



DUVAL INTERNATIONAL CORPORATION  
GEOLOGICAL BRANCH  
ASSESSMENT REPORT

11,227

Report on the Reconnaissance Geology  
and Geochemistry of the  
TILL 1 Claim

Nelson Mining Division  
82 F/3W

Latitude: 49° 05'N

Longitude: 117° 24'W

Claim Owner: Duval Mining Ltd.

Claim Operator: Duval International Corporation

Report by G. R. McKillop

Date Submitted: April 13/83

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## INTRODUCTION

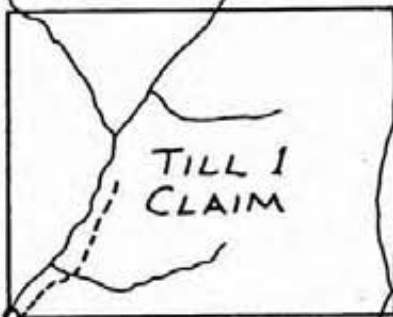
The TILL 1 claim was staked in 1982 on the basis of anomalous gold values in stream sediment samples collected during an earlier reconnaissance geochemical survey. Staking and follow-up sampling were undertaken in late May and early June of 1982 before the winter's snow had completely melted. Very little gold was detected during analysis of follow-up samples. Limited geological mapping identified syenite and granite stocks intruding fine-grained sediments and volcanics. Additional work in the district may be warranted in an effort to locate the source of placer gold previously recovered from Tillicum Creek.

## LOCATION AND ACCESS

The TILL 1 claim is located in the drainage of the east fork of Tillicum Creek, which flows southwards into the Pend d'Oreille River about 20 km southeast of the Cominco smelter at Trail. The Legal Corner Post is located approximately at latitude 49°05'N, longitude 117°24'W in N.T.S. Division 82 F/3W. The Index Map (Map 1) shows the claim location.

Access to the claims is by old, poorly maintained logging roads along Tillicum Creek from the power line access road which parallels the Pend d'Oreille River. In late May and early June four-wheel drive vehicles were required to negotiate the old logging roads, although two-wheel drive would probably be sufficient during drier times of the year.

Elevations on the claim range between about 1050 m and 1650 m. Lower elevations are choked with thick growths of cedar and hemlock trees, except where recently logged, and higher areas have



TILL 1 CLAIM

L.C.P.

TILLICUM CREEK

LIMPID CREEK

PEND D'OREILLE RIVER

SALMO RIVER

Road to Trail



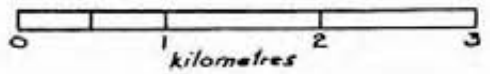
BRITISH COLUMBIA

CLAIM AREA

INSET MAP

# MAP 1 LOCATION MAP

Part of NTS 82F/3W



kilometres

variable vegetation ranging from sparse pine or tamarack forest to semi-open sub-alpine meadows. Most of the lower elevations have been logged at least once, and the second or third growth forest is often quite dense. On both sides of the valley there are several boggy areas overgrown with alders and devils club.

#### PROPERTY

The TILL 1 claim consists of 20 units (4N 5E) recorded at Nelson in the name of Duval Mining Limited (F.M.C. #230900) on May 31, 1982. The record number is 2637 (5).

No evidence of prior hardrock mineral exploration was noted on the claim, although such evidence could easily be obliterated by the extensive logging operations conducted there over the years. Minor evidence of placer mining was noted along Tillicum Creek, although most placer activity appears to have occurred further downstream. The exploration program described in this report was completed by Duval International Corporation to evaluate the gold potential of the claim area.

#### SUMMARY OF WORK DONE

The work completed by Duval in 1982 was of a reconnaissance nature, and consisted of geochemical sampling and prospecting. The following number of samples were collected for analysis:

<u>Sample Type</u>	<u>Number of Samples</u>
Rock	6
Stream sediment (silt)	34
Soil	155

All samples were analysed for gold, and selected samples were also analysed for silver, arsenic, lead, zinc and antimony.

.../...

Prospecting and geological mapping were impeded by a paucity of outcrop and by varying amounts of snow, particularly on the east half of the claim. Outcrop was studied where noted on traverses along claim lines, roads, streams, soil lines and ridge crests.

#### GEOLOGY

The claim area has previously been mapped by Walker (G.S.C. Memoir 172) and by Little (G.S.C. Map 1145A and G.S.C. Memoir 308). Although there are slight variations between the maps, the general distribution of rock types is similar. The main formation underlying the claim is indicated to be the Rossland Formation, consisting of andesite and basalt flows and flow breccia, agglomerate, augite porphyry, and minor sediments. Small syenite plugs, probably correlating with the Tertiary Coryell Syenites, intrude the Rossland rocks on the claim, as does a tongue of granite from the stock to the east, correlated with Cretaceous Nelson Plutonic Rocks.

Reconnaissance mapping of sparse outcrops by Duval tended to confirm the observations of Walker and Little. Few outcrops of Rossland Formation rocks were noted, this unit appeared to be recessive weathering relative to the intrusive rocks. Most of the observed Rossland rocks appeared to be fine-grained andesites, although pyritized siltstone was observed at sample site BCG82-M19-R.

A fresh biotite granite cropped out on a ridge near the centre of the claim. This granite was well exposed in several bluffs over about 500 m. Immediately west of the granite along the ridge was a basic biotite syenite. The contact between the syenite and the



granite was not observed, but the syenite was altered near the contact and contained minor quartz veinlets. Outcrops of syenite were fairly sparse. In an exposure on an old logging trail south of the ridge the syenite was seen to be weathered to a soft clay-rich mass barely distinguishable from the overlying soil.

No sulfides were observed in the intrusive rocks. Minor pyrite was seen as disseminations in the andesitic portion of the Rosslund Formation rocks. Pyrite contents of up to 5% were observed in siltstone south of the granite near the ridge crest. Outcrop was sparse in this area, and it is not known how far the exposure is from the granite-Rosslund contact. The pyrite may be syngenetic or may be related to the intrusion of the granite. The reconnaissance geology is illustrated on Map 2.

#### GEOCHEMISTRY

As described earlier, sampling consisted of the collection of 6 rock samples, 34 stream sediment (silt) samples, and 155 soil samples. All samples were analysed for gold, and all silt samples and selected soil samples were analysed for silver, lead, zinc, antimony and arsenic. All analyses were completed by Bondar-Clegg and Co. Ltd., located at 130 Pemberton Avenue in North Vancouver, British Columbia.

