

GEORGE F. CRESSY

ASSESSMENT REPORT

DIAMOND DRILLING - TRENCHING SURVEY

LAWLESS CREEK MINERAL CLAIMS GROUP
SIMILKAMEEN MINING DISTRICT

15 November 1983

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,810

Latitude: 49°35' North

Longitude: 120° 50' West

Diamond Drilling:H. Allen, Diamond Drilling
Merritt, B.C.Trenching:B. Fleck Excavators,
Merritt, B.C.
G.F. Cressy, Merritt, B.C.Geological Core Logging:William J. Weymark, P.Eng.,
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WEYMARK ENGINEERING LTD.

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SIMILKAMEEN MINING DISTRICT
BRITISH COLUMBIA

CONTENTS

	<u>Page</u>
1.0 PROPERTY	2
2.0 ACCESS AND LOCATION	2
3.0 CLIMATE	2
4.0 PHYSIOGRAPHY	3
5.0 GEOLOGY	3
6.0 WORK PROGRAMME	5
7.0 CONCLUSIONS AND RECOMMENDATIONS	5

APPENDICES

Annex A	Excerpt Memoir 243, Geology and Mineral Deposits of the Princeton Map-Area, B.C. H.M. A. Rice, 1960, p.97 O'Henry Group
Annex B	Excerpt, B.C. Minister of Mines Report, p. 43, 1960, Lawless Creek Area
Annex C	Geological Core Log, Drill Hole 83-1
Annex D	Cost Distribution

ILLUSTRATIONS

Figure 1	Frontispiece
Figure 2	Claims Location
Figure 3	Access - Topography
Figure 4	Regional Geology
Figure 5	Claims Geology - Work Locations

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November 15, 1983

Mr. George F. Cressy
P.O. Box 406
Merritt, B.C.

Sir:

Re: Trenching-Drilling Assessment Report
Lawless Creek Mineral Claims Group
Similkameen Mining Division
British Columbia

We are pleased to submit for your information this Trenching-Drilling Report relating to the Trenching-Diamond Drilling Surveys completed on the Lawless Creek Mineral Claims Group during the 1983 summer season.

The purpose of this Report is to record the scope-nature and results of the Trenching-Diamond Drilling works programme completed in the 1983 summer season on the Lawless Creek Mineral Claims Group for Assessment work requirements of the Department of Mines of British Columbia.

Supervision of the work was under the direction of George F. Cressy, Owner; Diamond Drilling was under contract to H. Allen Diamond Drilling of Merritt, B.C.; Geological Logging of the core was by William J. Weymark, P.Eng., as well as interpretation of the Geological formations on the claims and preparation of this Report.

Background technical references for the claims, previously known as the O'Henry Group, is in Memoir 243, Geological Mineral Deposits of the Princeton Map Area by H.M.A. Rice, 1960, Geological Survey of Canada and in B.C. Minister of Mines Annual Reports for 1948-1949 and 1960 referenced to Lawless Creek, Annex A and B.

1.0 PROPERTY

The claims composing the Lawless Creek Mineral Claims Group include the following:

<u>Claims</u>	<u>Units</u>	<u>Report No.</u>	<u>Record Date</u>
GFC-1	20	1360 (1)	27 January 1981
GFC-2	4	1534 (9)	21 September 1981
GFC-3 FR	1	1535 (9)	21 September 1981
TC 1-8	8	1536-43 (9)	21 September 1981

The Reference Mineral Claims Map of the B.C. Department of Mines is 92H10W, see Figure 2. The Geographical Reference is 49° 35' North Latitude and 120° 50' West Longitude. The reference Land Map is Tulameen 92H.

2.0 ACCESS AND LOCATION

Access to the claims area is reached by automobile during the summer and fall from Tulameen over a mostly graded logging road, a distance of about 12 miles. During winter and spring, a 4 x 4 is needed depending upon snowfall, See Figure 3.

3.0 CLIMATE

Climatic conditons are Southern-Interior with warm summers and cold winters. Precipitation is of the order of 15 inches and snowfall 36-60 inches. Exploration work could be carried out during most of the year provided suitable

transportation equipment is used, except in fire peril and heavy snowfall periods.

4.0 Physiography

The claims area is mainly creek valley-gulch topography, steep slopes, upper benchland and ridges, wooded with coniferous and deciduous trees. The area is drained by Lawless and Henning Creeks and tributories discharging into the Tulameen-Similkameen drainage system. Elevations on the claims range from 3,500 to over 5,000 feet, See Figure 3 and p.43, Annex B.

Topographical trending ridges and valleys is to the North West. Rock outcrops are fairly abundant being exposed mainly on the side slopes and ridges and creek banks. Overburden consists of glacial till gravels and debris ranging to 10 or more feet. Lawless Creek is noted for its placer gold-platinum deposits. There is ample water and timber on the claims area sufficient for mining exploration and development work but permits must be obtained from the controlling entities.

5.0 GEOLOGY

Geological References are Map 888A, Princeton Geology by H.M.A. Rice, 1939, 1941, 1944 and detailed in Memoir 243, Geology and Mineral Deposits of the Princeton Map Area 1960, Geological Survey of Canada, See Figure 4, and Annex B, Geology of Lawless Creek by G.E.P. Eastwood.

Base formations are the Upper Triassic, Nicola Group consisting of Varicoloured Lavas, Argillite, Tuff, Limestone, Chlorite and Sericitic Schist. These are interbedded and phase into each other. Intrusives in the area are Basic - Peridotite - Pyroxenite - Gabbro stocks of Jurassic or later age and Granite - Granodiorite plutons of Cretaceous-Tertiary age locally named Otter Intrusions (Red Granite). The chronological age sequences and distribution are given on Figure 4.

