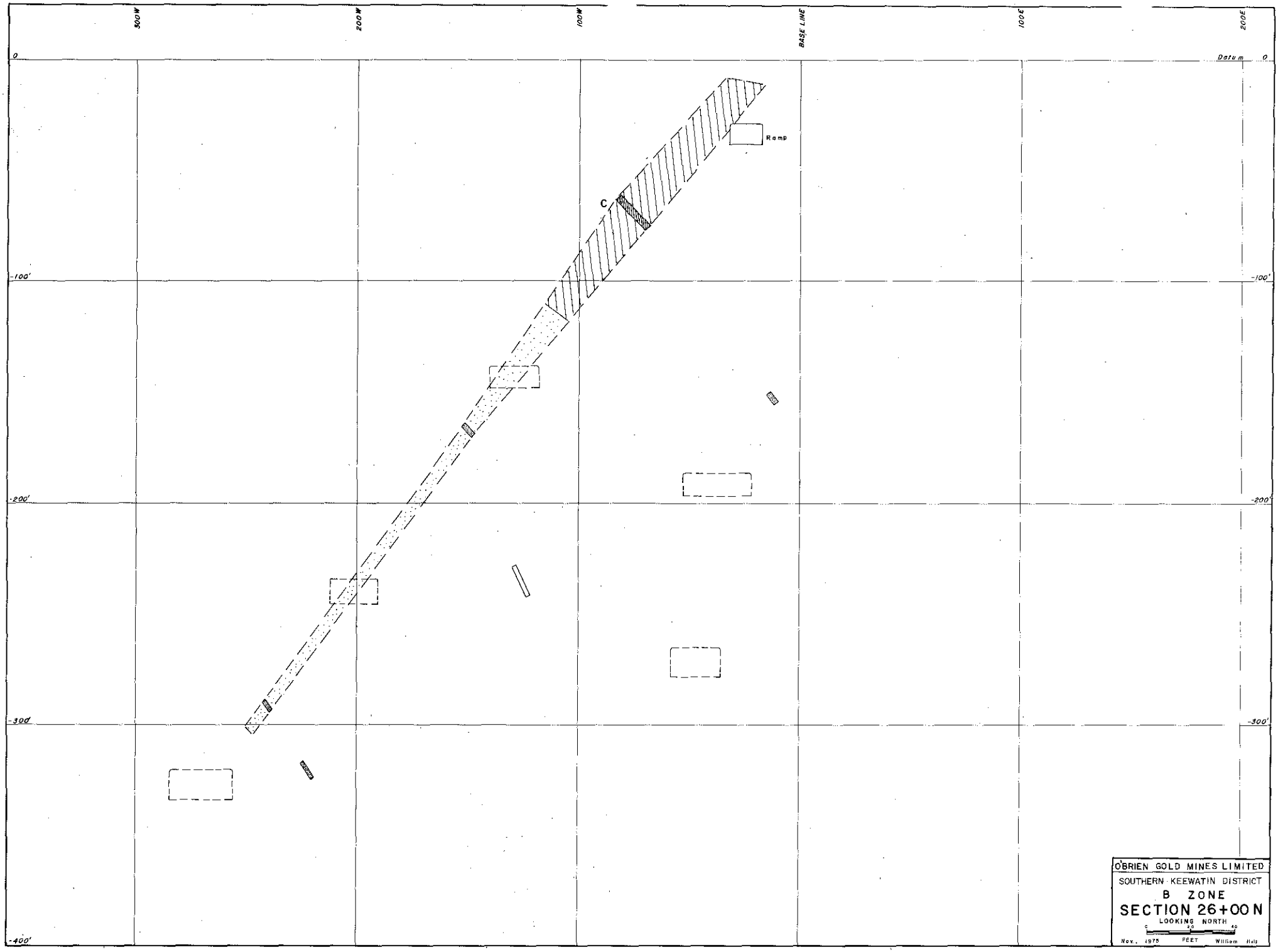
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O'BRIEN GOLD MINES LIMITED
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