Four of the rock samples (BCG82-M18-R through M21-R) were collected from relatively unweathered outcrop. Sample BCG82-M11-R was collected from highly weathered outcrop exposed in an old road-bed, and BCG82-M10-R was collected from angular basic syenite float. All samples except BCG82-M10-R were collected as chips across a length of 3 m to 10 m, and weighed at least one kilogram.

Silt samples were collected from the active portion of the stream channel using a plastic spoon. Samples were packaged in numbered standard kraft envelopes for transmittal to the lab.

Soil samples were collected from the "B" horizon at depths ranging from 15 to 75 cm, and averaging between 20 and 25 cm. Most samples were collected using a mattock and a plastic sample spoon, but some holes were dug using only a prospector's pick. Samples were packaged in numbered standard kraft envelopes and air dried before transport to the lab.

At the lab the samples were all dried and the rock samples were crushed, split and pulverized. The final product was 50% -150 mesh and 99% -80 mesh. Silt and soil samples were sifted in a -80 mesh stainless steel sieve. The following procedures were used for extraction and analysis:

<u>Element</u>	<u>Extraction</u>	<u>Method of Analysis</u>
Pb, Zn, Ag	Hot HNO <sub>3</sub> -HCl	Atomic Absorption
Au	Fire Assay & Hot Aqua Regia	Atomic Absorption
As	Nitric Perchloric Digestion	Colourimetric
Sb	-	X-Ray Fluorescence

Soil samples were collected at 100 m intervals along all claim lines, except for portions of the north and east lines where the snow was too deep to permit sampling. Samples were also collected at 100 m intervals along a line between I.D. posts 4N 4E and 0N 4E, along the north flank of a west trending ridge in the centre of the claim, along the main access roads on both sides of Tillicum Creek, and on a spur road which winds its way up the base of the south flank of the above-mentioned central ridge. Road-side samples



were collected on the uphill side of the road, and cultural contamination is not expected for the elements analysed. Silt samples were collected wherever streams were encountered during the above-described work. In addition, traverses were conducted along three tributaries of Tillicum Creek which cross the claim. Sample locations are indicated on Map 3 (in pocket).

#### GOLD GEOCHEMISTRY

Placer gold has been successfully recovered from the lower reaches of Tillicum Creek during several periods of mining. We recovered minute quantities of visible gold by panning stream gravel from the creek on the claim. However, the gold content determined for stream sediments collected during this survey was generally low. The highest value was 375 ppb Au, the next highest was 120 ppb Au, and the next was 65 ppb Au. The mean value (uncut and assuming that  $<5 = 0$ ) is 22 ppb, however if the high values are cut to 65 ppb a more meaningful mean of 11 ppb is obtained, with a standard deviation of 18.

Anomalous gold values in silts are erratically distributed, but it would appear that the more northerly of the two west-flowing tributaries is the best target area.

Gold values in soils are also generally low, with a maximum value of 65 ppb Au, and a mean of about 5 ppb. Values of  $\geq 15$  ppb Au occur in the northeast, southeast, and southwest corners of the claim, but there are no areas of consistently higher values.

The rock samples were analysed for gold only, and all contained 10 ppb Au or less.

### SILVER GEOCHEMISTRY

Of the 34 silt samples analysed for silver, the highest value was 0.8 ppm Ag, with the mean value being 0.4 ppm. Most of the higher values were obtained from samples collected from the southern west-flowing tributary of Tillicum Creek on the claim.

Values for the 84 soil samples analysed for silver ranged up to 2.0 ppm, with a mean value of 0.4 ppm. Of the area for which soil samples were analysed for silver, it would appear that the north-central portion of the claim carries the most consistent higher values. It is interesting that there are few higher silver values in soils near the southern west-flowing tributary where the higher silver values in silts were determined.

### LEAD GEOCHEMISTRY

Lead values in silt samples ranged from 10 ppm Pb to 237 ppm Pb, with a mean (uncut) value of 31 ppm Pb. There is not a consistent distribution of higher or lower values.

Lead values in the 51 soil samples analysed are generally lower than those for the silts, with a mean value of 15 ppm Pb. There are no areas of significant consistent higher values.

### ZINC GEOCHEMISTRY

Zinc values in silts have a fairly restricted range, with a mean of 102 ppm, and a maximum of 135 ppm. Soil values for zinc show a much wider range, with the 62 analyses yielding a mean value of 155 ppm and a maximum value of 1315 ppm. A 500 m length of line, a short distance north of I.D. post ON 4E, is quite anomalous in Zn, and silt samples in the drainage to the west of the soil samples

.../...

weakly mirror this anomaly. Elsewhere, silt samples collected along the west boundary of the claim are relatively high.

#### ARSENIC GEOCHEMISTRY

Arsenic values in silts range from 10 ppm to 28 ppm As, with a mean value of 18 ppm As. Values in the northern westerly-flowing tributary are slightly higher than background.

84 soil samples were analysed for arsenic, with a mean value of 16 ppm and a maximum value of 50 ppm As. A section of soil line about 600 m long, south of I.D. post 4N 4E, appears to be anomalous, as does a 300 m section of line 500 m north of I.D. post 0N 4E.

#### ANTIMONY GEOCHEMISTRY

Antimony values in silts were generally low, ranging from <2 ppm to 16 ppm, with a mean value of 6 ppm Sb. The distribution of higher values appears to be erratic.

The 51 soil samples analysed for antimony had a mean value of 9 ppm Sb, and a maximum value of 18 ppm Sb. Two of the higher values lie just south of I.D. post 4N 4E.

#### GEOCHEMISTRY SUMMARY

Because of the erratic distribution of sample sites and incomplete coverage of the claim area, this survey should be considered to be of a reconnaissance nature. There is insufficient data to contour results or to make confident conclusions. However, some points can be made from studying the data.

Firstly, no economic or even near economic values have

.../...

been determined by the analyses. The anomalies discussed above are statistical anomalies only, and may be meaningless in an economic sense.

There is little strong correlation between anomalies for different elements. In silts there is a weak correlation between higher values for gold and arsenic, between lead and zinc, and between zinc and silver. In soil samples zinc and arsenic anomalies coincide well in one area.

The zone of pyritized siltstone exposed about 500 m north of I.D. post ON 4E is probably the source of anomalous zinc and arsenic recorded in the overlying soils.

#### CONCLUSIONS AND RECOMMENDATIONS

The TILL 1 claim is underlain by Rossland Formation volcanics and sediments which are intruded by granite and basic syenite stocks.

Geochemical sampling and analysis were unsuccessful in pinpointing the source of placer gold in the district. Erratic higher gold values were determined in silt and soil samples, indicating the possibility of a nearby source.

