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Title ... Ann. Rept.

Author ... ASB

Date and Typist ... November 25, 1968 rm 1

Molybdenum-(Copper)

Laura
Laura Mines Ltd.
By A. Sutherland Brown

(55° 127° N.W.) This property is held by Laura Mines Ltd., Vancouver ; , president. Exploration is managed by MacDonald Consultants Ltd. under the overall supervision of Earle D. Dodson. Patrick Henry was in charge on the property which is 20 miles north of Hazelton. The porphyry plug that is the centre of mineralization is on the western flank of Mount Thomlinson between McCutcheon and Sterritt Creeks between 4,000 and 4,700 feet. The property consists of 187 located claims in five groups. The porphyry body is held by the Bear 1 to 26 claims. The ground was first staked in 1960 as the Mike group by Kennco Explorations, (Western) Limited as the result of a follow up on geochemical copper and molybdenum anomalies. It was dropped after preliminary examination and restaked by E. and H. Simpson of Hazelton in 1965. The property was acquired by Laura Mines Ltd. in 1967. Most exploration was conducted in 1968 with a detailed soil survey, 10,000 feet of BQ diamond drilling in 17 holes, 28,600 feet of trenching, and 3 miles of access road.

Geology

The Laura porphyry plug is a satellite of a group of small plutons in the core of Mount Thomlinson. These epizonal plutons are outriders in a zone of small plutons that mark the northern flank of the Skeena Arch. In this zone the thick sequence of clastic sediments of the Bowser Group are punctured by isolated intrusions that mark the zone of transition from the Bowser Basin proper to the frayed, faulted, and digitated southern margin. The Bowser Group in the vicinity of the Laura pluton originally consisted mainly of lithic sandstones and siltstones. These have been moderately compressed into northwesterly trending folds. The Laura plug occurs in the western flank of a major anticline but locally the attitudes are discordant and where bedding can be determined the beds dip commonly northeasterly. Surrounding the plug the volcanic sandstones have been hornfelsed in an irregular halo up to 1,500 feet wide characterized by the growth of new felted purply brown biotite. Near the porphyry plug this has an intense fracture stockwork.

The Laura pluton is an irregular but fairly simple porphyry plug consisting of two nearly identical phases. Figure is a map based partly on company maps. Considerable interpretation is necessary in projecting dyke-like masses and the contact of the phases because surface exposure is only fair and the phases are very similar. The earlier phase (P_1) is the most irregular for it combines elements of lineal and arcuate dyke systems with central intrusion. The later phase (P_2) is a central subcircular plug concentric with the first. Contacts between the two phases appear gradational over a short distance but this may be more apparent than real because of their great similarity.

In hand specimen P_1 is an obvious porphyry; P_2 commonly appears more granitoid. This results partly because P_2 is more crowded with phenocrysts. Both are rusty weathering, mid grey rocks with prominent plagioclase, hornblende, and scattered hexagonal biotite books. P_2 has intruded the P_1 for it has hornfelsed adjacent parts, indicated by conversion of original hornblende into a felted mass of brown biotite, or more restrictedly fine acicular actinolite.

Microscopy

Both phases of the Laura pluton are composed of rocks that in classification straddle the quartz monzonite-granodiorite boundary in that the potassium feldspar content varies narrowly on either side of one-third of the total feldspar. The average compositions of both are just within the granodiorite field. The following table gives estimated modes in volume per cent based on comparison charts for four and six fresh specimens respectively.

Leaminate O.K. ?

	P_1		P_2	
	Average	Range	Average	Range
Phenocryst				
Plagioclase	30.25	20-41	39.3	30-51
Composition	An_{43-20}		An_{44-25}	
Quartz	.25	0-1	-	-
Hornblende	8	5-12	8	7-10
Biotite	1.4	.5-3	0.5	0-2
Ores	1.4	.5-2	0.5	0-2
Total				
Plagioclase	44.4	37-57	44.3	36-55
Potassium feldspar	20	10-26	21.3	16-25
Quartz	20.4	17-24	20.3	15-25
Hornblende and biotite	13.2	11.5-17	13.1	11-16.5
Ores	1.8	.5-4	1	0-2

The chief differences evident microscopically between the two phases are a small difference in percentage of plagioclase phenocrysts and a variation in grain size of the matrices. In P_1 the matrix is fine (average about 0.03 millimetre) but in P_2 is somewhat coarser (average about 0.1 millimetre). Also rare quartz phenocrysts are present in P_1 but absent in P_2. Most quartz and all potassium feldspar is confined to the matrix in both. The plagioclase phenocrysts which form such a prominent part of the rocks are chunky crystals mostly 1 millimetre to 4 millimetres long. They are all intensely oscillatory zoned over quite a wide range in composition from about An_{45} to An_{20}. Most larger crystals show five or six major cycles over a large part of the total range. Many show synneusis (accidental attachment in the melt during flow) at intermediate stages of the oscillatory zonal growth stage. Plagioclase in the matrix shows only one normal zonation. Hornblende crystals are characteristically long diamond-shaped prisms with ragged terminations. Biotite occurs in scattered large hexagonal books. Sphene and apatite are the commonest accessory minerals and together form one-tenth to one-quarter of 1 per cent of the rock. Disseminated opaque minerals are chiefly pyrrhotite, but may be pyrite.