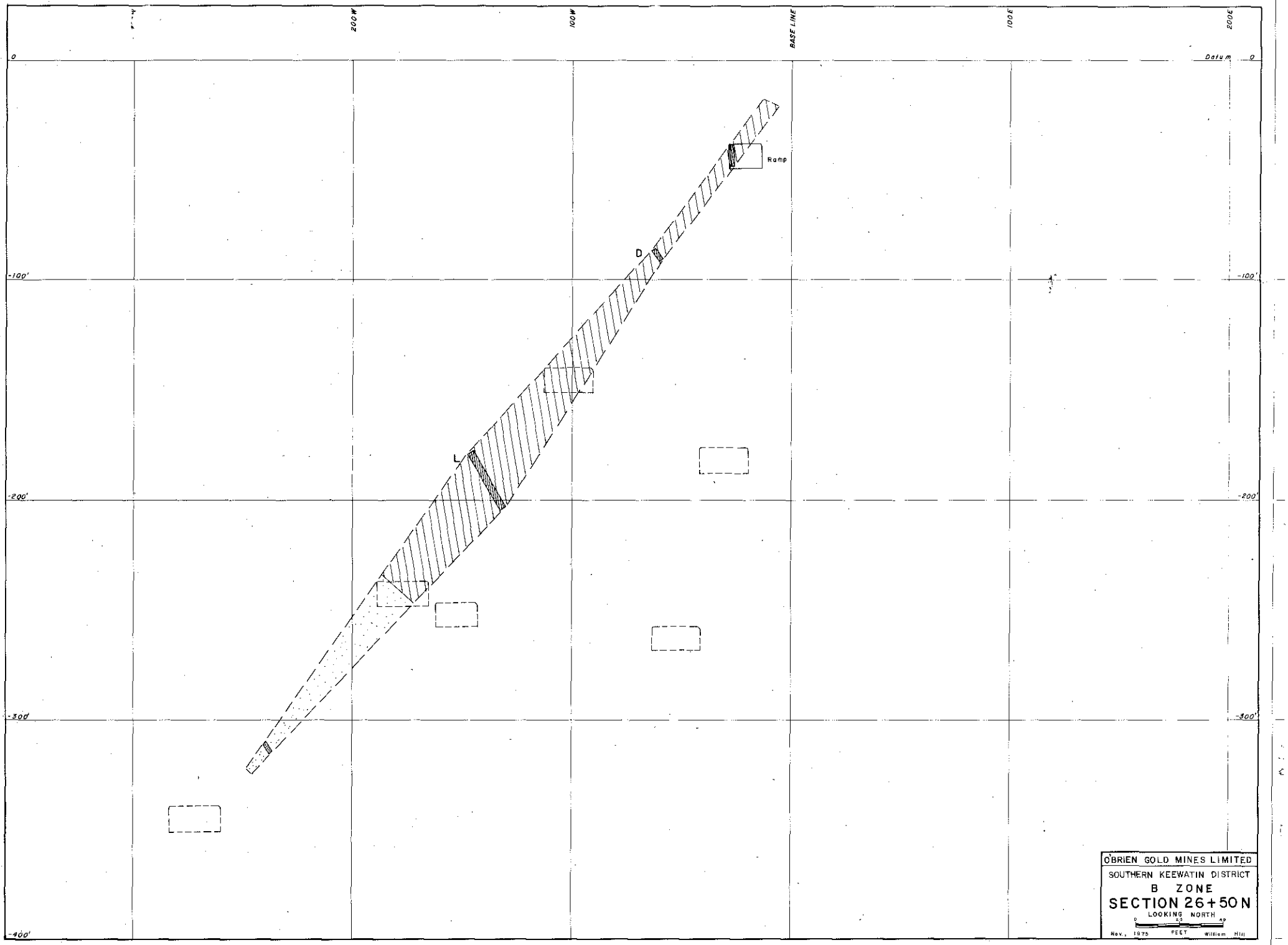

O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

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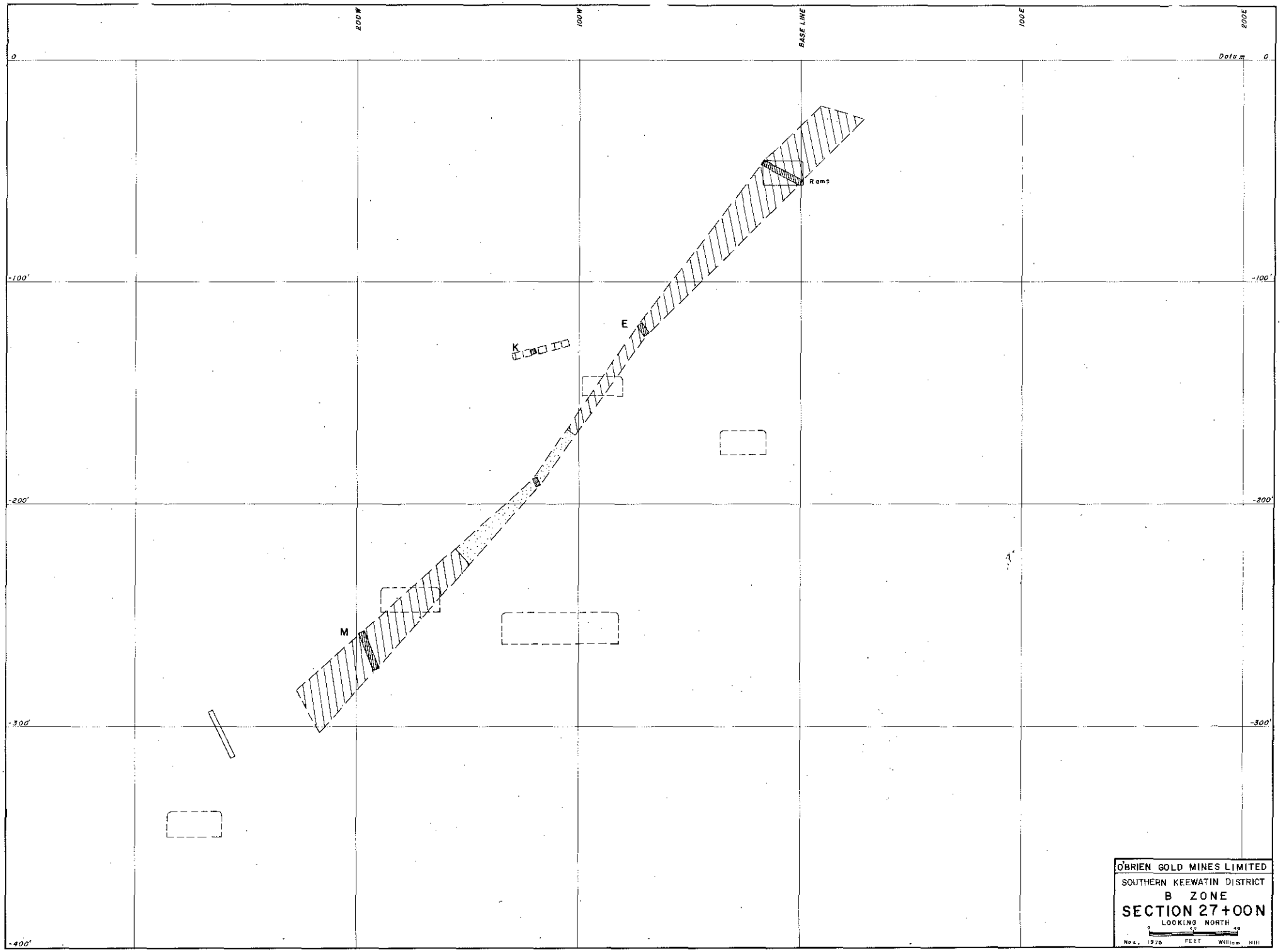

