82-548-10613

8

GEOPHYSICAL
AND
PROSPECTING

ASSESSMENT REPORT

on the

SYLVESTER PROPERTY

CLAIMS: BELMONT FR, CIMERON, NEW YORK
SYLVESTER K, SYLVESTER K FR, TIMER FR

PHOENIX AREA

GREENWOOD MINING DIVISION

NTS:	82E/2E
Latitude:	49°07.3' North
Longitude:	118°33.3' West
Owner:	Noranda Exploration Co. Ltd.
Operator:	Kettle River Resources Ltd.
Consultant:	K.L. Daughtry & Associates Ltd.
Author:	W.R. Gilmour
Date:	July 15, 1982.

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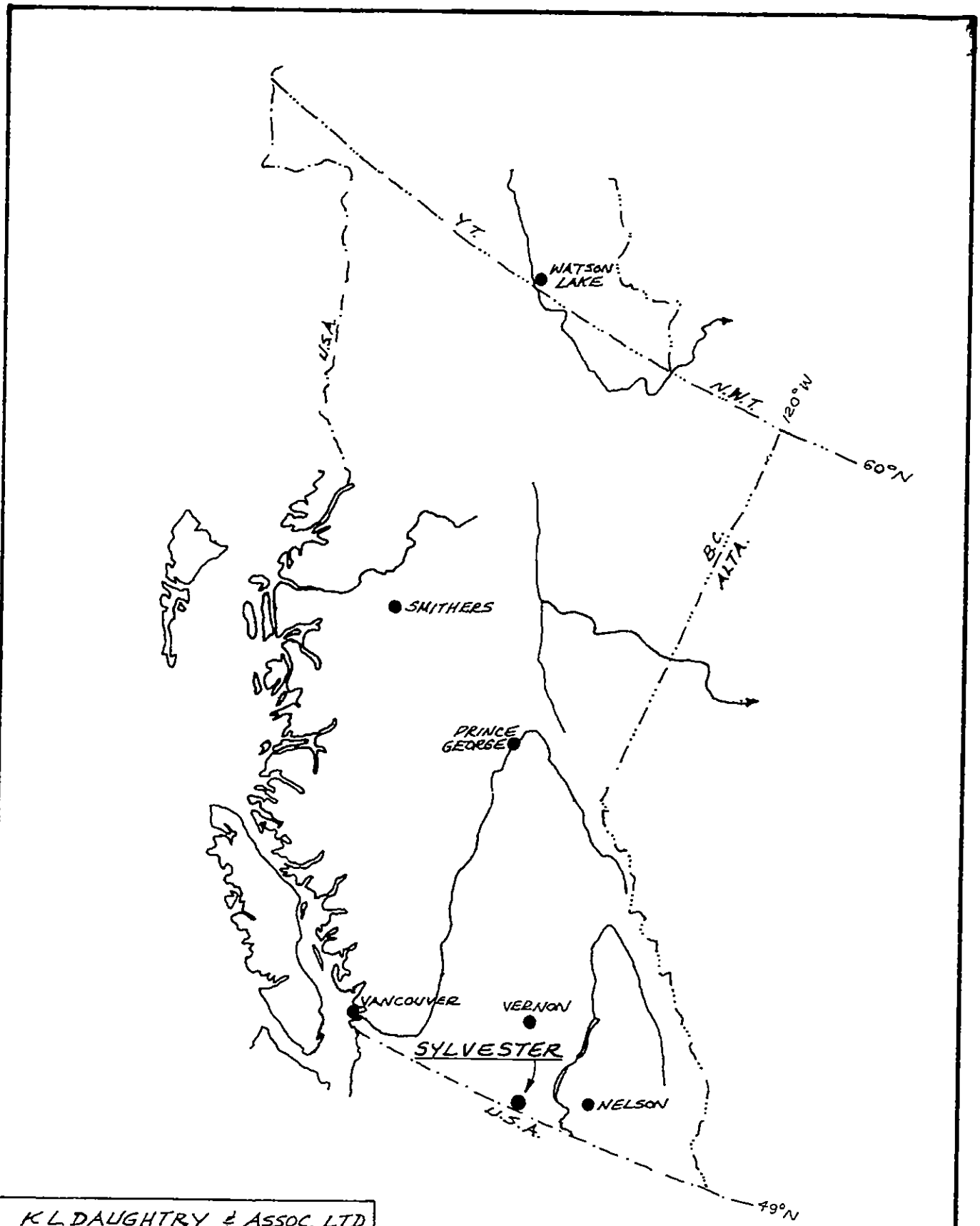
LIST OF ILLUSTRATIONS

SUMMARY

Previous work has indicated the presence of pyrite-gold mineralization on the Sylvester property. An exploration program was begun in June, 1982.