Additional work should be undertaken in the district, taking advantage of the experience gained to date. Further work should be undertaken on the TILL 1 claim, preferably late enough in the season that snow is not a problem. This work should include more comprehensive mapping and fill-in sampling in areas of the more significant geochemical anomalies.



DUVAL INTERNATIONAL CORPORATION

SUITE 505 - 1281 WEST GEORGIA STREET

VANCOUVER BRITISH COLUMBIA V6E 3J7 CANADA TELEPHONE (604) 685-0185

ITEMIZED COST STATEMENT

Labour - Note: Labour is charged against assessment only for the period subsequent to recording of the claim.

David J. Wilson	June 2, 3 and 4 - \$ 56/day.....	\$ 168.00
Stewart P. Burgess	June 2, 3 and 4 - \$ 84/day.....	\$ 252.00
Gregory R. McKillop	June 2, 3 and 4 - \$140/day.....	\$ 420.00
Gregory R. McKillop	Dec. 3 - Report preparation.....	\$ 140.00
		<u>\$ 980.00</u>

Room and Board

9 man days @ \$35/man day.....	\$ 315.00
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Truck Rental

5 days @ \$40/day.....	\$ 200.00
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Fuel

311 l @ 40 ¢/l.....	\$ 125.00
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<u>Sample Shipping</u> .....	\$ 21.60
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Geochemical Analyses

Rock preparation	6 x \$2.90.....	\$ 17.40
Soil and silt preparation	189 x \$0.70.....	\$ 132.30
Gold analyses	195 x \$6.00.....	\$1,170.00
Silver analyses	118 x \$1.90.....	\$ 224.20
Lead analyses	85 x \$0.90.....	\$ 76.50
Zinc analyses	96 x \$0.90.....	\$ 86.40

Sub-Total.....\$3,348.40

Brought Forward.....		\$3,348.40
Arsenic analyses	118 x \$3.25.....	\$ 383.50
Antimony analyses	85 x \$4.00.....	\$ 340.00
<u>Typing, Draughting and Reproduction.....</u>		<u>\$ 200.00</u>
	Grand Total.....	\$4,271.90
		=====





DUVAL INTERNATIONAL CORPORATION

SUITE 505 - 1281 WEST GEORGIA STREET

VANCOUVER BRITISH COLUMBIA V6E 3J7 CANADA TELEPHONE (604) 685-0185

AUTHOR'S QUALIFICATIONS

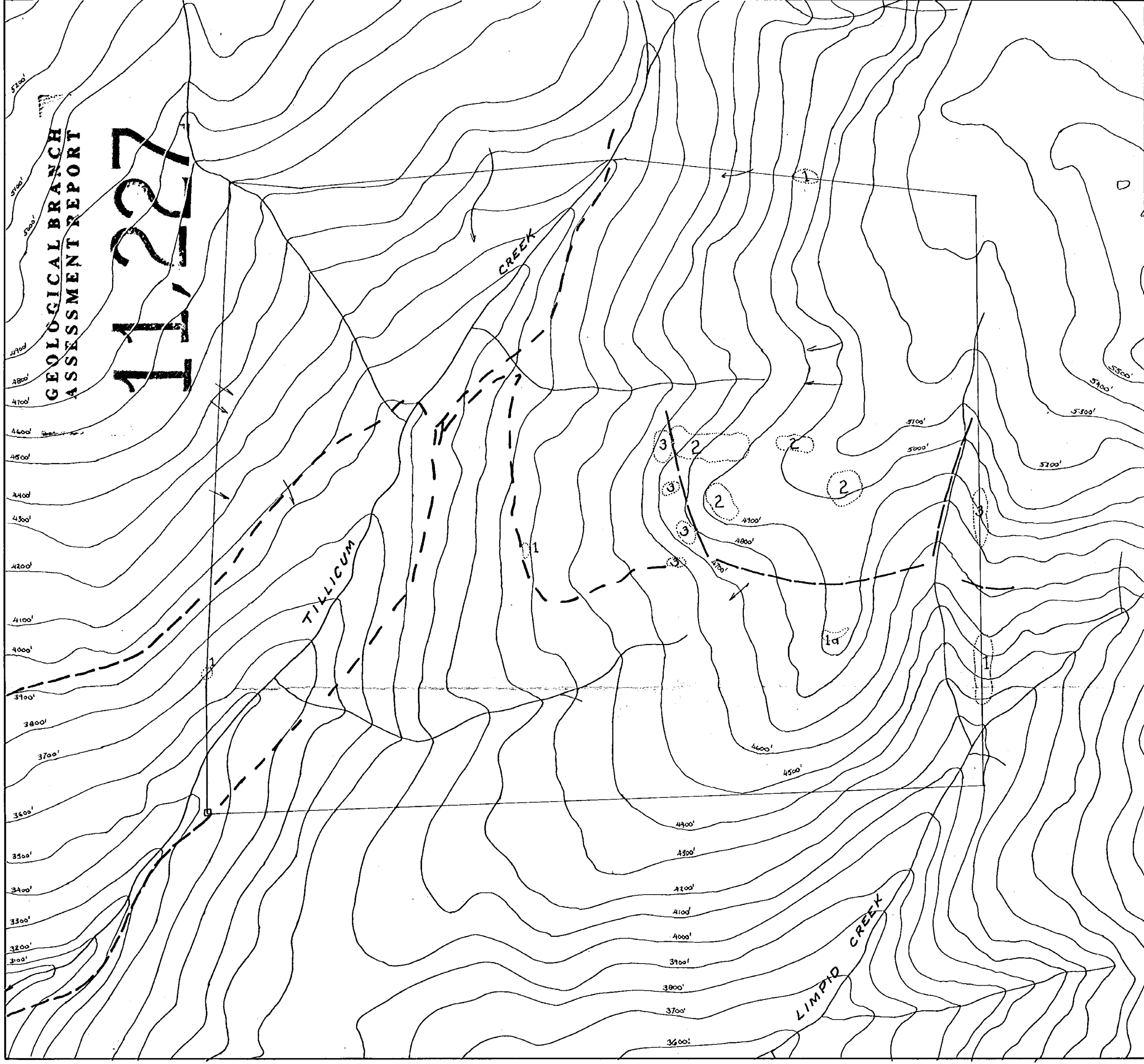
I, Gregory Ross McKillop, do hereby certify that:

- I reside at 1259 Demsey Road in North Vancouver, B.C.
- I am a graduate of the University of British Columbia with a 1973 B.Sc. Degree in Honours Geology.
- I have been employed in the mining exploration industry as a geologist continuously since 1973.
- I am currently District Geologist for Western Canada for Duval International Corporation.
- I supervised reconnaissance geological and geochemical work on the TILL 1 claim, as described in this report, in May and June of 1982.