Alteration

Hydrothermal alteration is rather erratically distributed. In the drill core from most holes there is an alternation of fresh and altered rock, mostly kaolinite (and carbonate) or sericite with pyrite and quartz. Rarely there is some potassium feldspar alteration or intense silicification. The altered zones appear to be oriented relatively flatly but with the widely spaced vertical drill holes it is difficult to be sure. Intense sericite zones appeared most closely associated with mineralization.

Disseminated pyrite and pyrrhotite appear to be rather erratically distributed also but with a tendency to pyrrhotite with depth and to pyrite in hydrothermally altered rocks.

Mineralization

Diamond drilling has established that molybdenum and minor copper mineralization is widely distributed within the pluton with a tendency to better grades toward the periphery. The detailed distribution is, like the alteration, fairly erratic. Molybdenite and chalcopyrite occur in quartz veinlets and as dry fractures in a stockwork. Four stages of fracturing and veining are evident:

(1) Dry pyrite fractures with traces of chalcopyrite and amphibole.

(2) Quartz-pyrite-molybdenite stockwork with chief orientations steeply dipping.

(3) Quartz-pyrite.

(4) Quartz-carbonate banded veins with vuggy openings and minor pyrite, sphalerite, specularite, arsenopyrite, and a hair-like stibnite or bismuthinite--oriented chiefly near horizontally.

The company has not announced the discovery of any mineable reserves.