A flagged grid comprising a base line and cross lines totalling 3.0 km was installed with a VLF EM survey being completed over 1.8 km of grid line. Geological mapping at a scale of 1:1,000 was commenced. Twenty rock samples were collected and analysed for gold and/or silver. Significant gold values were obtained and a strong VLF EM conductor discovered. The property exhibits good exploration potential and a programme of further exploration is recommended.



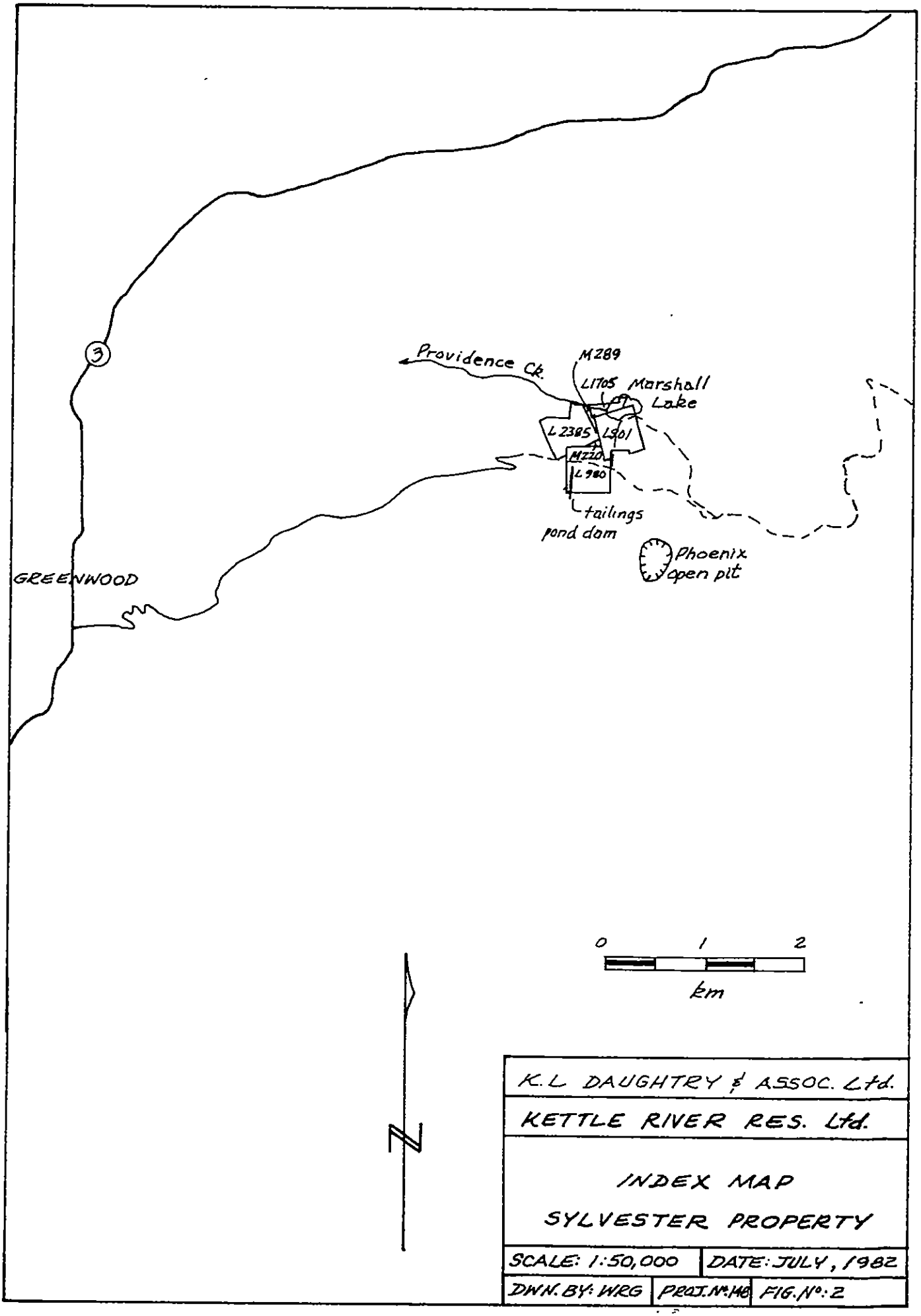
K L DAUGHTRY & ASSOC. LTD
KETTLE RIVER RES. Ltd.
LOCATION MAP SYLVESTER PROPERTY
JULY, 1982 FIG. NO. 1

LOCATION, ACCESS, TOPOGRAPHY

The Sylvester property is located 5.5 km ENE of Greenwood, in the Phoenix Camp of the Boundary District of south-central British Columbia. The claims are immediately southwest of Marshall (Providence) Lake. The center of the property is 49°06.4' N. Latitude and 118°36.5' W. Longitude. The National Topographic System map reference is 82E/2E.