Signed: \_\_\_\_\_

Dated: \_\_\_\_\_

April 13/83



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**LEGEND**

- Eocene (?) or later
- 3 **CORYELL SYENITE**  
-basic biotite syenite
- lower Cretaceous
- 2 **NELSON GRANITE**  
-biotite granite, porphyritic  
in part
- lower Jurassic
- 1  
1a **ROSSLAND FORMATION**  
-andesitic volcanics  
1a -pyritized siltstone
- Area of outcrop
- Geologic contact (assumed or inferred)
- Road
- Claim line and legal corner post

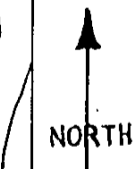
NORTH ↑  
 To accompany an assessment report on the TILL claim  
 by G.R.M. Killip. *G.R.M. Killip*  
 Claim lines located using compass and hip-chain.

<b>DUVAL INTERNATIONAL CORPORATION</b>		PROVINCE <b>B.C.</b>
<b>TILL 1 CLAIM</b>		N.T.S. <b>82F/3W</b> TOWNSHIP & RANGE
TYPE <b>Reconnaissance Geology</b>		MAP No. <b>2</b>
DATA BY <b>G.M.</b>	DRAWN BY <b>G.M.</b>	DATE <b>DEC 82</b>
		PLATE No.

GEOLOGICAL BRANCH  
ASSESSMENT REPORT

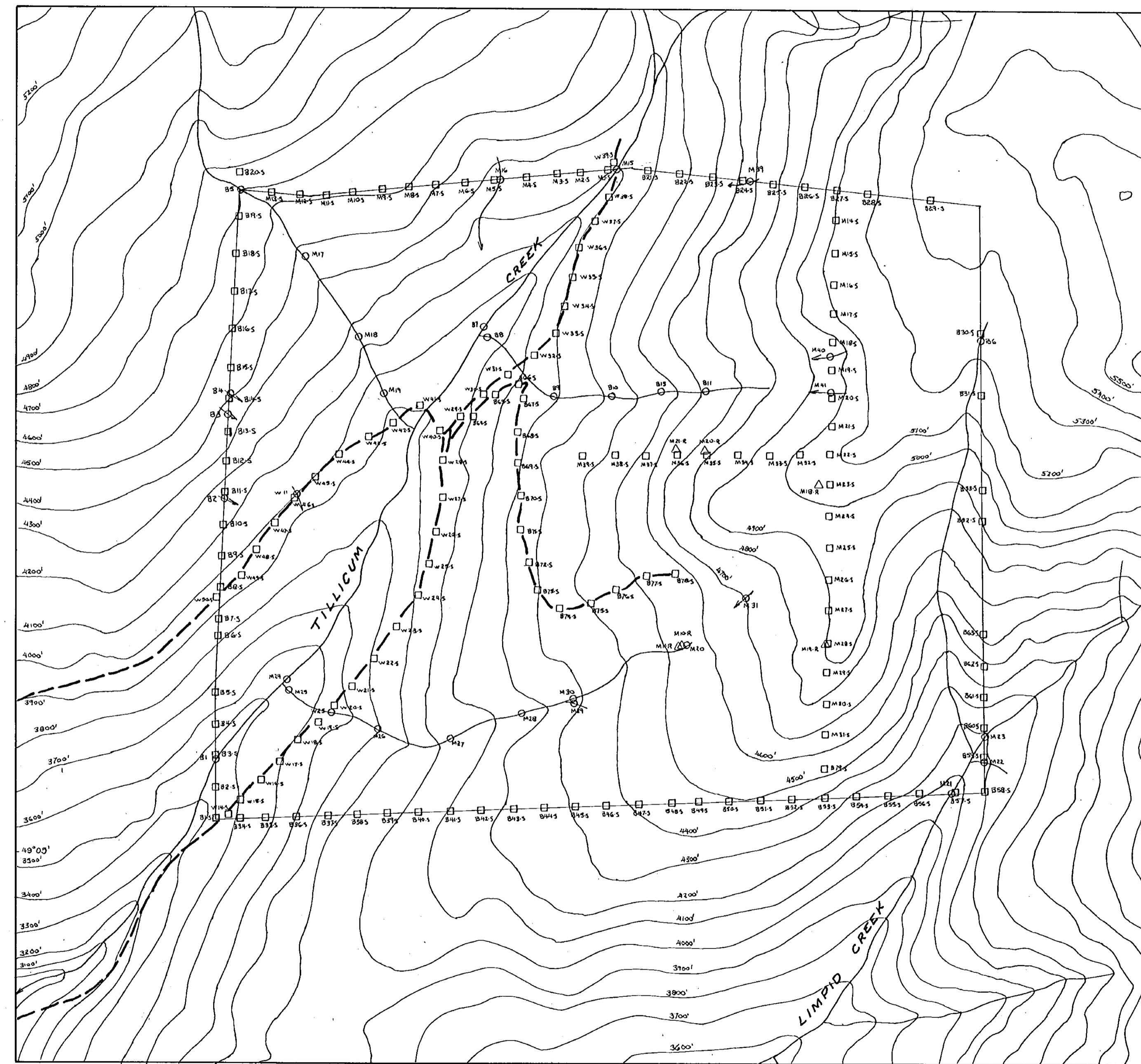
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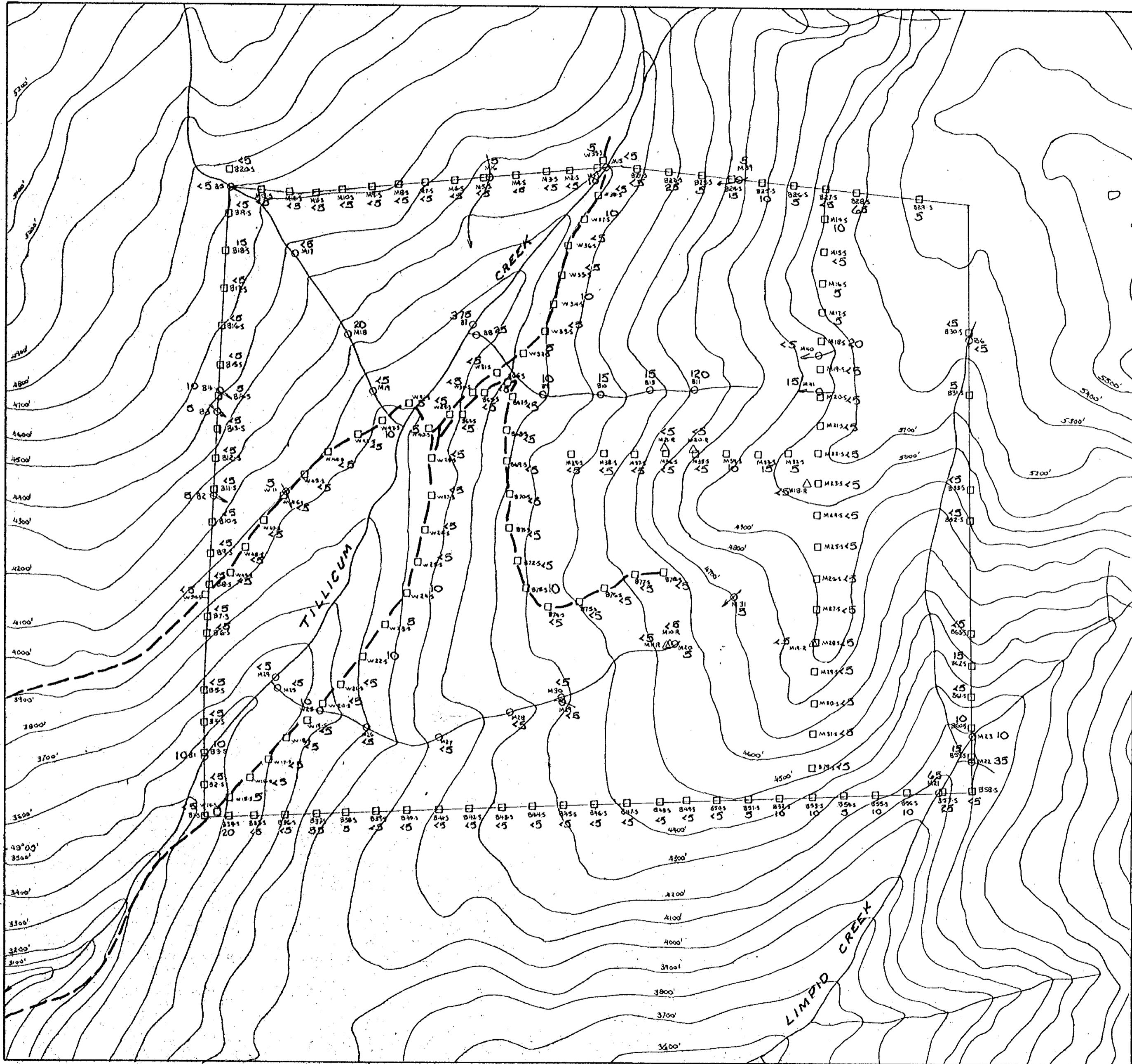
- Soil Sample Location  
*All sample numbers preceded by B.C.G.82 prefix.*
- Silt Sample Location
- △ Rock Sample Location
- Road
- └ Claim Line