LAURA MINES DDH 4 ELEV. BRG ANG - VERT

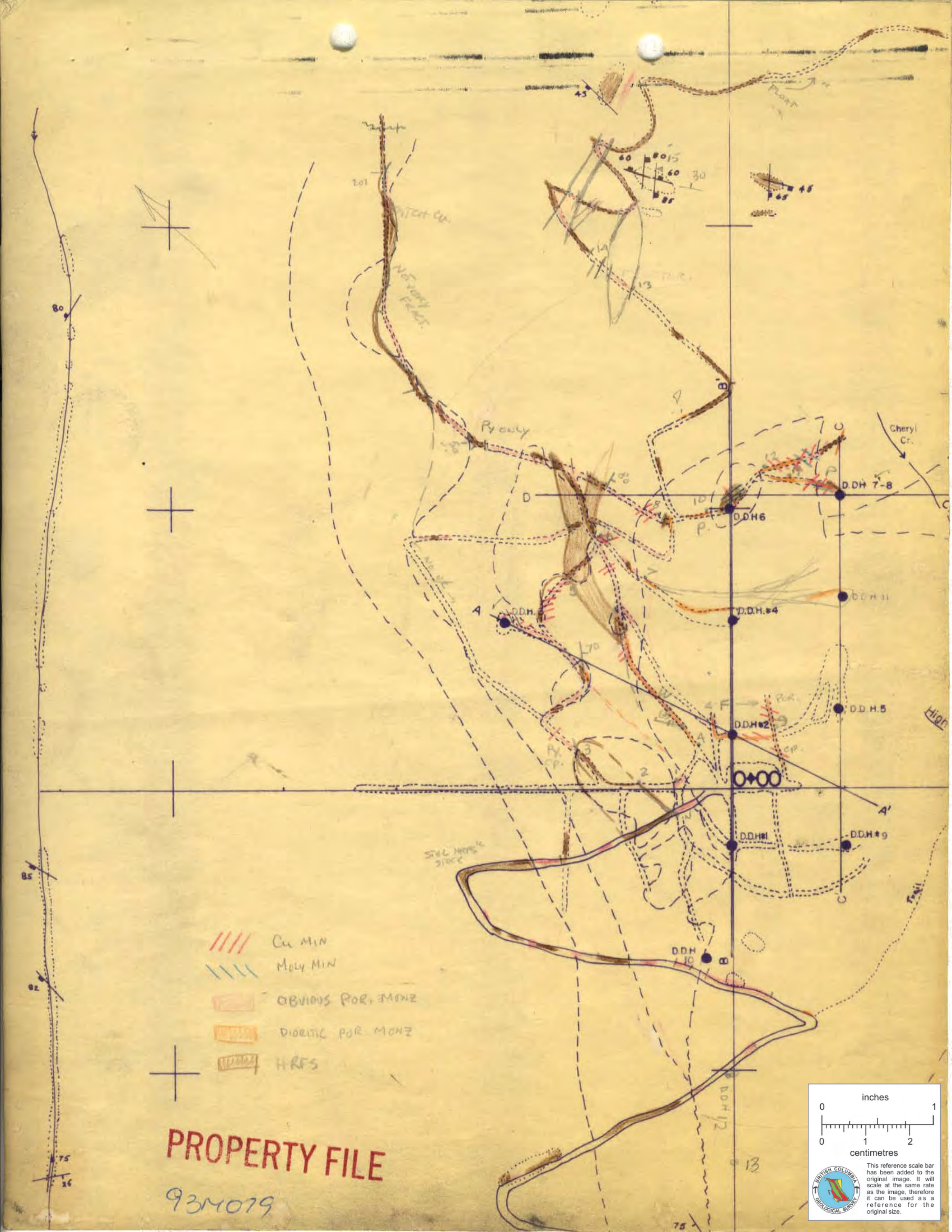
LOG ASSB 8 AUG

FOOTAGE	DESC	FRACT.	VEINS	MIN.	ALT.
0 - 2	N.C.				
2 - 2.3	HRFS				
-2.3 - 61	MONZ. POR. IDENTICAL TO HOLE #3. HB → BI MOSTLY, DK MATRIX FRESH APART FROM SOME VERT. FRACT.	COMMON. PY CP	QTZ PO, CP 2"-3"	PO CP	HB → BI; OXID VERT FRACT PY → LIM
34		4"+	4" +	PO. MoS_2 (CP)	HB → CHL
61 - 91.6	POR. - HRFS - FG	INTENSE	~1" QTZ M.	MOLY	BI ALT
74	BECOMES - ~~MED~~ DK GREY.				
91.6 - 106	FG GN GR. SLIGHT POR. ANDESITE DYKE FOL. CA 15° AXIS. - PREMINERAL - PYRITIC.	+CP	MOLY	FAIR	
106 -	POR. SAME AS BEFORE	4+	6"	DIS. PO	HB → CHL
129-144	OXIDATION		H GRADE VEIN.		OXIDATION, RUST
144	MOSTLY VERY FRESH SOME OX. FRACT.				
168-186	WITH MUCH CORE MISSING.				CLAY ALT.
196	FRESH - HB. ALSO - PROB. CALLED DIORITE LOCALLY.				
213-210	SEVERAL GOOD VEINS. WITH CARB VEINS CUTTING QTZ - TR M. IN CARB. ALSO PY & SPECULARITE			MoS_2, PY SPECULARITE	ARG TO CLAY CARB.
	FRESH		FAIR TO GOOD.	PY (MOLY) TR CP.	CLAY CARB
251-256	FRESH.		2" BUT MOSTLY PY. (MOLY)	PO. IN VEINS = PY IN FRACT	
300			GOOD QTZ M VEIN. 1/8" THICK		
313			CARB - STIBNITE		1' CARB-CLAY
	FRESH. POR (DI)' FAIR MINERALIZATION	PY FRACTURES	PO IN SOME VEINS	PY (MOLY) SPECULARITE IN SEVERAL VEINS	
325-332					
330		ABOUT 330 PY IN FRACT & DISS → PO.			
360	FRESH SP. POR (IE DIO TO LAURA) REL. UNMIN. SP. FOR PETROL [91]				
390	[92]		BANDED QTZ CARB - PY STIBNITE VEIN ⊥ AXIS.		1' CARB CLAY AL
391-96	CHL^IC SLIPS.				
396	FRESH POR (OBVIOUS)		- FAIR VEINING MANY ∥ AXIS	POOR MOLY CP	
422					
422	IN FRESH POR. (OBVIOUS)			CP PO FRACT.	
442-6					
446	DI LOOKING POR		FAIR	POOR CP M.	CARB-CLAY
478	GOOD 1/8" FG BANDED MOLY QTZ VEIN (PO CP) CUTTING QTZ-PO VEIN.				

483 TD

LAURA MINES   DDH 6   ELEV.   BRG   ANG-VERT
LOG. ASB 8 AUG.

FOOTAGE	DESC.	FRACT.	VEINS	MIN	ALT
0 – 19	NC.				
19 – 78	POR. MONZ (DIORITIC LOOKING) HB FRESH – FOL ‖ AXIS OXIDIZED & WEATH. – POOR CORE			MOLY. PO. 65' GOOD V. VEIN.	OXIDIZED
78 – 105	NO CORE				
105 – 126	SAME – BECOMING LESS OXIDIZED –		GOOD QTZ	FAIRLY BARREN	F → KAOL.? ~~HB~~ → CHL
126	FRESH – POR. (DI).	SOME PO.CP.		PO.	
162 – 63					CLAY CARB.
187			LOTS QTZ. NOT MUCH MIN.	GOOD CP. FRACT.	
196		PY CP FRACT CUT BY BARREN QTZ	"	PY, PO, CP.	
215				ALL PO NO PY BY 215	
272	SAME CONTS. TO WHERE SLIGHTLY LIGHTER COLOURED & MORE PORPH. LOOKING OTHERWISE SAME – LOTS BARREN QTZ VEINLETS SOME PO – CP FRACT., A LITTLE MOLY				
333		ON FRACT. →	ONE 1" QTZ MOLY	GOOD VEIN PY NOT PO MOSTLY	
354 – 390	SEVERAL BANDED QTZ CARB. STIB? VEINS ⊥ AXIS MINOR BRECCIA IN VEIN – CONT. VARIABLE ALT. & LATE VEINS	PY – CP			CARB – CLAY HB → CHL
390	FRESH DI PORPH	PY – (CP)	COMMON 4" BARREN		
415 –	TO 445				~~HB → CHL~~ ~~F → ARG.~~ CARB CLAY
424 – 432					
424	FAULT RUBBLE – LOST CORE				
445 – 460	FAIRLY FRESH	PY – (CP)	ONE GOOD MOLY V		
460 – 62			GOOD MOLY V.		CARB CLAY
462	FAIRLY FRESH.		"		
467 – 478			QTZ PO VEIN		SOME SILICIFIED SOME ~~CLAY~~ ARGILLIC
467 – 487	ALTERED & FAIR MOLY MIN				
487 – 508	FAIRLY FRESH BUT ~~MANY~~ QTZ VEINS COMMON & NOT BAD MOLY		QTZ PY – MOLY		
508	INTENSE ALT – CLAY MOSTLY FAIR MOLY QTZ – SERICITE		" ✓		
530 – 31			QTZ CARB STIBNITE? NEEDLES		QTZ – CARB ALT.
562 – 69			DRUSY QTZ. CARB BRECCIA VEINLE		
573	T.D.				