As shown on Figure 5, the rocks on the claims area, as exposed consist of Meta-Volcanics and Sediments - Tuffs-Andesites-Quartzites-Argillites which have been metamorphosed foliated in sections to Chloritic-Carbonaceous-Sericitic Schist. Strikes are to the North West and dips are steep - mainly to the South West.

Quartz and carbonate veins - stringers cut through these formations - ranging from a few inches to 10-15 feet or more in width. Continuity is limited. Most of these veins are barren but locally there is sulphides-pyrite-chalcopyrite mineralization and derivatives. Recorded assays indicate values in copper-gold-silver.

Future mapping is required.

The geological formations are favourable for metallic mineral deposition - there are several prospects in the area - some of which have been exploited in the past, see Memoir 243 and Annex B.

6.0 WORKS PROGRAMME

During the 1983 season, exploration work consisted of Excavator Stripping, Rock Trenching and Diamond Drilling.

The location of the trenching-stripping is shown on Figure 5. The volumes involve:

Trench A	600 cubic ft.
Trench B	500 cu ft.
Trench C	500 cu ft.
Stripping	1,000 sq.ft.

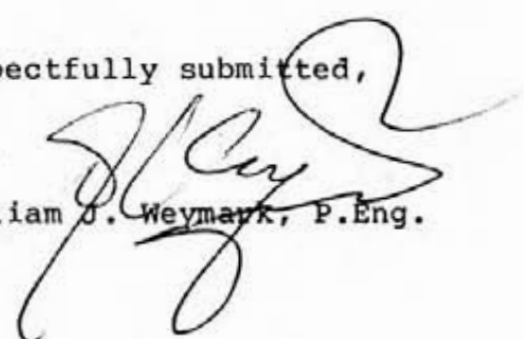
Diamond drilling involved a 352 ft BQ drilled hole, see Annex C for the geological core log.

This hole intersected several quartz-carbonate veins - stringers with sectionalized sulphides mineralization.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Favourable Geological-Mineralized formations for metallic mineral - gold-copper-silver have been exposed on the claims area, conforming to the regional setting in which mining exploration, both placer and lode has been conducted in the past and present. Further exploration of metallic possibilities is warranted involving surface and sub-surface testing of the Geological Structure-Lithological-Mineralogical features of the formations.

Respectfully submitted,


William J. Weymark, P.Eng.

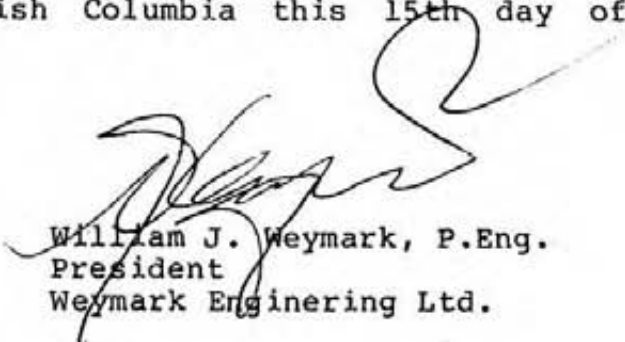
M/01

CERTIFICATE

I, William J. Weymark, P.Eng., Consulting Engineer, President of Weymark Engineering Ltd., of the District of West Vancouver, of the Province of British Columbia, hereby certify that:

1. I am a graduate of Mining Engineering of Queen's University Kingston, Ontario, B.Sc. 1940 and have been practising my profession for thirty-five years.
2. I am a member of the Association of Professional Engineers of the Province of British Columbia, the Consulting Engineers Division of the Association of Professional Engineers of British Columbia and the Association of Consulting Engineers of Canada.
3. I am a practising Consulting Engineer and reside at 3310 Westmount Road, West Vancouver, British Columbia.
4. I am a member of the Canadian Institute of Mining and Metallurgy and of the American Institute of Mining, Metallurgical and Petroleum Engineers and of the American Geophysical Union.
5. I have no direct or indirect interest whatsoever in Lawless Creek Mineral Claims Group, nor do I expect any interest, direct or indirect in this property or any affiliation with owner(s).
6. The findings of the accompanying report are based on my personal examination of the Lawless Creek Mineral Claims Group in 1982, October 1983 and of the Princeton-Tulameen Area 1960-1983.

Dated at West Vancouver, British Columbia this 15th day of November, 1983.


William J. Weymark, P.Eng.
President
Weymark Engineering Ltd.

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APPENDICES

The Totem Pole group is located on the trail up Mount Thynne about 3 miles from the Otter Lake road. The area is underlain by sheared rocks of the Nicola group, which have been intruded and metamorphosed by dykes from a nearby small body of light-coloured granodiorite, and also by dykes and sills of Otter granite. In the rocks of the Nicola group small shear zones or fracture zones have been silicified and cut by irregular stringers of quartz and calcite, and some pyrite, chalcopryite, and galena have been deposited. These showings have been explored by open-cuts and a 10-foot shaft, but have nowhere proved to be either extensive or of high grade.

O'Henry Group (19)

The O'Henry group is owned by H. Y. Lowe of Tulameen. It is situated on the summit and west flank of the ridge on the west side of Lawless Creek $1\frac{1}{2}$ miles from the trail bridge. A good branch trail leads to the cabin on the property situated near a creek tributary to Lawless Creek.

Several types of deposits are represented on the property. On the summit of the ridge between Lawless Creek and the tributary stream, four open-cuts and some stripping exposed one or more quartz veins at least 3 feet wide in Nicola, green, andesite lava. Much of the vein material is white, barren-looking quartz, but in places it carries pyrite, chalcopryite, and a few specks of galena and sphalerite. Nowhere is the evidence of mineralization extensive enough to be of much interest.