Good access is provided by well maintained gravel roads, adjacent to the area mapped. The distance westerly, via a gravel and then paved road, to Greenwood is about 8 km and easterly is about 12 km to Highway 3.

The elevations range from 1340 to 1425 m above sea level, with a generally moderate topography. The Twin Creek valley has been filled in with tailings from the Phoenix mine. Some of the area has recently been logged.



K. L DAUGHTRY & ASSOC. Ltd.	
KETTLE RIVER RES. Ltd.	
INDEX MAP SYLVESTER PROPERTY	
SCALE: 1:50,000	DATE: JULY, 1982
DWN. BY: WRG	PROJ. No: 146 FIG. No: 2

PROPERTY

The following claims comprise the Sylvester property.

CLAIM NAME	Record No.	Expiry Date	Registered Owner
BELMONT FR	M 220	October 16, 1982	Noranda Exploration Company Limited (no personal liability)
CIMERON	L 980	Crown-granted	Noranda Exploration Company Limited (no personal liability)
NEW YORK	L 901	Crown-granted	Noranda Exploration Company Limited (no personal liability)
SYLVESTER K	L 2385	Crown-granted	Noranda Exploration Company Limited (no personal liability)
SYLVESTER K FR	M 289	September 22, 1982	Noranda Exploration Company Limited (no personal liability)
TIMER FR	L 1705	Crown-granted	Noranda Exploration Company Limited (no personal liability)

The CIMERON is part of PHOENIX 82 group, the remaining claims belonging to the CYCLOPS 82 group.

Kettle River Resources Ltd. acquired the property on option from Noranda in 1981.

HISTORY

Although there are numerous old exploration workings on the Sylvester property there is no record of work in any British Columbia Ministry of Mines Annual Reports.

Minor sampling of the old workings was carried out by Granby Mining in 1963 (12). "Massive pyrite" ran Cu, tr; Au, 0.135 oz/ton; Ag, 0.28 oz/ton and "magnetic skarn" ran Cu, 2.15%; Au, 0.610 oz/ton; Ag, 1.72 oz/ton; Zn, 0.60%.

The MARSHALL claim, adjoining the Sylvester property to the north was drilled by Cominco in 1938 (2,12). During the period 1966-1973 the Marshall property was explored by San Jacinto and Highland Lode (3,4,5,6,7,10,19). Soil sampling, magnetometer, IP and geological surveys and percussion and diamond drilling were carried out.

Minor production during that period amount to 468 tons grading 1.0 oz/ton Au with minor values in Ag, Cu, Pb and Zn.

In 1966, Huntec carried out I.P. surveys for Granby over the southern part of the CIMERON claim (9,16). A NNE trending anomalous zone ("zone B") possibly connects with the I.P. anomaly on the Marshall property.

The zone was tested with 2 drill holes. One of the holes interesected long sections of talc with disseminated pyrite (12). A sample ran trace in Cr, Au and Ag (10).

WORK PROGRAMME

A flagged grid was installed over the area of interest. Geological mapping, rock sampling and a VLF EM Survey was conducted over the grid south of 300 N. North of 275 N only prospecting was completed at the time of this report.

REGIONAL GEOLOGY AND MINERALIZATION

Proterozoic(?) gneisses and schists are the oldest rocks in the Greenwood area. Their relationship to the younger rocks is unclear at present.

Pennsylvanian-Permian rocks comprise two distinct rock units (17); 'oceanic' basalt and chert, and 'trench and arc' clastic (chiefly pelitic) and volcanic (andesite to rhyolite) rocks. The Upper Paleozoic rocks have undergone moderate metamorphism and folding.

Tectonically emplaced ultramafic rocks of probable Permian age (17) commonly occur in the area. Minor platinum (SAPPHO), chromium and nickel showings are related or occur in these generally serpentinized rocks. Deposits spatially associated with the Ironclad serpentinite (WINNIPEG, ATHELSTAN-JACKPOT, GOLDEN CROWN, KENO, IRONCLAD, and WINNER) produced 16,800 oz. gold and 47,000 oz. silver from 74,000 tons of ore.