FLOAT
Cheryl Cr.
Py only
B'
C
D
D.D.H 7-8
D.D.H6
D.D.H.#4
D.D.H 11
D.D.H.5
D.D.H#2
A
A'
0+00
D.D.H#1
D.D.H#9
D.D.H 10
B
Trail
Cu MIN
MOLY MIN
OBVIOUS POR. MONZ
DIORITIC POR MONZ
HRFS


0-750
3 400-650
200-900
450
570
78
280-330
LAURA
1" = 400
SURFACE MIN
MOLY
Cu

inches
0 1
0 1 2
centimetres

3
11
5
2
9
10
12
13
14

LAURA MINES DDH #12 ELEV. BRG ANGL LOGGED 9 AUG. ASB

QUICK DESCRIPTION.

0-16	V.C
16	WEATHERED "DIORITE". PO + TR CP. HB FRESH
	WHERE KAOLINIZED CAN SEE IT IS A PORPHYRY. — 16. 58'
125	RUSTY WEATHERING CEASES - FRESH MONZ PORPH
	NOT MUCH VEINING - DISSEM. PO & PRY FRACT. PO
190	ALT. HB → CHL F - KAOL. & FAULT CA. 204
212	FRESH AGAIN.
226	QTZ VEINING STARTS - NOT MUCH MOLY - PY AS WELL AS PO
260	SOME MOLY IN QTZ VEINS & FRACT.
279-282	WH. Q? SER. PY ALT - HB → PY? BI - SER. FELD → SERICITE & KAOLINITE (CREAM COLOUR)
	MATRIX FINE QTZ? 94
330.	FRESH TO 330
330 - 358	ALTERNATING ALT. < CHL - KAOL - CARB WITH BANDED QTZ - CARB PY MOLY VEINS ⊥ AXIS & FAIRLY FRESH
358 - 380	FRESH PY. MONZ POR (DI) PYRITIC - BUT NOT WELL VEINED NOR MUCH MOLY
380 I	MUCH IS ALTERED - SLIGHTLY HB → CHL.
	BUT 5% BI BOOKS VERY FRESH & PROM. NOT MUCH VEINING ONLY TR. MOLY
450 -	MORE ALT. HB → CHL → SER. BI → SER. P → SER?
	FAIR MOLY 450 - 470
570	BECOMES GENERALLY KAOLINITIC (F) CA. 570 & PORPH. NATURE OBVIOUS
620-622	HRFS INCL. IN GENERALLY KAOLINITIC POR MONZ (DI?)
667	WHICH CONT TO TD. 667

#

NOTE SEQUENCE.

1. PY (cp) AMPH. FRACT
2. QTZ PY, MOLY STOCK. — MAIN ORIENTATION VERT.
3. QTZ (PY) BARREN
4. QTZ-CARB BANDED VEINS (HORIZ.) WITH VUGS - COATED BRECCIA.
   MINOR MIN. PY (PO) SPHAL? SPECULARITE, ARSENOPY. STIBNITE, BISMUTHINITE
   HAIRLIKE XLS.