In the bed of the creek below the cabin a quarter of a mile or so from the above workings, an open-cut has exposed a vein of barren-looking quartz more than 20 feet wide.

A little downstream from the above the creek has cut through a small ultrabasic stock. In several places narrow but strong shear zones intersect this body, and these are locally mineralized with abundant pyrite and magnetite. The showing, however, seemed to have little economic significance.

Law's Mining Camp (23)

References: Ann. Repts., Minister of Mines, B.C.: 1908, p. 132; 1913, p. 236; 1916, p. 261; 1922, p. 107; 1926, p. 228; 1927, pp. 255-256; 1928, p. 269; 1929, p. 279. Camsell, 1913, pp. 162-166.

General Statement. Law's Mining Camp is situated on the west side of Lawless (Bear) Creek about 3 miles from Tulameen River. The principal claims on which most of the work has been done, fall into two groups, one including the St. Lawrence and St. George claims, and the other, the Liverpool. The first named claim was staked in 1900 by Charles L. Law and associates, and on it and the nearby St. George claim all the early work, consisting of two shafts, an adit, and open-cuts, was done. By 1916 Law had developed enough ore to ship a carload, which is reported to have returned him \$600. Since that time, however, nothing further has been done. The second group of claims is owned by Louis Marcotte of Coalmont, who in 1922 sank a 60-foot shaft on the Liverpool claim. Encouraged by the results, he extended an adit, already started near the collar of the shaft, until, by 1926, it was 110 feet long. The following year a group of twelve claims, including the Liverpool, was taken over by Hope Range Copper Company, Limited, and exploration was continued on a small scale for the next 2 years. Since 1929 the claims have lain idle.

1960

The Lawless Creek area is 22 miles west of Princeton and extends northwest from the Tulameen River along both sides of Lawless Creek. Most of the bedrock belongs to the Nicola group. Observations made in 1959 suggested that it might be possible to deduce the rock sequence and structure of that part of the Nicola group included within the Lawless Creek area. Unfortunately, these hopes were not realized in the 1960 mapping. For most of the area, only a general lithologic description can be given, together with notes on the structure. A small section about the mouth of Lawless Creek was studied more intensively than other parts of the area, and is described in more detail in order to illustrate the complexities.

The general geography of the area is outlined in Figure 4. The two main roads converge on Tulameen, 2 miles to the east, which is served by the Kettle Valley Railway and by roads from Princeton and Merritt. The more northerly road was built by the British Columbia Forest Service as an access road to assist potential logging. The principal streams are the Tulameen River and Lawless Creek. Three tributaries of Lawless Creek—namely, Grasshopper, Skwum, and Henning Creeks—divide the country to the west into four sub-radiating ridges, the most southerly of which is Grasshopper Mountain. Northeast of Lawless Creek is a mountain mass carrying several summits separated by shallow saddles; the south part of this mass is known as Mount Rabbitt and the north part as Spearing Mountain. The valley of Lawless Creek is generally steep-walled, and for much of its southern part is a canyon. Henning Creek enters at grade, and its valley is also steep-walled in its lower part. The valleys of Skwum and Grasshopper Creeks are hanging and are rather broad, with moderate slopes. The character of Tulameen River valley changes abruptly half a mile below the mouth of Lawless Creek. Above this point the valley is broadly V-shaped, with the river generally incised in a rock canyon. Below this point the river meanders over a broad alluvial floor.

Till covers a large part of the area. It is generally at least 20 feet thick on the slopes of Mount Rabbitt and Spearing Mountain and on the ridge between Skwum and Henning Creeks, and in these areas natural rock exposures are rare. Elsewhere in the area the till is generally thinner and more patchy, exposing a variable amount of rock; Grasshopper Mountain and the ridge between Henning and Lawless Creeks are typical. The crest of the ridge between Grasshopper and Skwum Creeks differs somewhat; it is veneered by only 1 to 3 feet of overburden, yet outcrops are scattered, small, and rubbly. This overburden, mainly till, thickens down the slopes of the ridge. Along the Tulameen River above the alluvial flats, and along Lawless Creek below the access-road bridge, the till has been largely eroded. Above the access-road bridge, outcrops along Lawless Creek are almost entirely restricted to the right bank.

Alluvial and talus deposits are small and scattered. Apart from the broad flood-plain of the lower Tulameen River, alluvium occurs as scattered terraces farther up the river and along upper Lawless Creek, as a valley flooring along Grasshopper Creek, and as stream-channel deposits. Talus cones are largely restricted to the south slope of Grasshopper Mountain.

Most of the area is thickly timbered with Douglas fir, balsam spruce, hemlock, pine, and less cedar and poplar. Open patches occur on the southwest slope of Mount Rabbitt and the south slope of Grasshopper Mountain.

* By G. E. P. Eastwood.