Overlying the Upper Paleozic rocks are middle to upper Triassic rocks of the Rawhide and Brooklyn formations. Shales of the Rawhide Formation are conformable with the overlying Brooklyn Formation (18). The Brooklyn Formation comprises three main rock types: (17)

1. Clastic units of shale, greywacke and/or conglomerate. The clasts in the conglomerates are either chert pebbles ('sharpstone'), volcanic rocks, or limestone ('puddingstone').
2. Carbonate units, grading from pure limestone to limy shale. Iron and copper mineralization occurs in impure limestones and limy shales.
3. Tuffaceous units which in places are difficult to distinguish from greywackes and vice versa.

All of the above rock types are intercalated and commonly have been metamorphosed to coarse grained marbles and calc-silicate rocks.

In the Greenwood area very significant copper-gold-silver mineralization occurs in the Brooklyn Formation. The ore deposits are restricted to what has been previously classified as 'skarn'. It was believed that certain stratigraphic horizons, comprising porous limy sediments, were more susceptible to hydrothermal fluids emitting from a mineralizing instrusion, resulting in the formation of calc-silicate skarns and iron and copper mineralization, that is, 'contact metasomatic' deposits. However the author of this report supports a different view, summarized by Peatfield (p 185) as follows:

> "...the deposits are stratabound metamorphic, probably originally sedimentary concentrations of copper and iron in limey [sic] shales associated with the landward edges of limestone reefs, or located in 'pools' within reefal accumulations."

These Triassic deposits are generally stratabound and are occasionally stratiform (e.g. EMMA and north end of the BROOKLYN). The deposits have been deformed tectonically, to varying degrees, by faults and folds and cut by intrusive rocks. Pyrite, chalcopyrite, hematite and magnetite are the common 'ore' minerals. Sphalerite occurs in the area of the CYCLOPS showing. Garnet, epidote, actinolite, calcite and quartz are the common 'gangue' minerals, with notable changes in relative amounts according to each particular camp.

Production figures for the main Triassic deposits are as follows:

	Tons	Cu %	Au oz/ton	Ag oz/ton
PHOENIX CAMP - Knob Hill, Old Ironsides, Stemwinder, Brooklyn, Idaho, Snowshoe, Rawhide, Gold Drop, Curlew, Monarch	30,278,000	0.85%	0.032	0.20
DEADWOOD CAMP - Motherlode, Sunset, Greyhound, Morrison	4,643,000	0.86%	0.038	0.16
SUMMIT CAMP - BC, Emma, Oro Denoro, Mountain Rose	506,000	1.8%	0.023	0.65
TOTAL	35,427,000	0.86%	0.033	0.20

Andesitic volcanic rocks of probable Jurassic age occur east of the Phoenix area, overlying the Brooklyn Formation. No economic mineral deposits are known to exist in these rocks. The Mesozoic rocks have undergone moderate folding, with a general north-south axial trace of slightly northward plunging open folds.

Intrusive 'Nelson' rocks of Cretaceous age do not seem to be genetically related, except through metamorphism, to the copper-gold-silver Triassic deposits. Porphyritic rocks of Cretaceous(?) age host copper mineralization at the CITY OF PARIS deposit (8), and are responsible for the copper-silver mineralization on the SAPPHO prospect (11).

Mineralized quartz veins of Cretaceous and/or Tertiary(?) age occur in the Greenwood area apparently with random areal distribution. The seven main deposits (DENTONIA, PROVIDENCE, SKYLARK, YANKEE BOY, NUMBER SEVEN, E PLURIBUS UNUM and LAST CHANCE) have produced 54,400 oz. of gold and 2,015,000 oz. of silver from 179,000 tons of ore.

During Tertiary times deposition of clastic sediments and volcanic flows and the intrusion of acidic to basic igneous rocks accompanied graben-like normal faulting (15).

PROPERTY GEOLOGY & MINERALIZATION

On the Sylvester property the Brooklyn Formation is represented by the same stratigraphic units as at the Phoenix mine. Using Granby's geological terms the rock units are, from west to east and older to younger, 'sharpstone conglomerate', 'footwall argillite', 'aeolian sandstone' and Brooklyn limestone. These rocks dip steeply and strike NNE.

The 'sharpstone' is represented by a green sandstone with minor conglomeratic and argillaceous sections. Chert grains occur in a green matrix with minor epidote alteration.

Overlying the sandstone is a grey to black, siliceous, pyritic argillite. The pyrite content probably averages about 10% although massive pyrite bands occur, seemingly more frequently at the top of the unit. Minor sandstone units, probably lensoid, were noted.

The 'aeolian sandstone' consists of rounded rice-sized grains of chert in a calcite matrix. Minor limy argillaceous and limestone beds or lenses also occur.

The limy chert sandstone is overlain by limestone, recrystallized to a marble. The recrystallization has not been very intensive as the rock is usually fine grained and in places still is grey coloured on a weathered surface.