O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

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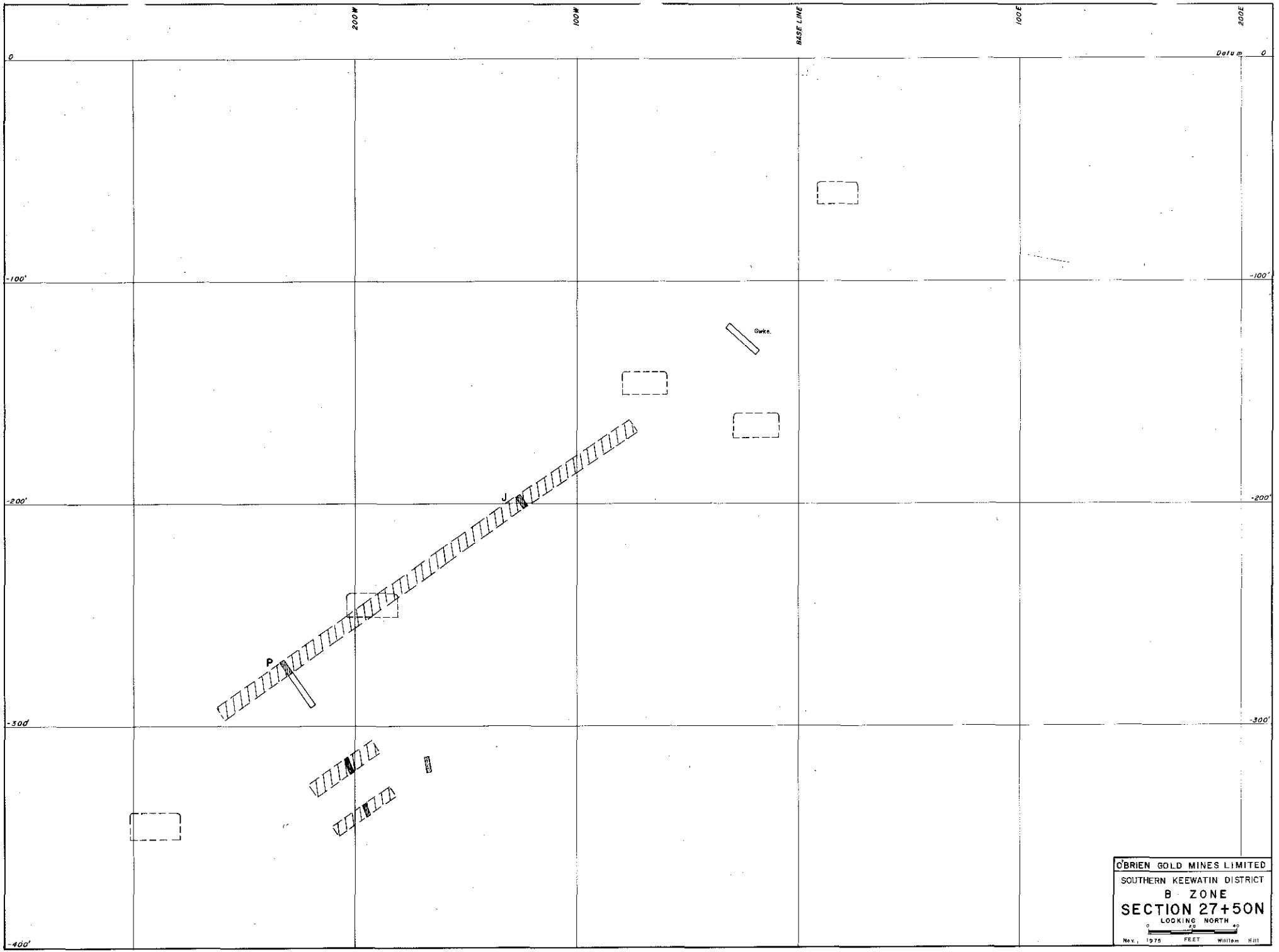