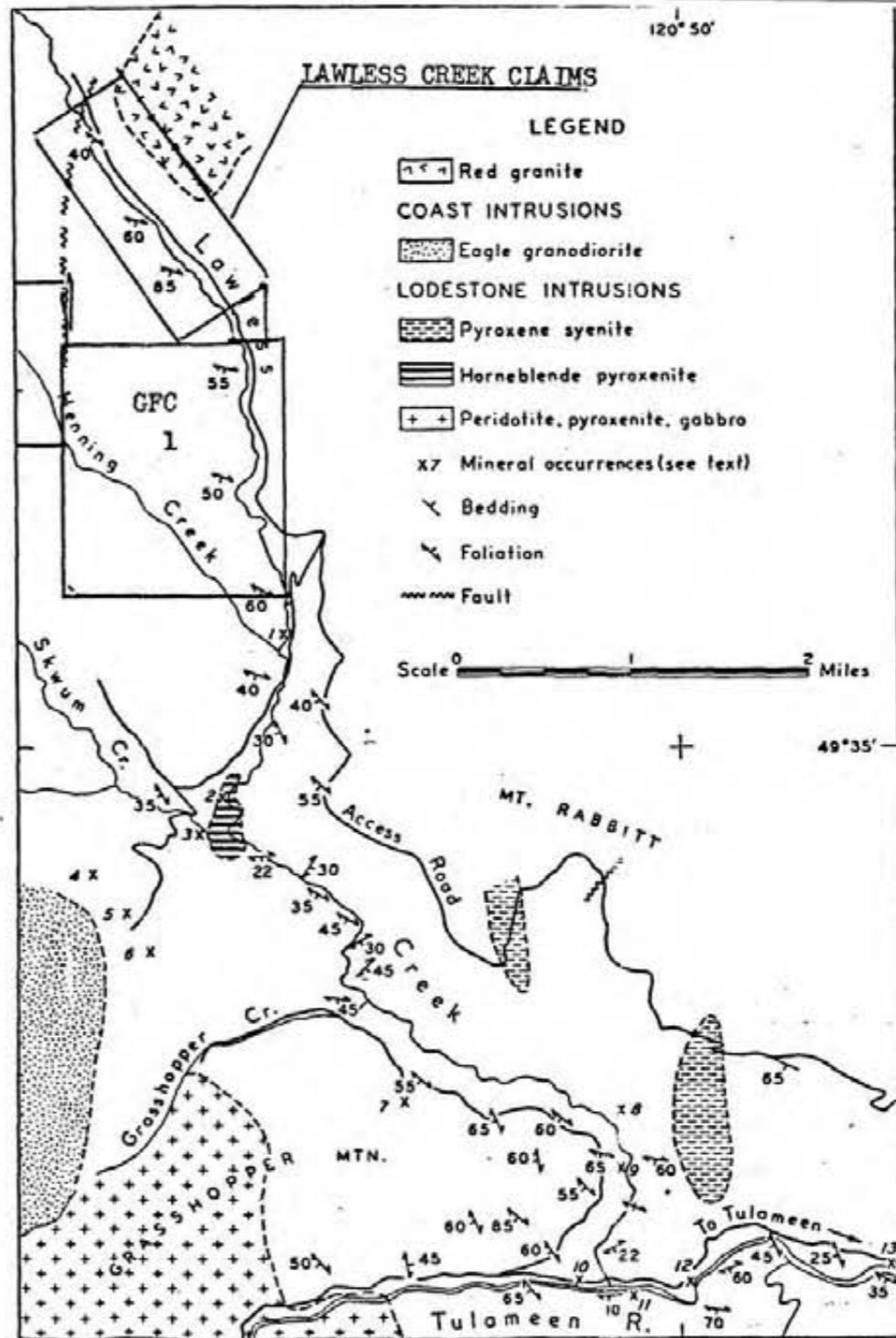


Figure 4. Outline map of Lawless Creek area showing mineral occurrences and principal intrusions.

Camsell included Lawless Creek in his geological mapping of the Tulameen district. Rice made minor rectifications when incorporating this mapping in the Princeton sheet. El Alamein mine and vicinity was geologically mapped by J. S. Stevenson in 1949. The 1960 mapping was on a base at 1 inch to 500 feet with 50-foot contour interval, aided by aerial photographs at 3 inches to the mile.

[References: Camsell, Charles (1913), *Geology and Mineral Deposits of the Tulameen District, B.C., Geol. Surv., Canada*, Mem. 26; Rice, H. M. A. (1947), *Geology and Mineral Deposits of the Princeton Map-area, British Columbia, Geol. Surv., Canada*, Mem. 243; Stevenson, J. S. (1949), *Minister of Mines, B.C., Ann. Rept.*, 1949, pp. 124-127.]

GENERAL GEOLOGY

TABLE OF FORMATIONS

	Alluvial and glacial deposits; minor talus.
	Non-conformity.
Other intrusions?	Red granite.
Coast intrusions	Eagle granodiorite.
Lodestone intrusions	Pyroxene syenite, coarse-grained gabbro, pyroxenite, peridotite, dunite.
	Intrusive contact.
	Buff-coloured feldspar porphyry and aplite.
	Relations unknown.
	Medium- to fine-grained diorite and gabbro.
	Intrusive contact.
Nicola group	Lavas, flow breccia, and pyroclastics, mostly intermediate to basic; greenstone; subordinate sediments, including black argillite, siltstone, greywacke, conglomerate, schist, and limestone.

NICOLA GROUP

The oldest volcanic and sedimentary rocks in the Tulameen district were named by Camsell the Tulameen group. They were subsequently correlated by Rice with Dawson's Nicola group, of Triassic and Lower Jurassic age. No fossils were found in the present mapping.

In Lawless Creek area these rocks are highly varied and show marked changes over short distances, along the strike as well as across it. They have undergone mild thermal metamorphism through most of the area, and are baked and recrystallized along contacts with some of the stocks. They have been squeezed and probably closely folded, with production of a coarse regional cleavage or foliation in most of the rocks. Finally, they have been shattered by a network of faults. The resulting pattern is kaleidoscopic. Outcrop is generally inadequate to unravel the complexities, and in any case an inordinate amount of time would be required.

A majority of the Nicola rocks in the area are dense or fine grained and dark greyish-green; they have not been closely identified, and are here termed greenstones. They may be andesitic in composition, and may include lavas, flow breccias, pyroclastics, greywacke, and mixed pyroclastics and greywacke. Interbedded with the greenstones, and in part intergrading or intertonguing with them laterally, are bands of dacite, rhyolite, fine-grained dark sediments, sedimentary schists, limestone, and minor pebble and granule conglomerate.