On the southern part of the property there appears to be a facies change from argillite and limy chert sandstone to limestone. This limestone unit, different stratigraphically from the lower Brooklyn limestone, can be traced to the north as intermittant lenses.

A post-Triassic microdiorite, containing about 5% pyrite, cuts the stratigraphy at the north end of the property. Hornblende, with minor feldspar,

Tertiary porphyry dykes and minor possibly related 'skarny' rocks seem to occur in a NW-SE zone cutting the stratigraphy. Calc-silicate (epidote) rich zones occur but are not pervasive. The dykes appear to be flat lying with northerly or easterly dips. Outcrops along the main road show the dykes are truncated by faults.

Rock samples, totalling 20, were collected and assayed, or geochemically analysed, by Bondar Clegg & Company Ltd. for Au and/or Ag by standard methods. The results are shown in Table 1 and the sample locations are plotted on Figure 4.

The sampling covered the range of rock types present but concentrated on pyritic rocks. Eight samples assayed >.01 oz/ton Au of which three ran >.10 oz/ton. The highest silver value was 0.40 oz/ton. The average pyritic argillite generally contained no anomalous gold values. However, most of the samples containing >.02 oz/ton Au were from massive to semi-massive pyrite zones within the argillite. The notable exception is the highest Au value, in a 'skarny' rock, 50% pyrite and 50% calcite from the dump of a water filled shaft by 125N/15E. The pyritic zones, where seen in the old workings, were less than 10 cm in width. The mineralization commonly has a medium grained, partly rounded, texture.

TABLE 1 - ROCK SAMPLING

SAMPLE NUMBER	SAMPLE TYPE	WIDTH or LENGTH m	Au oz/ton ppb*	Ag oz/ton ppb*	COMMENTS
71889	grab	-	30*	-	microdiorite, 5% py
71890	grab	-	35*	-	cherty argillite, 10-15% py; dump
71891	grab	-	.054	.04	6 cm wide massive py band
71892	selected grab	-	.191	.19	massive py; dump
73206	selected grab	-	.031	.04	75% py; dump
73207	selected grab	-	.260	.40	50% py, cal; dump
73208	selected grab	-	.163	.20	50% py, qtz; dump
73209	grab	-	20*	-	chert sandstone, limy matrix
73210	chip	W 1.1	.004	.05	green chert sandstone py
73211	chip	W 1.1	.002	.04	pyritic siliceous argillite
73212	grab	-	.005	.03	green chert sandstone
73213	grab	-	25*	-	hornblende porphyry dyke
73214	grab	-	<5*	-	siliceous, skarny rock ep, 5% py

SAMPLE NUMBER	SAMPLE TYPE	WIDTH or LENGTH m	Au oz/ton ppb*	Ag oz/ton ppb*	COMMENTS
73215	grab	-	< 5*	-	hornblende (+feldspar) porphyry dyke, minor rusty fractures
73216	grab	-	.004	.03	rusty consolidated regolith; 0.02% Cu
73217	chip	L 1.0	.032	.06	light colour, bleached looking, siliceous; 15% py
73218	chip	L 1.7	.014	.05	light grey cherty argillite; 10% py
73219	chip	L 1.6	.013	.03	light grey cherty argillite: 10% py
73220	selected grab	-	.006	.04	50% py
73221	chip	W 1.9	.004	.02	grey to black siliceous argillite, 15% py

VLF EM SURVEY

The VLF (very low frequency) method makes use of powerful, distant military radio transmitters. These transmitters induce electric currents in conductive bodies. The induced current produce secondary magnetic fields which can be detected by measuring deviations in the normal VLF fields. To maximize detection the direction to the transmitting station should be parallel to the strike of the conductor, although differences in direction of up to 45° still give very good responses. Klein and Lajoie summarize the interpretation of results as follows:

> "The conductor is located at the inflection point marking the crossover from positive tilt to negative tilt, and the maximum in field strength" (Klein and Lajoie, p 270).

They also state that the VLF method can detect "unwanted sources" such as swamp edges, creeks and topographic highs. Griffiths and King state that:

> "VLF. . . has been found useful for mapping concealed boundaries between formations of contrasting resistivities rather than for the detection of localized conductors" (Griffiths and King, p 126)

On the Sylvester property a VLF EM survey was carried out over a flagged grid comprising 1.8 km of line. Readings were taken every 10 m on lines 25 m apart. The instrument used was a Sabre model 27. Hawaii, transmitting at 23.4 khz and at a direction of 250° azimuth, was the station used. This station does not transmit all day on Wednesday. A base station was set up near 100N/60E. The operator returned to the base station several times throughout the survey to adjust the instrument. The field strength readings often showed considerable drift, in both directions, and readings were difficult to duplicate. However,

tilt angle measurements remained consistent.