O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

SECTION 27+50N

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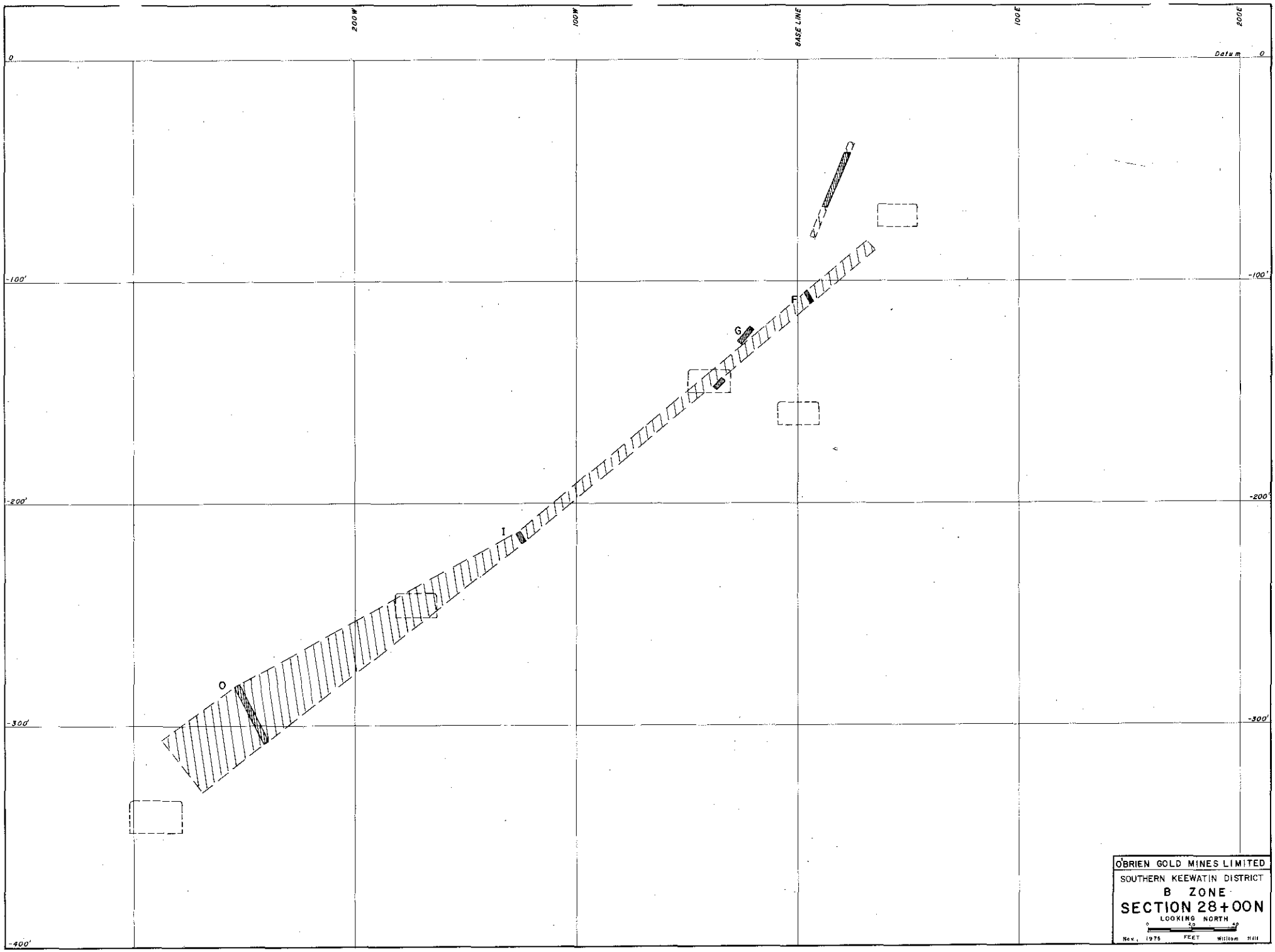
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