Relatively small bodies of dacite were identified, by field observation only, on the east end of Grasshopper Mountain, at the mouth of Grasshopper Creek, and in the northwest part of the area. Rhyolite was identified by Stevenson on lower Lawless Creek, but has not been identified elsewhere in the area. These rocks are described below, in the section on lower Lawless Creek.

Thin bands of dark sediments are sparingly interbedded with greenstones through most of the area, and somewhat larger patches of these rocks occur in the southwest. The rocks are black argillites, silty argillites, and phyllites, and dark-grey siltstones and impure quartzites. The bands range in width from a foot or two

to a few tens of feet. Some are relatively isolated, others are grouped in zones, separated by thin bands of greenstone. Neither bands nor zones could ordinarily be traced from outcrop to outcrop, although a series of black phyllite exposures along Grasshopper Mountain road from near the Rabbitt mine to Grasshopper Creek may be of a single band. It is not known whether this apparent lack of continuity of bands is caused entirely by folding and faulting or also by lensey deposition. The larger patches of dark sediments were found on the Tulameen River above the foot of Grasshopper Mountain road, and on the south slope of Grasshopper Mountain toward the Lodestone stock; they could not be traced to the northwest.

Sedimentary schists, with subordinate limestone, appear to underlie a considerable part of the ridge between Grasshopper and Skwum Creeks east of the granodiorite. A wedge of these sediments reaches down to Lawless Creek just below the small pyroxenite stock, and scattered outcrops were found westward and southwestward to Law's Camp. The colour varies from creamy white to various shades of grey, brown, and green. Toward the contact with the Eagle granodiorite, seams of limestone are intercalated along the schistosity, growing generally thicker and more numerous westward. They culminate in two or three lensey bands of coarsely crystalline limestone, 200 or 300 feet wide, against the contact. This limestone-bearing zone can be traced southward along the granodiorite contact to Grasshopper Creek; it is covered to the northwest. A similar or the same limestone-bearing zone can be traced along the granodiorite contact from the summit of Mount Britton for many miles to the southeast.

Pebble conglomerate was found only in the southern part of the area. Small outcrops of it on lower Lawless Creek are described below. A larger band, about 100 feet wide, was followed 3,500 feet northwest from the southeast corner of the area, and it may extend to outcrops of pebble conglomerate on the access road 4,000 and 8,000 feet farther to the northwest.

The greenstones are characterized by a medium- to dark-green or greyish-green colour and generally by dense or fine-grained texture and well-developed but relatively widely spaced cleavage or foliation. Some are, however, porphyritic or medium grained. Commonly the foliation is the only structural feature apparent, but many outcrops exhibit greenstone fragments or calcite lenses, rarely pillow-like structures. These various types of greenstone are commonly closely interbedded and also grade into each other along strike.

Medium-grained greenstone is sparingly scattered through the area. The texture is generally granular rather than interlocking and suggests that the rock may be tuffaceous. One band contains chips of argillite.

Four types of greenstone with a porphyritic appearance were distinguished in the field; they are believed to have had diverse origins. One type containing equant feldspar grains is probably largely tuff or greywacke. A second type contains oblong creamy-white feldspar phenocrysts, as much as 7 millimetres long, set in a dense green groundmass. It is exposed on the access road opposite the mouth of Skwum Creek and as several other bands crossing Lawless Creek. The bands are thick, generally exceeding 100 feet, and are texturally uniform, suggesting that they may be lava flows. A third type is characterized by attenuated cream-coloured feldspar laths. The most striking exposure is beside the access road just east of the second switchback, where the laths attain lengths of 1½ inches and thicknesses of one-quarter inch. This rock could be a dyke or flow, but from varied occurrences it is concluded that the feldspar laths have been introduced. A fourth type is characterized by hornblende prisms about 1 millimetre across, and also by unusually dark-green colour and by hematite coatings on slip surfaces. This rock is

exposed on Lawless Creek for 1,200 feet above the access-road bridge. Ankerite veins and zones of ankerite replacement are very common in this rock, though uncommon in Nicola rocks elsewhere in the area. It is suggested that considerable iron has been introduced, possibly with other constituents, and that the unique characters are metamorphic.

Fragmental greenstones are more common in the southern part of the area, and are described in the following section. Structures suggestive of pillow rinds were seen in two small patches on Lawless Creek, between Skwum and Grasshopper Creeks. Large epidote knots in a band of bluish-green greenstone on the Tulameen River below Lawless Creek may also represent pillows.

About 80 per cent of the greenstone effervesces with 6N hydrochloric acid. In some outcrops the calcite is not visible to the naked eye, and in others it occurs as tiny fracture veinlets or scattered grains or lenses. The origin(s) of these lenses is unknown. In some places, particularly on the Tulameen River just above Lawless Creek and in the northwest corner of the area, the lenses attain lengths of 2 to 3 feet and suggest fragments of disrupted limestone beds. Many lenses the size of a quarter or half dollar leave a deeply ribbed cavity surface when they weather out, possibly suggesting organic structures. Other lenses resemble amygdules. Weathered greenstone surfaces commonly look worm-eaten due to the solution of the smaller lenses.