To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop.  
*G.R. McKillop*  
Claim lines located using compass and hip-chain.

DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		N.T.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Sample Locations		MAP No. 3
DATA BY	DRAWN BY G.M.	DATE DEC. 82
0 100 200 300 400 500 600 700 800 900 1000 metres		PLATE No.

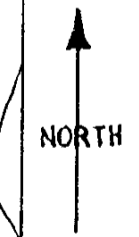




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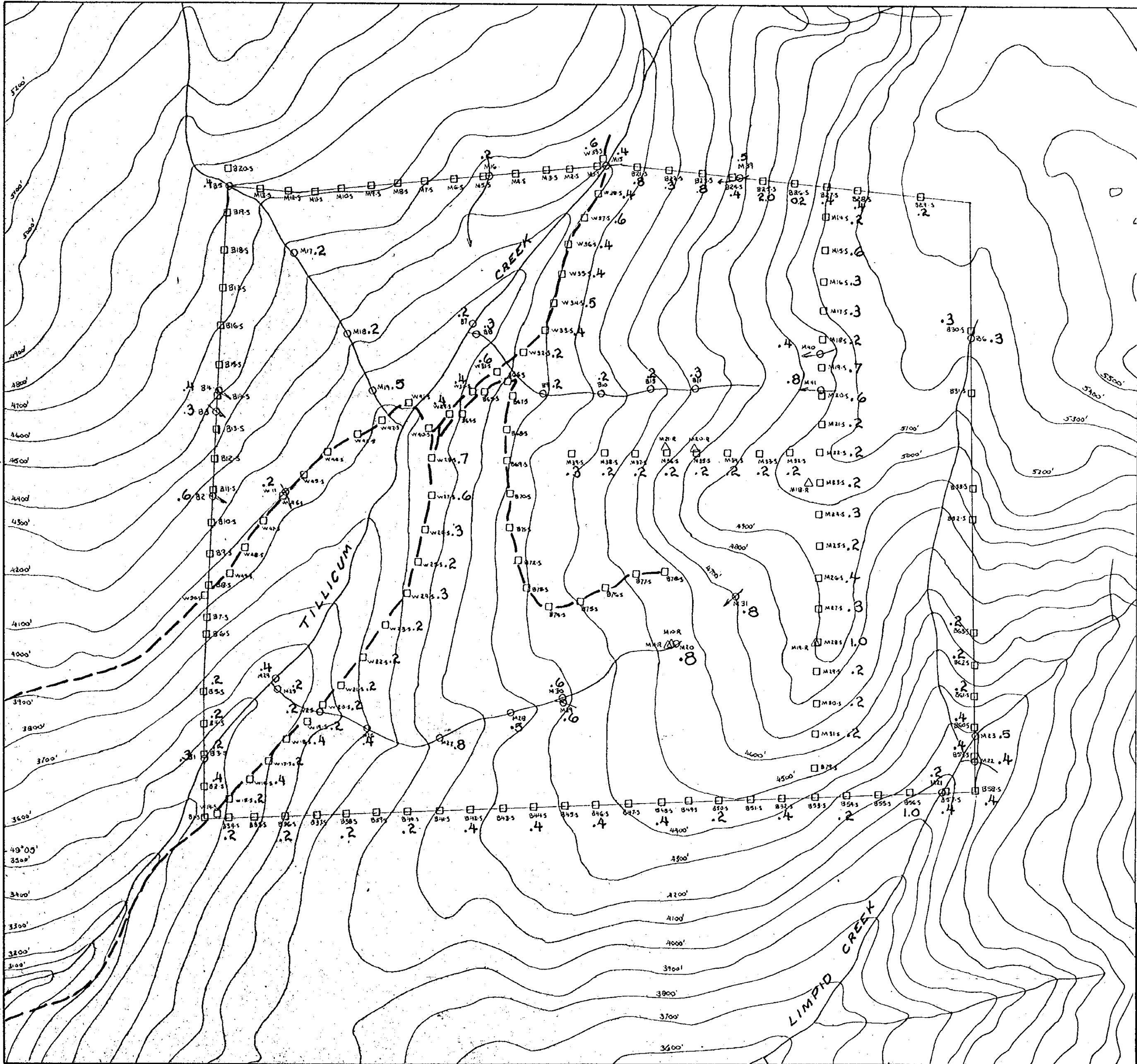
- 5 Gold Content (p.p.b)
- Soil Sample Location  
*All sample numbers preceded by B.C.G.82 prefix.*
- Silt Sample Location
- △ Rock Sample Location
- Road
- └ Claim Line



To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop. *G.R. McKillop*  
Claim lines located using compass and hip-chain.

DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		N.T.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Gold in p.p.b.		MAP No. 4
DATA BY	DRAWN BY G.M.	DATE DEC. 82
		PLATE No.





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4 □ Silver Content (p.p.m)

WALS □ Soil Sample Location  
All sample numbers preceded by B.C.G.82 prefix.

86 ○ Silt Sample Location

WZR-R △ Rock Sample Location

— Road

└ Claim Line

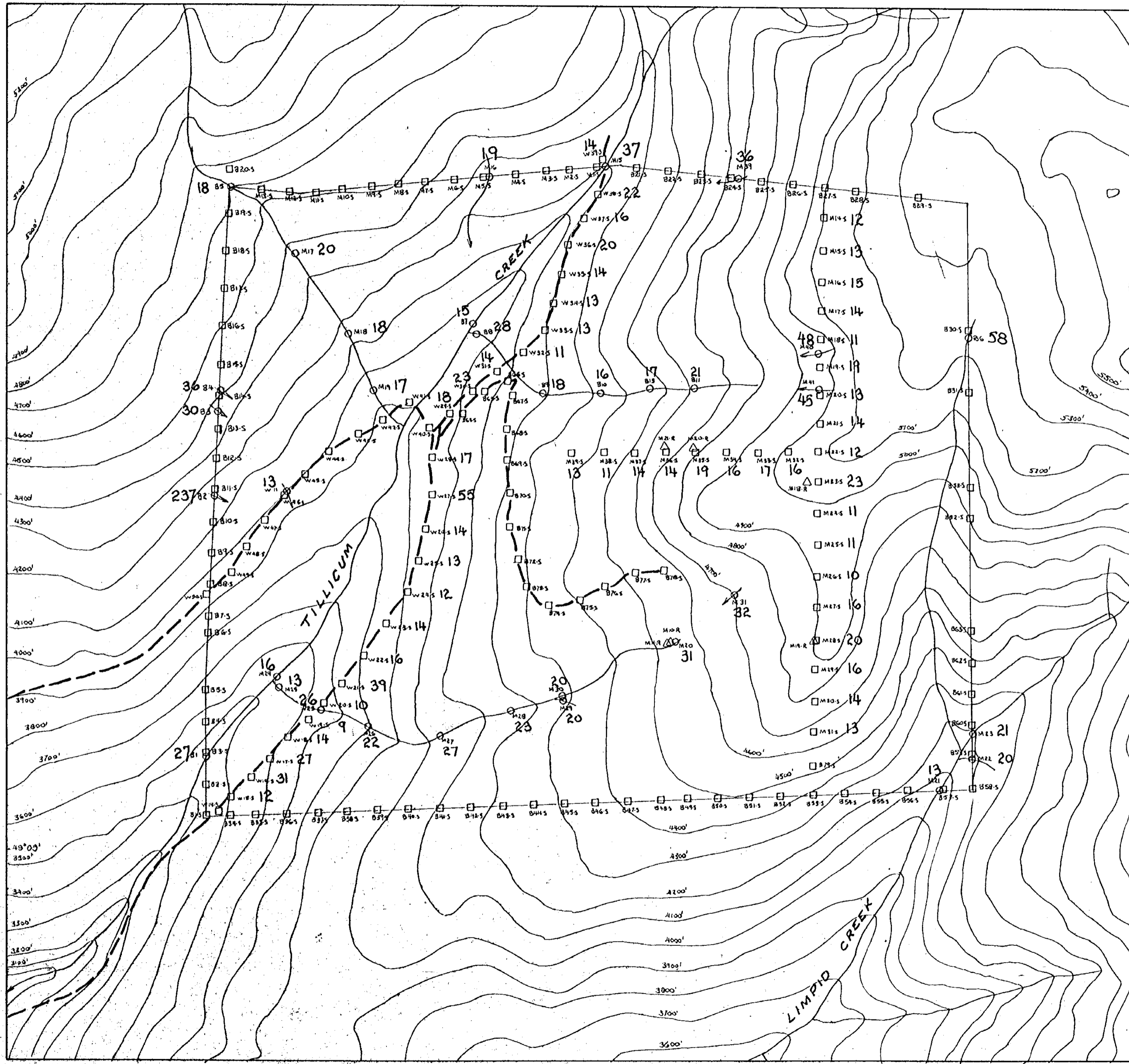


To accompany an assessment report on the TILL 1 claim by G.R. McKillop. *G.R. McKillop*  
Claim lines located using compass and hip-chain.

DUVAL INTERNATIONAL CORPORATION			PROVINCE B.C.
TILL 1 CLAIM			M.T.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Silver			MAP No. 5
DATA BY	DRAWN BY G.M.	DATE DEC. 82	PLATE No.

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12 □ Lead Content (p.p.m.)

W315 □ Soil Sample Location  
All sample numbers preceded by BCG.82 prefix.

86 ○ Silt Sample Location

M21-R △ Rock Sample Location

— Road

└ Claim Line



To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop. *[Signature]*  
Claim lines located using compass and hip-chain.