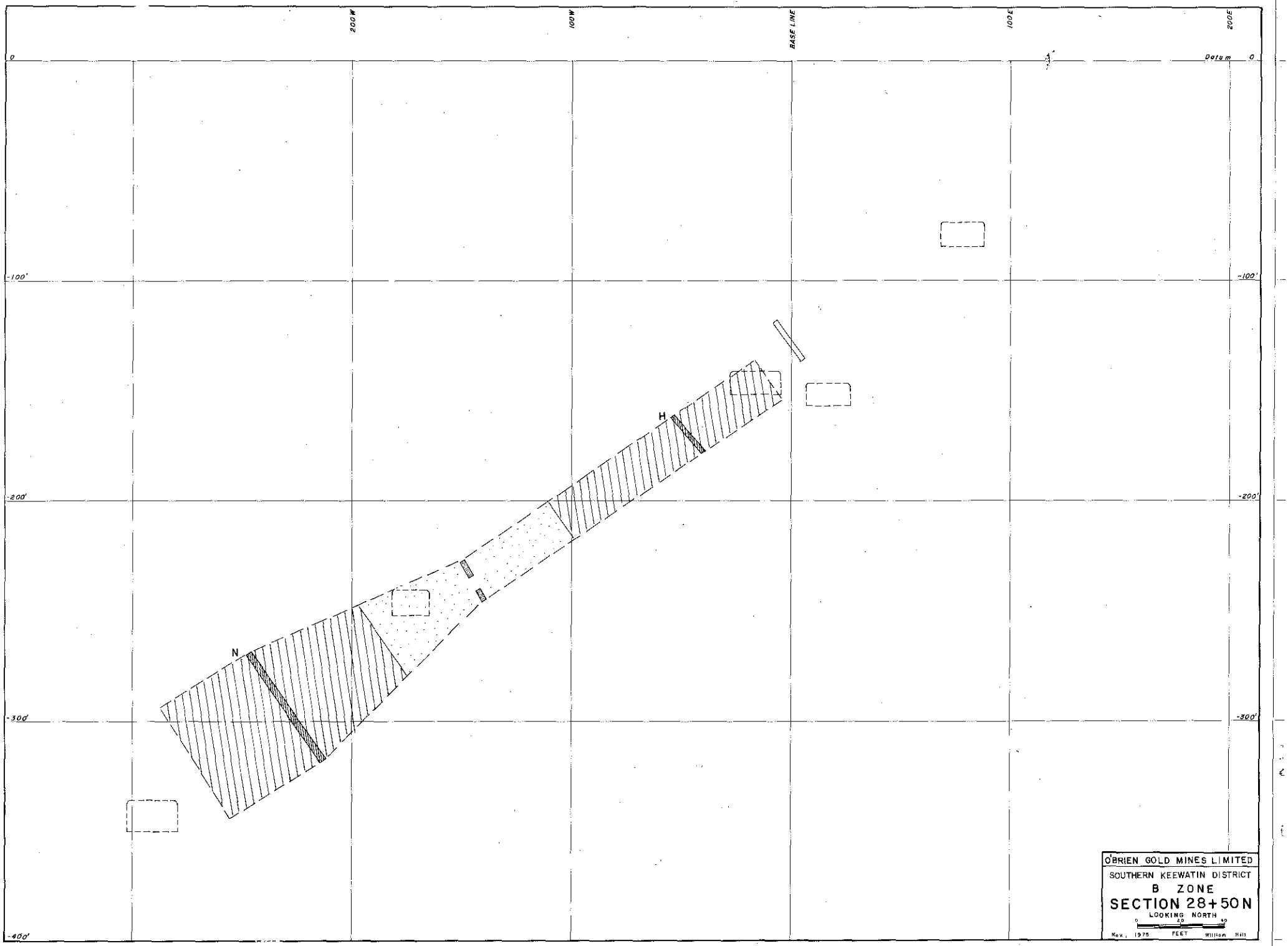
William Hill



O'BRIEN GOLD MINES LIMITED

SOUTHERN KEEWATIN DISTRICT

B ZONE

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