INTRUSIVE ROCKS

Small bodies of diorite and gabbro scattered across the southern part of the area differ markedly in appearance from the Lodestone diorite and gabbro, and probably do not belong to the Lodestone intrusions. They appear somewhat more sheared, suggesting that they may be older. The largest is in the southeast corner; it is a dyke 600 feet wide and traceable for half a mile north from the river, traversing the beds at a small angle to the right. Another dyke about 100 feet wide occurs in El Alamein mine. Several others a few tens of feet wide intrude rhyolite along the lower part of Lawless Creek. An outcrop of diorite occurs northwest of the Rabbitt mine. The rock is dark green in colour, and where fine grained closely resembles green Nicola volcanic rocks. The large body is much more massive than the volcanics, but the smaller bodies are more or less foliated. Two dark porphyry sills in the lower canyon of Skwum Creek may belong to this group.

Buff feldspar porphyry has been found principally on the ridge between Grasshopper and Skwum Creeks and along the adjoining segment of Lawless Creek. Innumerable sills, a few feet to a few tens of feet thick, have been injected into Nicola sedimentary and volcanic rocks. Taken as a whole, the porphyry shows a complete gradation from porphyritic granite through feldspar porphyry to aplite. Around Law's Camp on top of the ridge it is generally massive, but nearer Skwum and Lawless Creeks it is generally somewhat foliated. Several small bodies of feldspar porphyry and aplite are included in the area shown as hornblende pyroxenite on Figure 4. In a few places where the two rocks were seen directly in contact, the pyroxenite showed marked chilling against the porphyry. At one contact, fragments of aplite were found in pyroxenite. The porphyry appears somewhat more sheared and contains considerably more pyrite than the pyroxenite; it is considered to be the older.

The main Lodestone stock, a portion of which is shown in the southwest corner of Figure 4, was briefly described in the Annual Report for 1959, and will not be further discussed here. A small outlying body of hornblende pyroxenite occurs at the mouth of Skwum Creek. As already noted, it contains inclusions of feldspar porphyry and aplite. The rock is mostly coarse grained and greenish-black to

black, consisting of roughly equal amounts of pyroxene and hornblende. Here and there it also contains some biotite. It is slightly magnetic. In three places it was seen to pass into a fine-grained dark brownish-grey gabbro near contacts, but on Skwum Creek coarse-grained pyroxenite is separated from Nicola greenstone by a 5-foot zone of ankerite. Veins of ankerite are also found in places inside the pyroxenite, which generally appears to be little altered against them. In an outcrop 400 feet above the mouth of Skwum Creek a little slip-fibre asbestos is present along minor shears in the pyroxenite.

Two narrow dykes of peridotite or picrite intrude Nicola rocks on Lawless Creek. One is nearly a mile above the mouth of Henning Creek, the other a quarter mile above the mouth of Grasshopper Creek. It is not known whether they belong to the Lodestone intrusions.

Two small stocks of pyroxene syenite intrude Nicola rocks on the southwest slope of Mount Rabbitt, and are exposed in cuts on the access road. The rock is identical with pyroxene syenite of the Lodestone stock on Tanglewood Hill and evidently belongs to the Lodestone intrusions. The rock consists of coarse white or pale-green feldspar and medium-grained pyroxene and amphibole. A small body of this rock occurs just below mineral occurrence No. 8, and other bodies may be present on the same slope.

The Eagle granodiorite underlies a large area to the west. A lobe of this mass extends into Lawless Creek area between Grasshopper and Skwum Creeks. As exposed just west of Law's Camp, the rock is slightly gneissic, coarse grained, and is mottled white and black by its principal minerals, quartz, feldspar, and biotite. This intrusion was assigned by Rice to the Coast intrusions, and was considered by both him and Camsell to be younger than the Lodestone intrusions.

In the northwest corner of the area a stock of red granite intrudes Nicola rocks in a hill east of Lawless Creek. Two small dykes of red granite cross the creek a little farther south. The rock is generally massive and medium grained and consists of pink to red orthoclase, green saussuritized plagioclase, quartz, and subordinate hornblende. The actual contact of the stock with Nicola rocks is exposed only along a small creek to the south, where it is irregular in detail. Near the stock, Nicola volcanics have been baked, and possibly partly silicified, to a light-green rock that rings when struck with a hammer. The red granite appears to fit Camsell's description of the Otter granite near Tulameen.

In addition to the above intrusions, the Nicola has been injected by a variety of dykes, especially along Tulameen River. Dykes of pinkish-grey syenite porphyry are sparingly but widely distributed. They are characterized by coarse feldspar phenocrysts and needles of dark-green amphibole, and closely resemble syenite porphyry dykes that intrude pyroxenite of the main Lodestone stock.

STRUCTURAL GEOLOGY

Most of the Nicola rocks display a planar parting or coarse cleavage with a spacing commonly of several inches. This parting was found to be parallel to the axial planes of the few folds observed, and to bedding where recognizable beds were not folded. Breccia fragments are locally squeezed parallel to the parting. Locally on the north slope of Grasshopper Mountain, and more generally around Law's Camp, the parting becomes close-spaced, platy minerals tend to be aligned parallel to it, and the parting grades into schistosity. For this parting the general term foliation is used in this report.

The general trend of the foliation is west-northwest, but there are marked local divergences in the southern part of the area. Dips are in general to the south.

Figure 4 shows attitudes that are averages for the small areas they represent. North of the access-road crossing of Lawless Creek the strike is fairly uniform, although the dip varies. South of this bridge, however, both strike and dip vary widely. Between Skwum and Grasshopper Creeks, transitions between patches of markedly different attitude are abrupt and may represent faults.

The fold structure in the Lawless Creek area is not known. The variations in attitude noted above are believed to be related, not to the primary folding, but to later deformation. Dragfolds are scarce, small, and vary in plunge. They can rarely be tied into the lithologic pattern. The majority indicate a movement of southwest side over northeast.