LAURA MINES DDH #3 ELEV- BRG ANG-VERT
LOG. A5B - 8 AUG

FOOTAGE	DESC.	FRACT.	VEINS	MINERAL.	ALT.
0 - 5	NO CORE				
5 - 594	PC POR. - PC-PHENO - 30, HB → BI CHL -15-20, BI + SULP. BI - 5, DK MATRIX 55 - SLIGHTLY MAGNETIC.		CA 3" APART STEEP ONES OXID	CP PY	HB → BI + CHL MINOR OXIDATION
30	FRESH	2"	4"	PY CP, MOLY TR	
50	OXIDIZATION INCREASES - PY LEACHED				
87	" RK WEATHERED - POOR CORE				
143 / 152	SAND, THEN. OX WEATH. & LEACHED				
221	FRESH AGAIN		3-4"	PY, MOLY CP DISS. PY	HB → BI
228	CP PY DRY FRACT CUT BY QTZ PY [89]				
260			CARB VEIN 3"	"	
280					MINOR ARGILLIC
291	DOWN TO AQ CORE				
294			PO - ¼" VEIN		
301-3					CARB, CLAY ALT
320			PO BECOMES COMMON IN VEINLETS. BUT PY STILL MAIN MIN.		
390			MIN GENERALLY LESS BUT MORE MOLY.	(PO) INSTEAD OF PY	
406 / 417					ARG ALT.
436	CONT. FRESH HB → BI PO REPLACES. BI SOME CP & MOLY				
480	SAME BUT	COMMON	RARE	(PO), CP. FAIR GOOD	
507 / 517	MANY FRACT. ∥ AXIS.				
560 / 576					CLAY ALT. F.
594 - 610	POR HRFS. CONTACTS IRREG CA 70° AXIS SOME CHILL OF POR. SP CONT. 610' [90]	FAIR STOCKWORK 3"?		NOT MUCH	
610 - 674	SIM POR. BUT PRIMARY BI PHENOS MORE PROM 5+% - FOL. SMALL HB. 30° AXIS			(PO), CP. (MOLY) FAIR (<0.1 Cu)	
647				MINOR	ARGILLIC ALT FELD.
674	BOTTOM				

LAURA MINES LTD. DDH # 4 ELEV. VERT. 5680 ASB. 9 AUG.

FOOTAGE	DESC.	FRACT.	VEINS	MIN.	ALT.
0 – 16	NC				
16 –	RUSTY STAINED, SL WEATHER. POR MONZ (DI) PO OR PY → LIM.		SOME QTZ PRETTY FAIR BUT LEACHED	PY MOSTLY GONE	WEATH.
131 149 147 – 149	KERNELS OF FRESH POR MONZ (DI) HB FRESH IN WEATH. AS ABOVE –			HEPS WITH PO. DISS. + FRACT	
160	FIRST TR MOLY.		GOOD STOCK QTZ &		STILL SOME OXIDATION
186.	FAULT		QTZ CARB PO		
189			GOOD MOLY QTZ	VEIN ‖ AXIS	
201			" "	30° AXIS	
190	LAST RUSTY OXIDATION. & ALSO START OF VARIABLE GENERAL ALT. FROM SLIGHT CHL'C OF HB TO QTZ VEIN – SERIC FELD + PY WITH FAIRLY GOOD MOLY HB-SER CHL → SERIC. NOTE (PY IN ALT. RX) (PO. IN FRESHER) BEST MOLY IN ALT. SECTIONS. – FAIRLY WHITE OR BUFF WITH MAFICS → SERICITE		225 – 1/4 H. GRADE	CP, PY VEINS.	CHL SERIC. SER
250	GENERAL FRESH – FEW QTZ VEINS BUT SOME WITH GOOD MOLY. ; PO. DISS & FRACT WITH (CP).		MOLY FRAC NOT BY CARBON QTZ		
298.	ALT. QTZ SER & (CARB) STARTS & POOR CORE FAIR MOLY			QTZ CARB ARSENO PY	(ALSO SEEN BEFORE CA 200)
330 – 380	ALT. GRADES TO CHL-PO ONLY – VEINING FAIR BUT MOLY LESS. – AMPH – PO FRACT.				
380 –	FRESHER (D) MONZ POR – SOME QTZ SER. PO ALT ‖ LATE VEINS 481 – 488'	GOOD Po (CP) FRACT.	FAIR QTZ PO MOLY VEINS. SOME ⊥ LATE QTZ CARB ‖ ALT. VEINS	CP PO QTZ AT 460-466	
506 – 532	506 – MANY LARGE QTZ VEINS & QTZ SER. ALT. – ALTERNATING WITH FAIR FRESH MONZ POR (DI).			MOLY FAIR CP. PO QTZ VEINS	
532	FAIRLY FRESH			& MOLY QTZ COM.	
560	"		GOOD QTZ MOLY VEINS.		
592 – 612	592 SOME SMALL BI'HRPS INCLUSIONS BECOMES HRPS WITH CLOSE STOCKWORK.		GOOD STOCKWORK QTZ – MOLY.		
612 – 645	CHL'IC POR MONZ (DI) PY & PO.'C. FAIR QTZ STOCKWORK – FAIR MOLY – TR CP.				
645 – 669	ALTERNATING ALT & FAIRLY FRESH. QTZ SERICITE. – CHL.		GOOD QTZ MOLY. STOCKWORK		
669 – 842	FAIR FRESH HB → CHL.		SAME ‖ AXIS		
	(750) CONT. GOOD MOLY WITH MINOR – QTZ-SER ALT. (OR CLAY)				
	(770) GRADE DROPS OFF TO FAIR				
	790 – BACK TO GOOD – ALT REL. TO CARB BRECCIA VEIN (800)				
842 – 58	CONT. FAIRLY FRESH (CHL'C) – GOOD QTZ – GOOD – FAIR MOLY SOME QTZ-SER ALT BAND ⊥ AXIS ESP. 842 – 858 – EXCELL MOLY. [94] SP 856 – QTZ SER. ALT QTZ MOLY VEINS				
858 – 897	FAIR FRESH CHL MONZ POR DI – GOOD QTZ – FAIR – GOOD MOLY				
897 – 907	CHL'C ALT DI				
907 –	FAULT				
908 – 917	CHL'IC ALT DI – NOT MUCH MOLY				