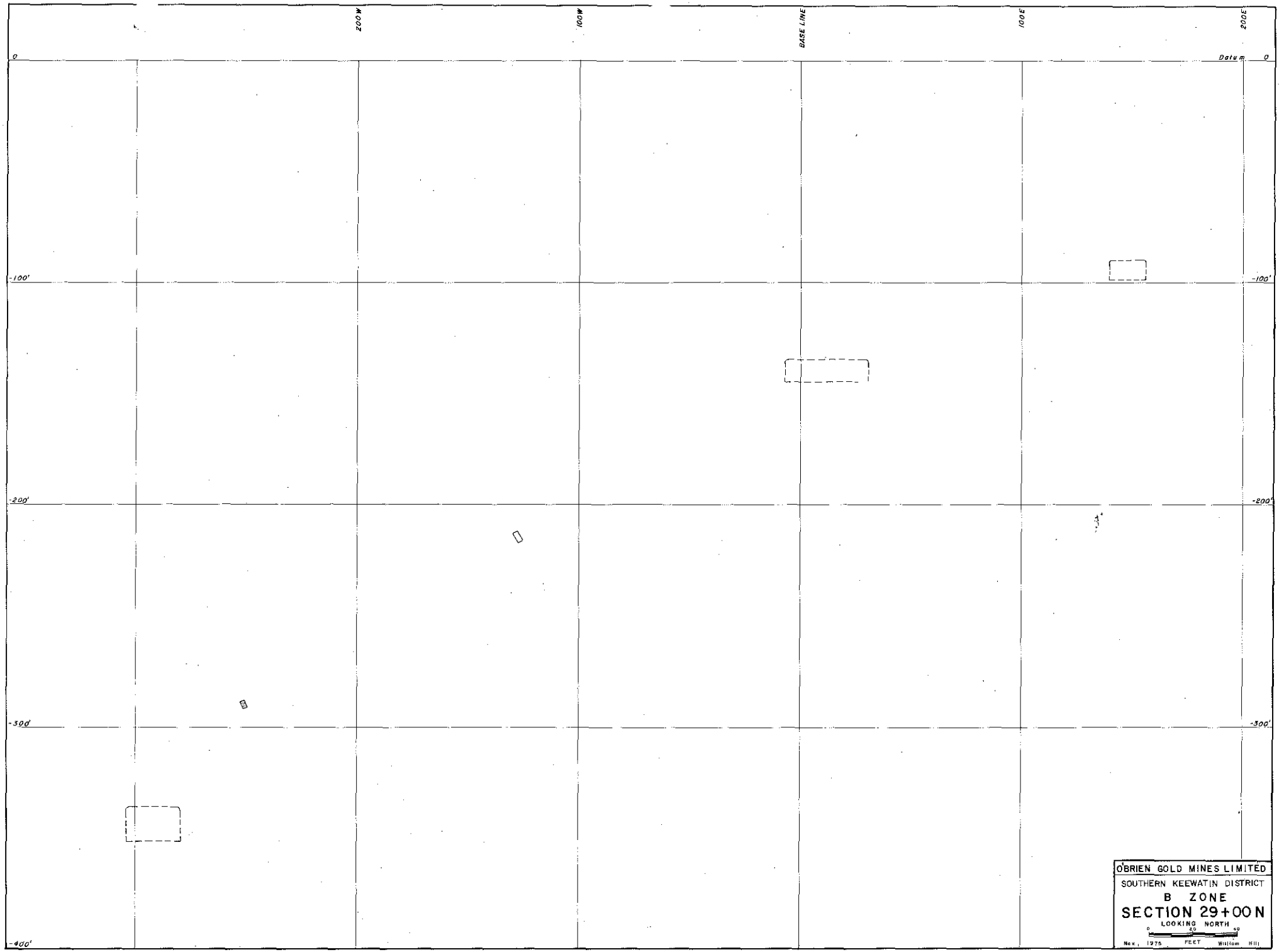
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O'BRIEN GOLD MINES LIMITED
SOUTHERN KEEWATIN DISTRICT