Nicola rocks have been intensively faulted in some parts of the area. Three of the broadest fault zones of the area are exposed in the access-road cuts. One fault zone traverses both Nicola rocks and pyroxene syenite at the second switch-back. The second, shown on Figure 4, is prominently displayed east of the second stock of pyroxene syenite. It is a zone of gouge and breccia nearly 200 feet wide, flanked by broad zones of pyritic silicified rock. A sample of this pyritic rock assayed: Gold, *nil*. The third, also shown on Figure 4, crosses the access road near its north end. Greenstone is sheared over a width of several hundred feet, but gouge and rock alteration are minor. This shear zone was inferred to continue south along a strong topographic lineament crossing the ridge between Lawless and Henning Creeks.

LOWER LAWLESS CREEK

The complexity of the Nicola rocks is illustrated by exposures along the lower part of Lawless Creek, on the east end of Grasshopper Mountain, and along the adjoining part of the Tulameen River. Figure 5 shows the distribution of the main rock types in this section. Some generalized rock units have been outlined, and are numbered from northeast to southwest. Faults are lettered. Some indirect evidence suggests that the numbered units may form an ascending sequence. Correlation with rocks farther up Lawless Creek is uncertain.

Unit 1 is predominantly massive green dacite. It forms high canyon walls along Lawless Creek. Regional foliation is indistinct or lacking. Small shear zones occur here and there. Epidote metacrysts are sprinkled through the rock in places, giving it a yellowish cast, otherwise it appears uniformly fine grained. Tiny feldspar phenocrysts can be detected in some places with the aid of a pocket lens. Interbedded sediments were not found, and fragmental bands generally are not common. Southeast of fault H however, massive dacite passes outward to fragmental dacite in which the fragments are increasingly rounded toward the greenstone contact. Elsewhere fine-grained dacite passes to fine-grained greenstone with only a darkening of colour and increase in foliation.

Unit 2 is a heterogeneous assemblage of varied andesitic volcanic rocks, including about 10 per cent of interbedded sediments. The volcanic rocks include fine-grained, calcareous, and fragmental greenstones, and the sediments include tuffaceous rock, black argillite, greywacke, and banded quartzite. The greenstone is normally medium to dark green or greyish-green. It is generally well foliated, though only on the north slope of Grasshopper Mountain is it sufficiently closely cleaved to be called phyllite or schist. Some of the greenstone effervesces with 6N hydrochloric acid; some does not. The calcite occurs partly in veinlets, partly as disseminated grains. Fragments were found in greenstone mainly in the northeast part of the unit, although faintly discernible bodies may have been missed in areas of poor exposure. The fragments range in size from half an inch to 3 inches across, and from ellipsoidal bodies just discernible on the cleanest surfaces, through

DIAMOND DRILL HOLE RECORD

MINE George F. CressyDATE 28 October 1983HOLE No. 93 - 1 SIZE BQ

Co-ordinates of Collar

LOCATION GFC - 1 2 South 2 WestDIRECTION South WesterlyN. E. DEPTH 352 Feet DIP 45°STARTED 26 September 1983POSITION Surface ELEV. COLLAR 3500 Ft Approx.FINISHED 19 October 1983

SECTION			LOG	ASSAY		
FROM	TO	RECY		NUMBER		
0	7		Casing			
7	352	330	Nicola Group, Triassic: Interbedded Meta Volcanics and Sediments - Chloritic Schists			
			7 - 112 Andesite - Greywacke Pale Greenish Fine Grained, Calcite stringers and phenocrysts, purplish hematitic stained slipjoints, some epidote - minor sulphides			
			112 - 124 Chloritic schist - sericitic - carbonaceous soft			
			124 - 169 Same as 7 - 112 feet Quartz veinlets at 145 and 155 - silicified barren - no sulphides			
			169 - 198 Argillite - <u> </u> - foliated calcite stringers slickenside jointing			
			198 - 247 Quartzite - variable sized grains to 1/32 in fine grained matrix - light grey			
			247 - 252 Chloritic schist - quartzite bed at 251			
			252 - 275 Same as 7 - 112: 124 - 169			
			275 - 295 Sheared Andesite - Greywacke: darker Grey Hematitic stained joints - slip planes			
			295 - 303 Interbedded quartzite - volcanics - greywacke			
			303 - 309 Argillite			
			309 - 352 Interbedded volcanics - sediments, argillites sheared - hematite stained joints slip planes			
TOTAL 330			% 93.8%	352	End of Hole	

MARKS:

DRILLERS H. Allen Diamond Drilling
Merritt, B. C.

EXAMINED BY William J. Weymark P. Eng.

ASSAYER DATE

(OVER)

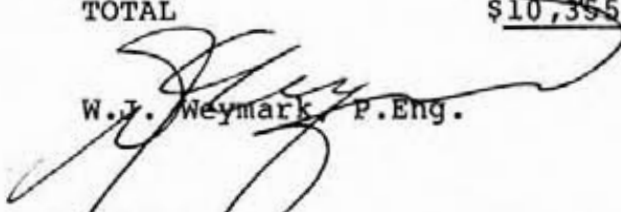
ANNEX D

COST DISTRIBUTION

1.	<u>Trenching, Bulldozer and Backhoe</u> G.F. Cressy, Box 406, Merritt, B.C. August-September-October, 1983 150 hours @ \$5/hr	\$ 750
	Pickup Mileage - 14 trips Merritt - claims 100 miles each, 1,400 mi @ \$0.30/mile	420
2.	<u>Diamond Drilling</u> 352 feet BQ core @ \$20/ft	7,040
	H. Allen Diamond Drilling Box 470, Merritt, B.C.	
3.	<u>Geological</u> Field: 28-29 October, 1983 W.J. Weymark, P.Eng. 3310 Westmount Road West Vancouver, B.C.	500
	Automobile: 50 mi @ \$0.30/mile	15
4.	Equipment Trenching B. Fleck, Merritt, B.C. 10 Equipment hours	1,000
5.	<u>Weymark Engineering Ltd.</u> Field Surveys, Layout Controls Office: Assembly, Collation, Plotting Fair Drawing, and Interpretation of Data and Report Preparation and Submission November 1-15, 1983	400
	Printing	150
	Reproductions and Maps	80