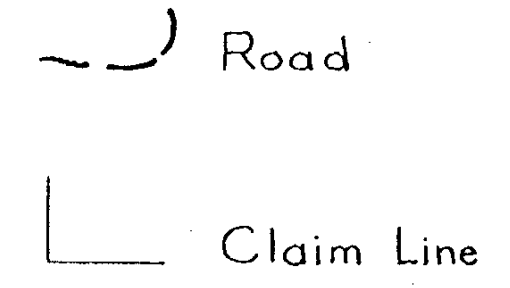
DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		N.T.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Lead		MAP No. 6
DATA BY	DRAWN BY G.M.	DATE DEC. 82
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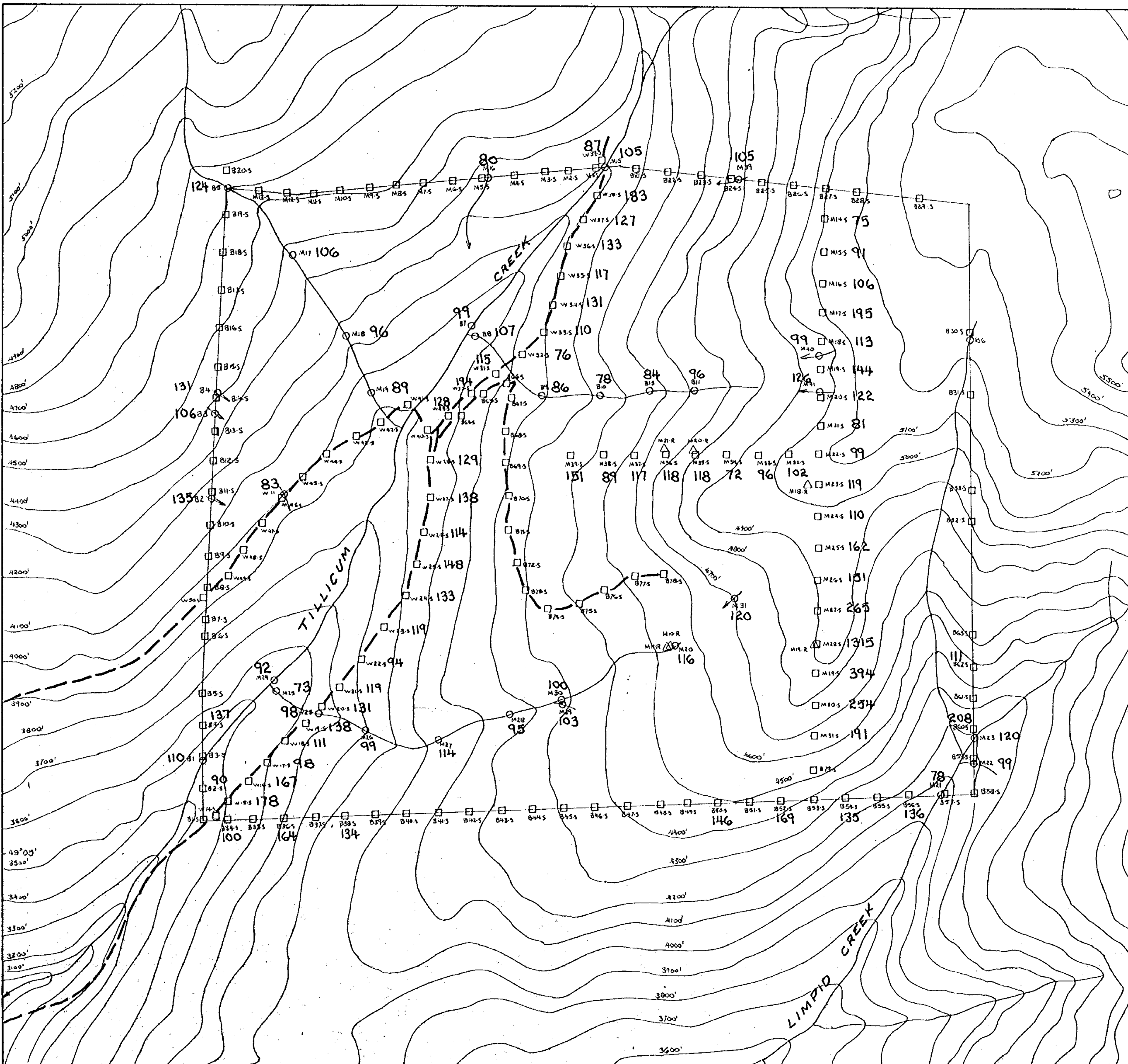
- 115 □ Zinc Content (ppm)
- W115 □ Soil Sample Location  
*All sample numbers preceded by B.C. 82 prefix.*
- 86 ○ Silt Sample Location
- W21-R △ Rock Sample Location



To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop.

*G.R. McKillop*

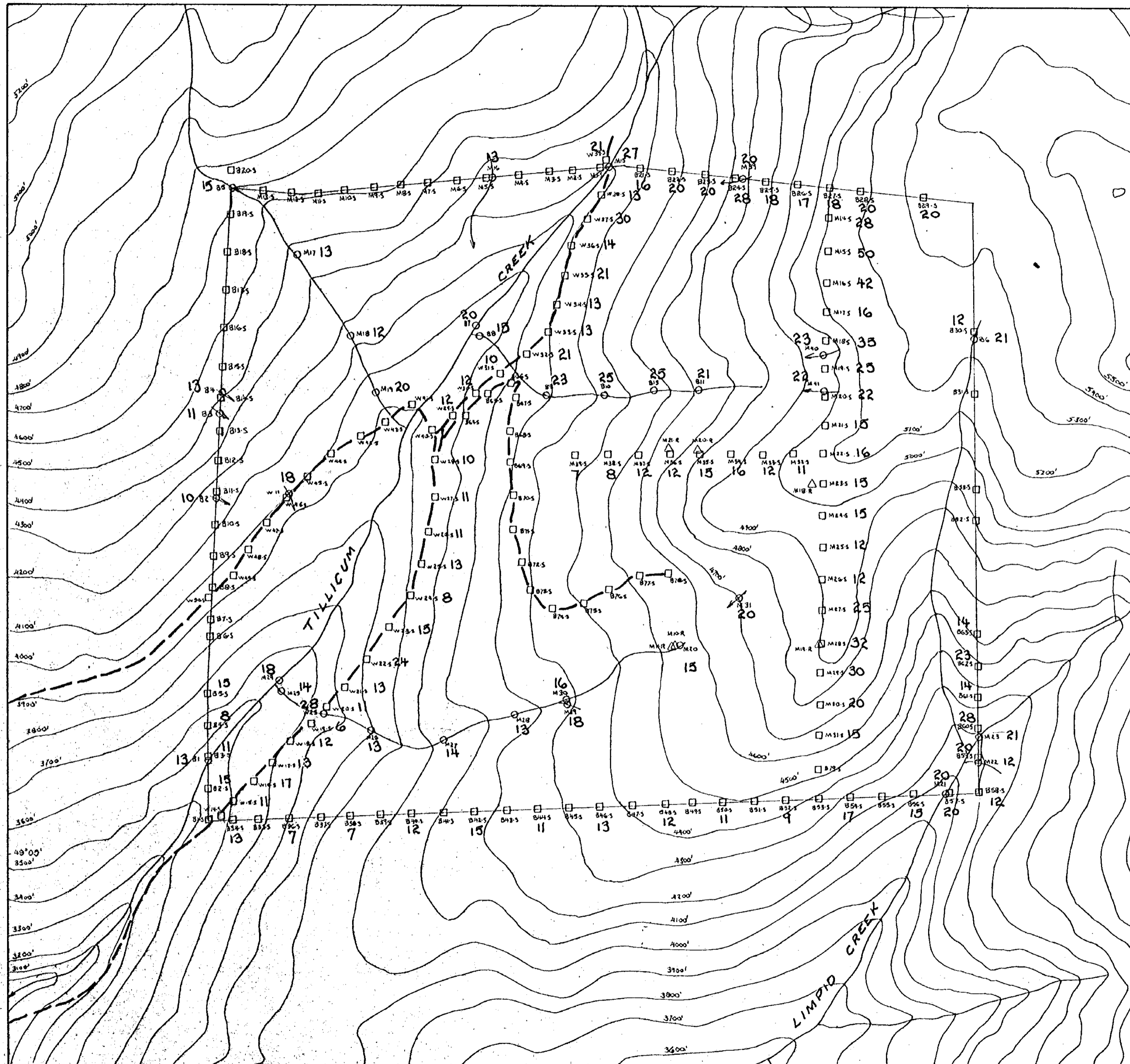
Claim lines located using compass and hip-chain.



DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		N.T.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Zinc		MAP No. 7
DATA BY	DRAWN BY G.M.	DATE DEC. 82
0 100 200 300 400 500 600 700 800 900 1000 metres		PLATE No.

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10 Arsenic Content (p.p.m)

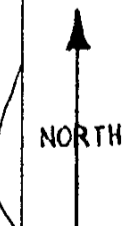
Soil Sample Location  
All sample numbers preceded by  
BCG.82 prefix.

Silt Sample Location

Rock Sample Location

Road

Claim Line



To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop

*G.R. McKillop*  
Claim lines located using compass and hip-chain.

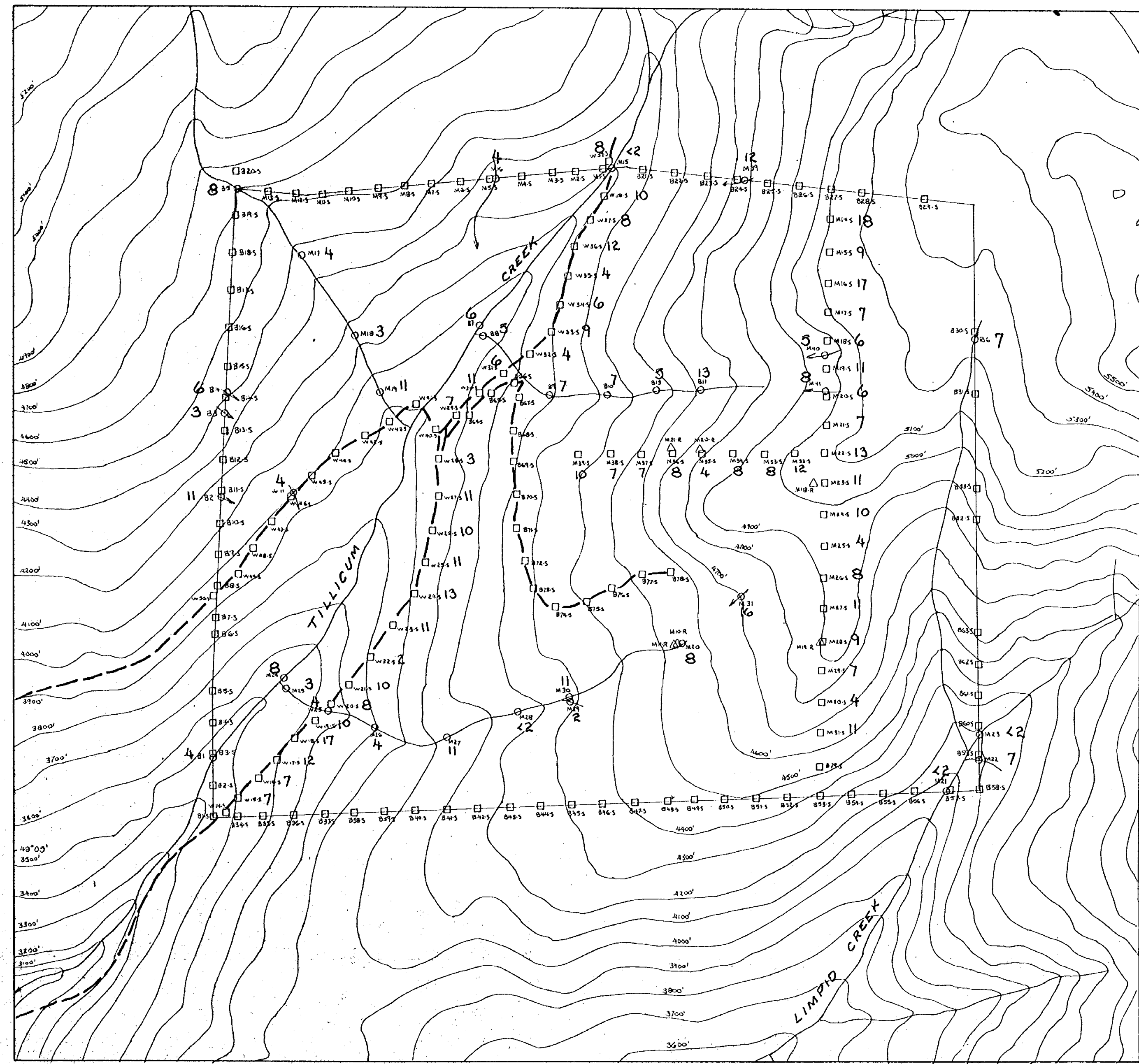
DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		N.F.S. 82F/3W TOWNSHIP & RANGE
TYPE Geochemistry: Arsenic		MAP No. 8
DATA BY	DRAWN BY G.M.	DATE DEC. 82
		PLATE No.

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- 6 □ Antimony Content (p.p.m)
- Soil Sample Location  
*All sample numbers preceded by BCG82 prefix.*
- Silt Sample Location
- △ Rock Sample Location
- Road
- └ Claim Line

↑ NORTH  
To accompany an assessment report on the TILL 1 claim  
by G.R. McKillop.  
*G.R. McKillop*  
Claim lines located using compass and hip-chain.



DUVAL INTERNATIONAL CORPORATION		PROVINCE B.C.
TILL 1 CLAIM		M.T.S. 82F/3W
TYPE Geochemistry: Antimony		TOWNSHIP & RANGE
DATA BY	DRAWN BY G.M.	MAP No. 9
	DATE DEC. 82	PLATE No.