Tilt angle profiles are shown on Figure 5. The VLF EM survey shows a distinct crossover on successive lines, indicating a linear conductor for a length of at least 110 m, from 175N/15E to 275N/60E. The survey has not been completed north of line 275N. The strike of the conductor is about 025° azimuth, or at a 45° angle to the transmitting station. The conductor parallels the geological strike and is near or at the pyritic argillite/limy chert sandstone contact. A short, weak conductor exists between 125N/35E and 150N/45E.

The field strength readings have not been used in interpretation. However, on lines 250N and 275N the field strength peaks (>100% of normal field) are located in the area of the tilt angle crossovers.

DISCUSSION & CONCLUSIONS

A siliceous argillite unit of the Brooklyn Formation containing 10% pyrite on average is host to semi-massive to massive pyrite beds containing erratic but significant gold. To date economic widths have not been seen although no rock is exposed along most of the strike length of the VLF EM conductor (see below).

There is an almost total lack of copper mineralization on surface of the Sylvester property although the stratigraphic section is very similar to that in the Phoenix mine.

The VLF EM survey shows a very distinct crossover on successive grid lines for a distance of at least 110 m. This geophysical response is most likely due to either:

1. a conformable bed of massive to near massive pyrite, as seen in some of the old workings;

or 2. the marked change from a siliceous pyritic argillite to an essentially non-pyritic limy chert sandstone.

The overburden in the area appears to be thin and there are no old workings along most of the length of the conductor.

RECOMMENDATIONS

The following programme on the Sylvester property is recommended.

1. The showings should be evaluated in terms of the geological study of the Phoenix Comp now being undertaken.

2. Completion of geological mapping and the VLF EM survey on the northern part of the property.

3. Backhoe trenching followed by mapping and sampling of the conductor as indicated by the VLF EM survey.

Any further work would depend on the results of the above programme.

Respectfully submitted

W.R. Gilmour

July 15, 1982

Vernon, B.C.

REFERENCES

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17.	Peatfield	1978	Geologic History and Metallogeny of the Boundary District, Southern B.C. and Northern Washinton, Queen's University, Ph.D. Thesis
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STATEMENT OF COSTS

1.	Professional Services W.R. Gilmour, geologist fieldwork June 7, 17, 19–22, July 17, and report writing 9 days @$200/day	$1,800.00	$1,800.00
2.	Transportation 4 X 4 truck 6.5 days @$30/day 600 km @$.30/km	195.00 180.00 375.00	375.00
3.	Accommodation, meals June 7, 17, 19–22 July 17		191.29
4.	Analyses Rock assays 14 gold & silver @ $12.50 1 copper @ $6.50 Rock Geochem 6 gold @ $6.00	175.00 6.50 36.00 217.50	217.50
5.	VLF EM rental 2 days @ $25/day		50.00
6.	Field Supplies, shipping		50.00
7.	Printing, secretarial, telephone		250.00
	Total		$2,933.79