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SECTION 29+00N
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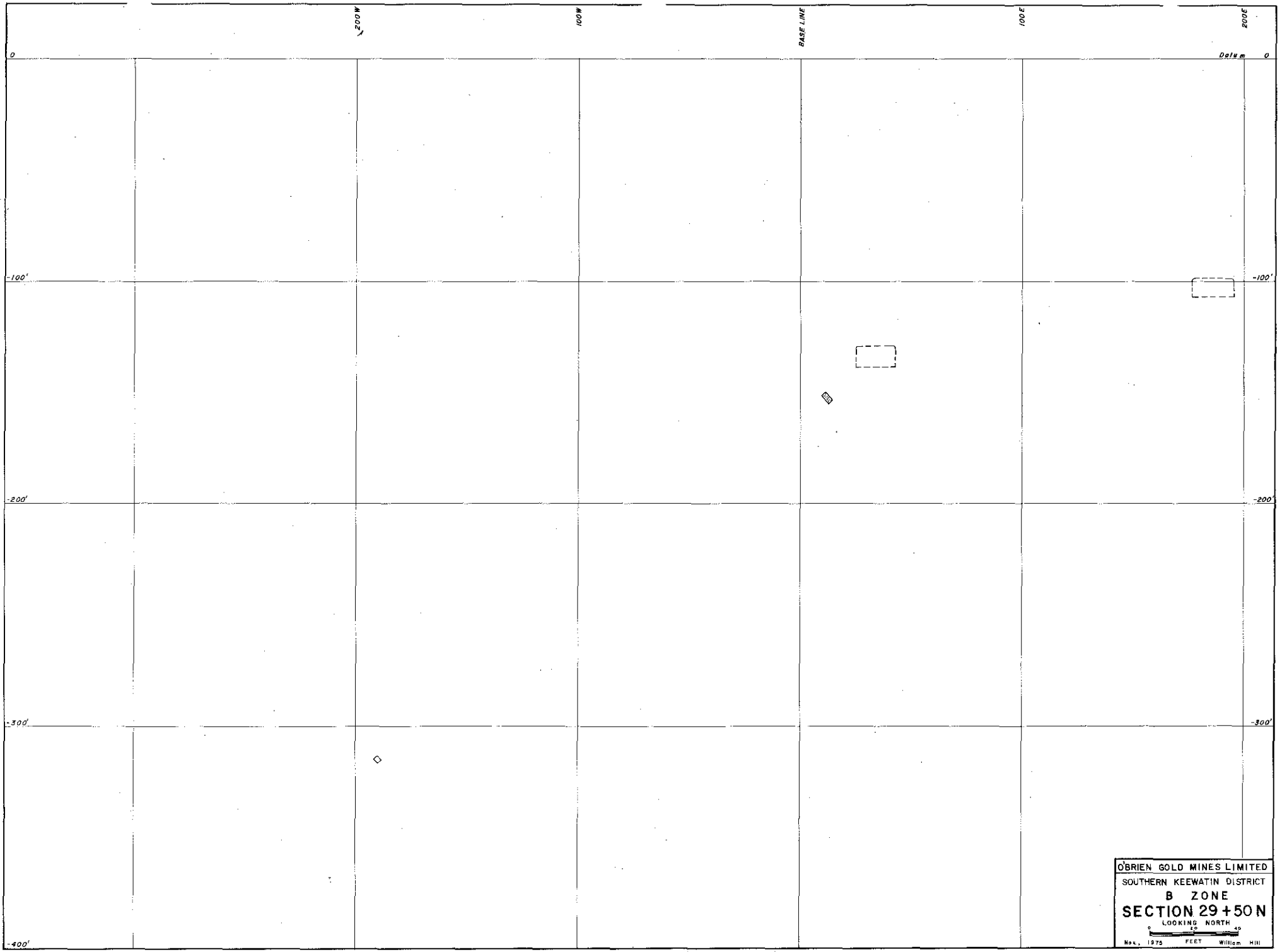
FEET
Nov., 1975
William Hill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O'BRIEN GOLD MINES LIMITED
SOUTHERN KEEWATIN DISTRICT
B ZONE
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Nov., 1975
William Hill