917 - 930 | BURPLE B1 HRFS. WITH QTZ STOCKWORK MINOR MOLY

930 - 945 | VARIABLE FRESH POR. D1 & CARB CLAY ALT. ∥ LATE VEINS

945 - 952 | HRPS.

952 - 963 | FRESH & ALT D1 TR. MOLY

963 - 981 | BUFF & PUR. HRFS. FAIR MOLY

981 - 992 | CREAM & GN ALTERED. D1 —

992 - 997 | HRPS. Some MOLY

997 - 1000 | FRESH POR. MONZ D1

TD.

LAURA PETROLOGY

P.

	75-1	75-2	82	88	91	95-1	AV.	78	80	83	85	
Pc	35	40	40	40	51	30	39.3	20	41	35	25	30.25
Kf.		?	An44	An35	?	An35→30				An43→20	An?	
Q.										1		0.25
Hb.	8	10 ~~10~~	8	7	7	8	8	5	7	8	12	8
Bi	1		2			1	1/2	3	<1	1/2	1	1.4
Orb				3/4	2	1	1/2	1	2	1/2	2	1.4

TOTAL.

	QM.	QM	QM.	GRDI	GRDI	QM.	GRDI	QM.	GRDI	GRDI	QM		GRDI
Pc	40	47	40	47.8	55	36	44.3 ✓	38.2	58	46	37	44.5	44.4
Kf	20	25	22½	18.3	16	25	21.3	26.4	10	19	18	18.3	20.0
Q	25	15	20	20.9	16	25	20.3	19.8	17	~~23~~	24	20.5	20.4
Hb+Bi	14	13	16½	11.8	11	13	13.1	14.6	12	11½	17	13.4	13.2
Orbs			1	1	2	1	1.	1	4	½	4	3.	1.8
	100	100	100	99.8	100	100	~~100.0~~	100	100	100	100	~~99.1~~	99.8
MATRIX	0.06±	0.1	0.1	0.15	0.1			0.03	0.085	0.03			