STATEMENT OF QUALIFICATIONS

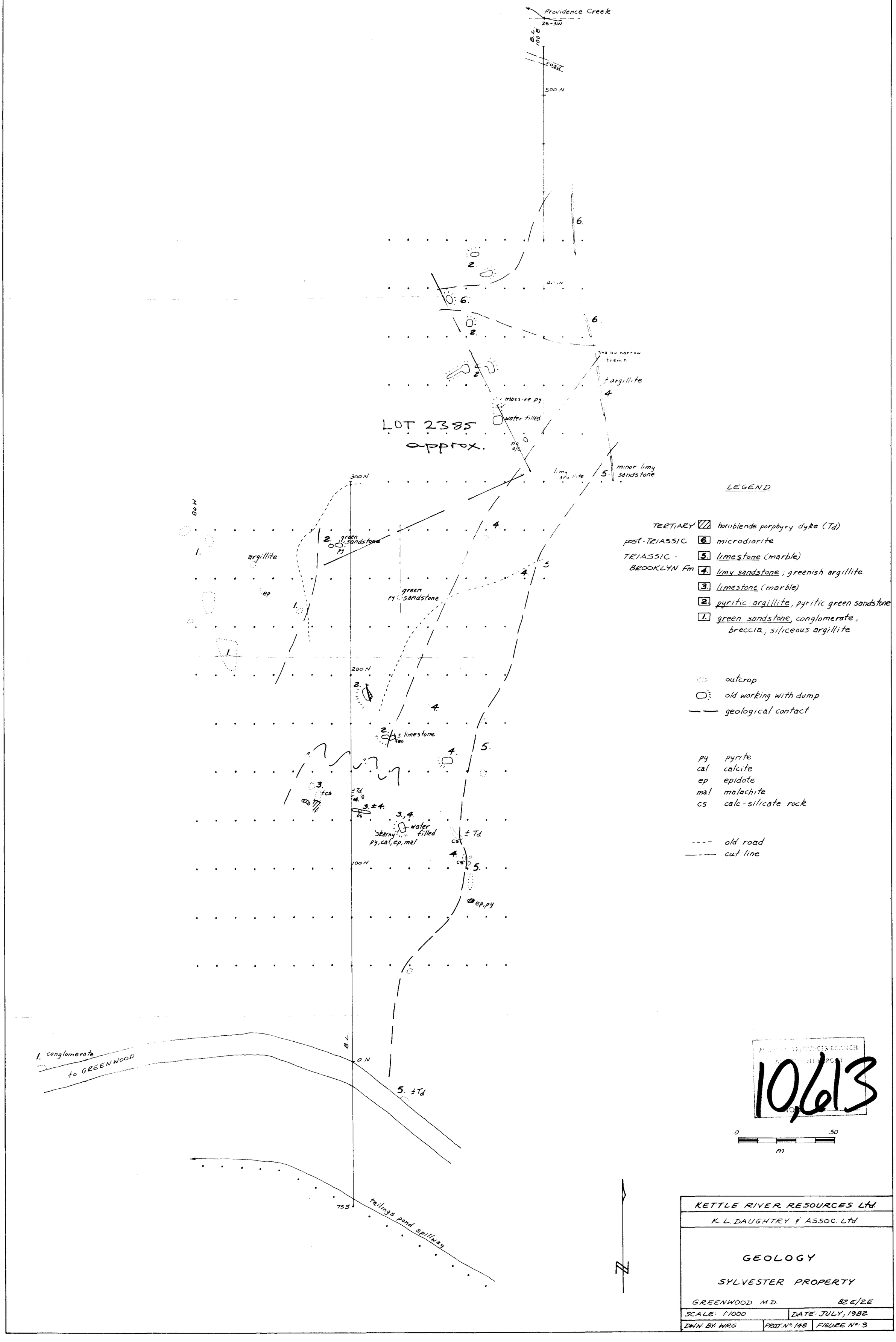
I, W. R. GILMOUR, of 13511 Sumac Lane, Vernon, B.C., V1B 1A1,

DO HEREBY CERTIFY that:

1. I am a consulting geologist in mineral exploration employed by W.R. Gilmour & Associates Ltd., Vernon.
2. I have been practising my profession in British Columbia, the Yukon Territory, and Nevada for 11 years.
3. I am a graduate of the University of British Columbia with a Bachelor of Science degree in geology.
4. I am a Fellow of the Geological Association of Canada and a member of the Society of Mining Engineers of A.I.M.E.
5. This report is based upon knowledge of the Sylvester property gained from exploration work on the property.
6. I am a Director of Kettle River Resources Ltd.

W. R. Gilmour

Vernon, B.C.
July 15, 1982



LEGEND

TERTIARY		hornblende porphyry dyke (Td)
post-TRIASSIC	6.	microdiorite
TRIASSIC - BROOKLYN Fm	5.	limestone (marble)
	4.	limy sandstone, greenish argillite
	3.	limestone (marble)
	2.	pyritic argillite, pyritic green sandstone
	1.	green sandstone, conglomerate, breccia, siliceous argillite

- outcrop
- old working with dump
- geological contact

py	pyrite
cal	calcite
ep	epidote
mal	malachite
cs	calc-silicate rock

- old road
- cut line

0 50 m

N

KETTLE RIVER RESOURCES Ltd.