Kf / TOTAL F = 32% 32.4

Kf / TOTAL F = 29.2%

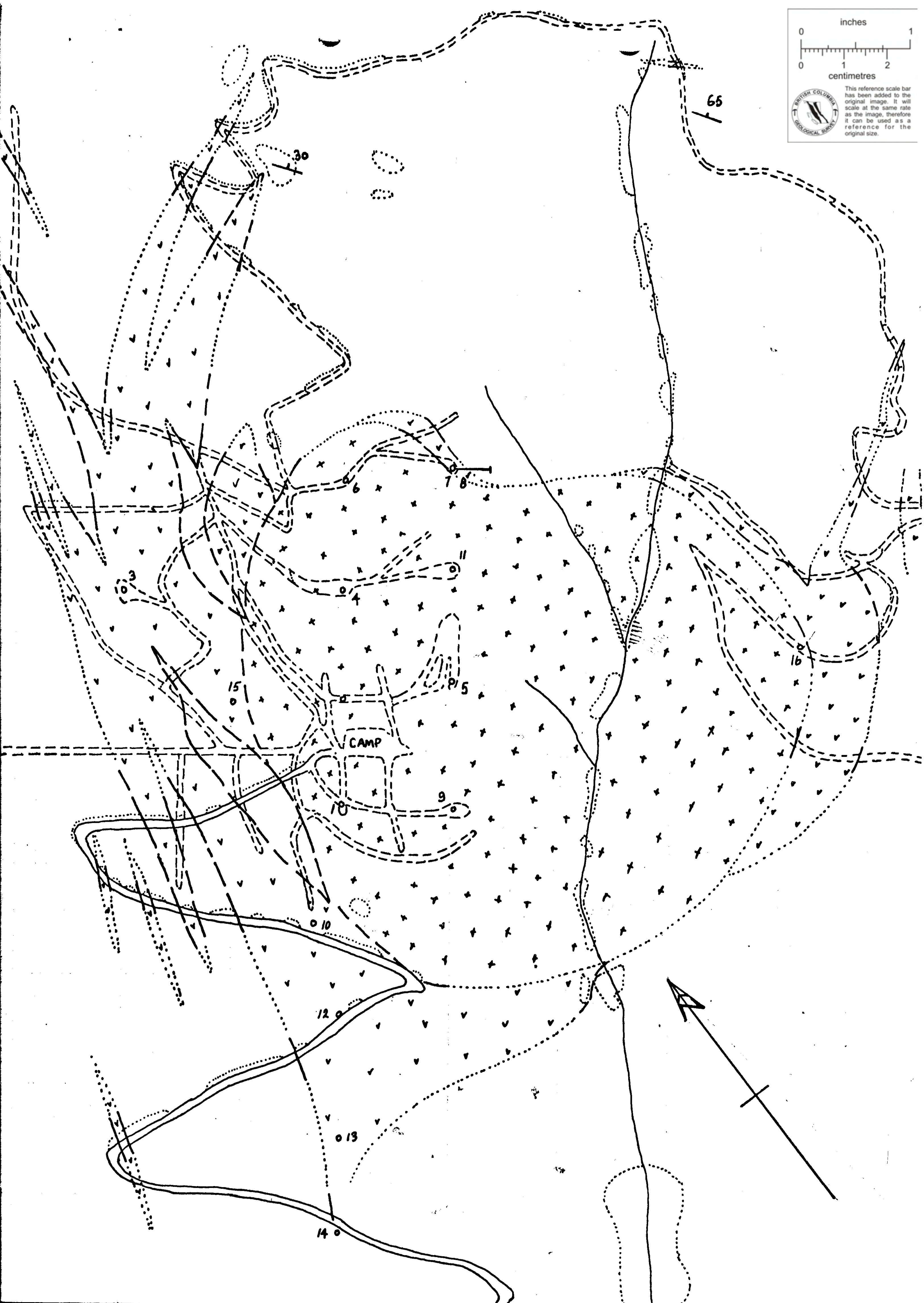
25/77 25/61 26.4/64.6 19/65 36 18 55 .4

77 -

0.03 MATRIX

Q Phen.