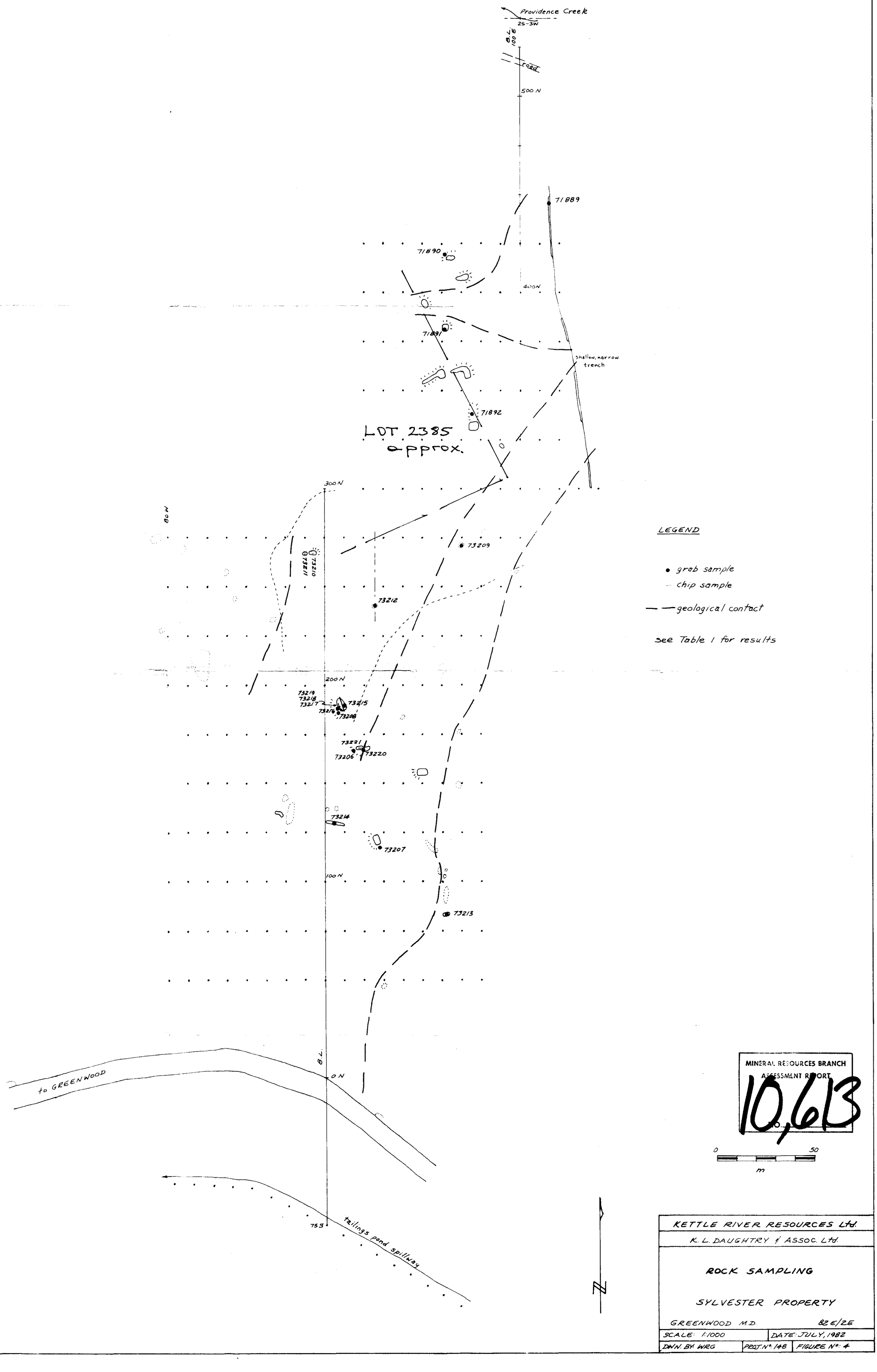
K. L. DAUGHTRY & ASSOC. Ltd.

GEOLOGY

SYLVESTER PROPERTY

GREENWOOD M.D. 82 E/2E

SCALE: 1:1000	DATE: JULY, 1982	
DWN. BY: WRG	PROJ. No: 148	FIGURE No: 3



KETTLE RIVER RESOURCES Ltd.		
K. L. DAUGHTRY & ASSOC. Ltd.		
ROCK SAMPLING SYLVESTER PROPERTY GREENWOOD M.D.		82 E/2E
SCALE: 1:1000	DATE: JULY, 1982	
DWN. BY: WRG	PROJ. No: 148	FIGURE No: 4

Providence Creek

25-3W

B.L. 100 E

road

500 N

400N

300 N

200 N

100 N

0 N

75 S

80 W

LOT 2385
approx.

Sag on narrow trench

20°
10°
0°
-10°
TILT ANGLE

Base Station

to GREENWOOD

B.L.

tailings pond spillway

LEGEND

conductor

weak conductor

instrument: Sabre model 27

transmitting station: Hawaii, 23.4 khz

direction to station

0 50
m

KETTLE RIVER RESOURCES Ltd.

K. L. DAUGHTRY & ASSOC. Ltd.

VLF EM SURVEY
TILT ANGLE PROFILES
SYLVESTER PROPERTY

GREENWOOD M.D. 82 E/2E

SCALE: 1:1000	DATE: JULY, 1982	
DWN. BY: WRG	PROJ. No: 148	FIGURE No: 5