An43→33



P2 GRANODIORITE PORPHYRY

P1 GRANODIORITE PORPHYRY

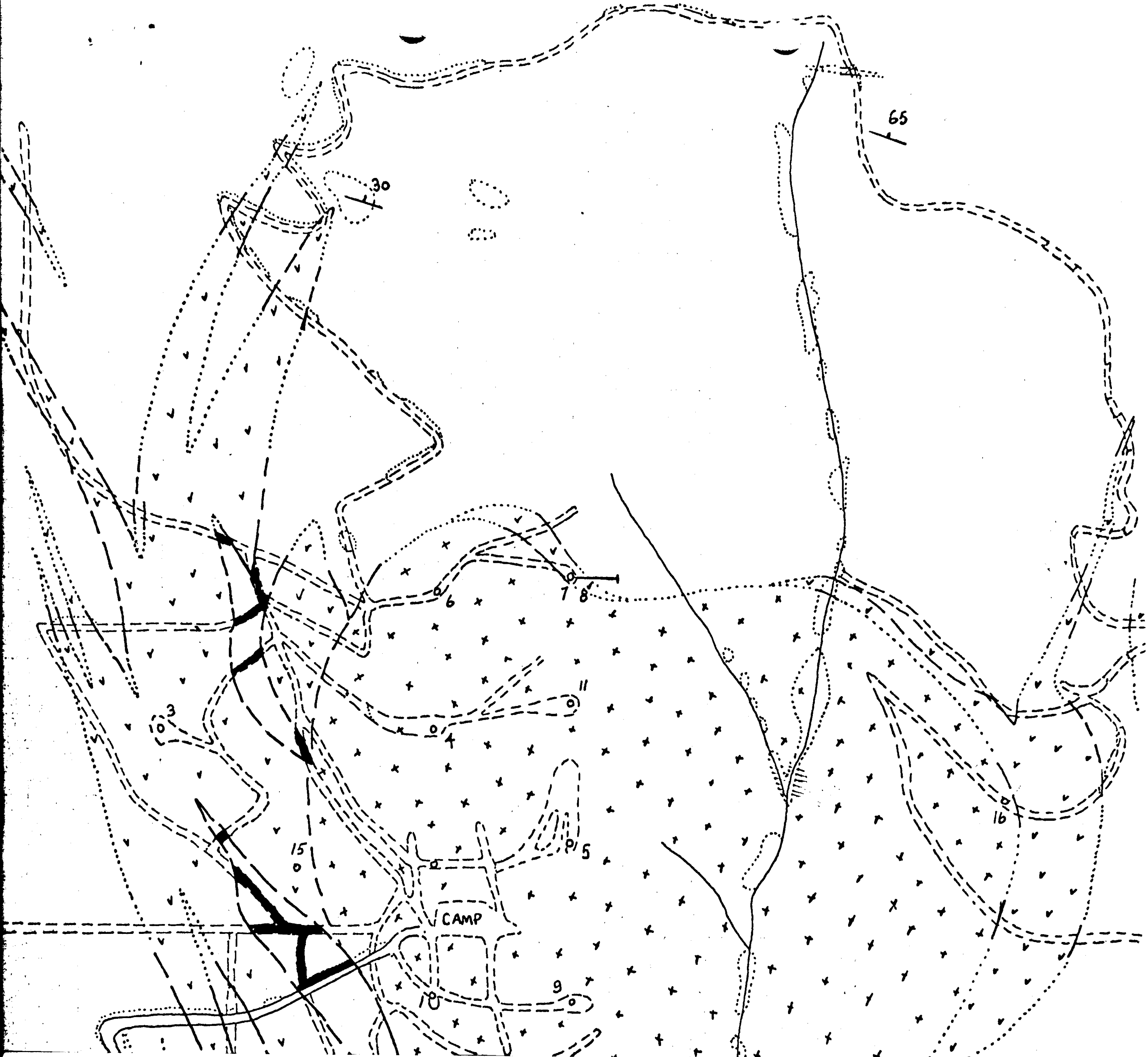
BOWSER GR. hornfelsed

LAURA PORPHYRY PLUTON

0 500 1000 FT.

PROPERTY FILE

93M079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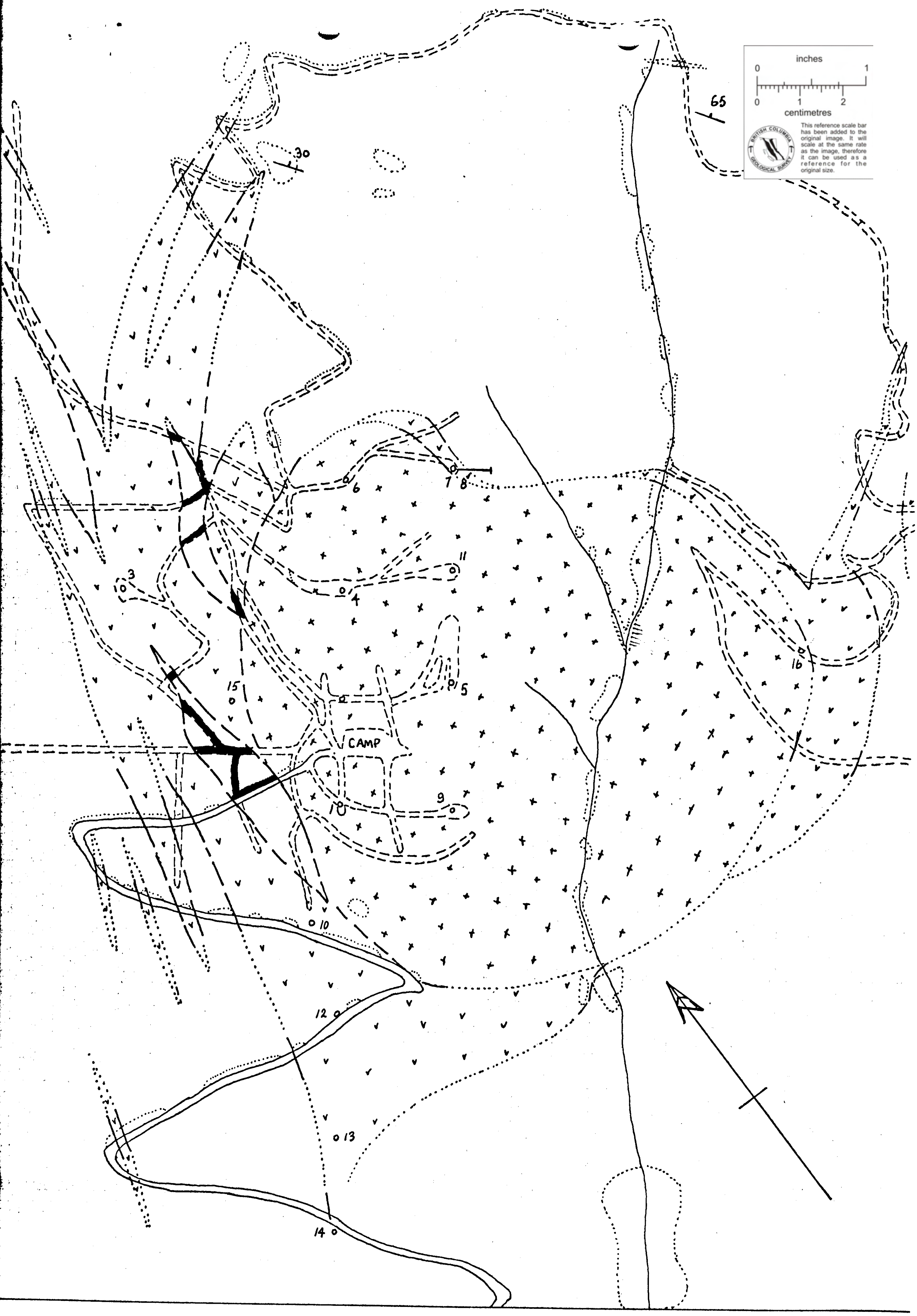

P2 Granodiorite Porphyry

P1 Granodiorite Porphyry

Bowser Gr. hornfelsed

Diamond drill holes

Bulldozer trenches

Laura Porphyry Pluton

Scale 0 500 1000 Ft.

Adapted from company plans, Laura Mines Ltd.