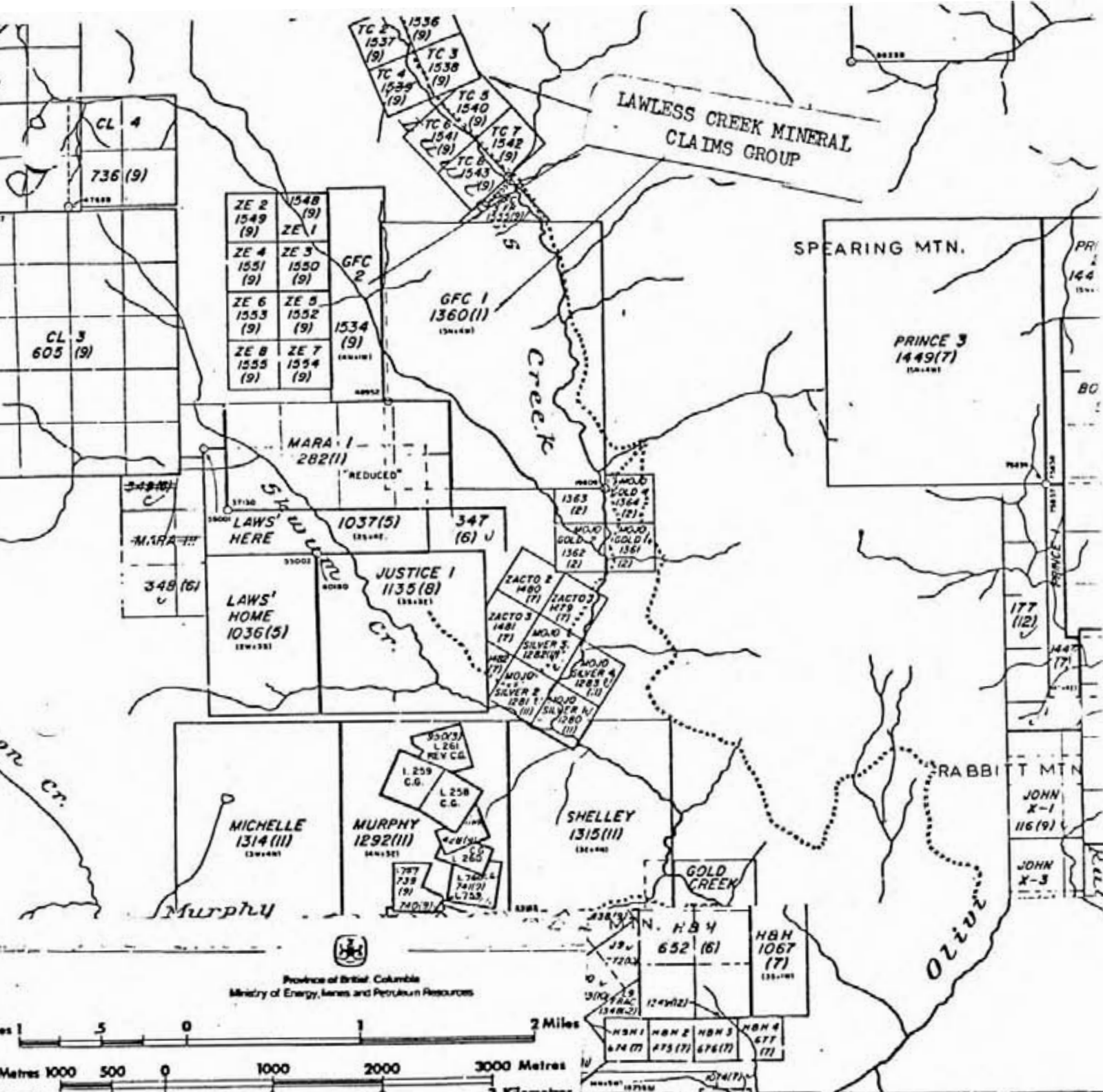
TOTAL

\$10,355


W.J. Weymark, P.Eng.

WEYMARK ENGINEERING LTD.

ILLUSTRATIONS



LAWLESS CREEK MINERAL CLAIMS GROUP

SPEARING MTN.

PRINCE 3
1449(7)

ZE 2 1549 (9)	ZE 1 1548 (9)
ZE 4 1551 (9)	ZE 3 1550 (9)
ZE 6 1553 (9)	ZE 5 1552 (9)
ZE 8 1555 (9)	ZE 7 1554 (9)

GFC 1
1360(11)

MARA 1
282(11)
"REDUCED"

LAWS' HOME
1037(5)

JUSTICE 1
1135(8)

LAWS' HOME
1036(5)

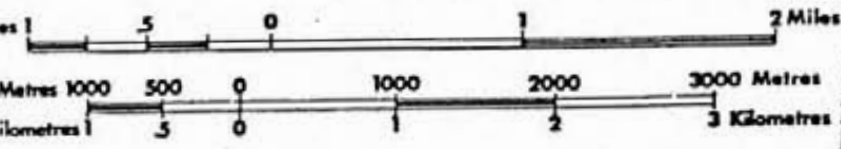
MICHELLE
1314(11)

MURPHY
1292(11)

SHELLEY
1315(11)

GOLD CREEK

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources



TH SEE MAP 92 H/7 W

MAP M 92H/10W
DEPARTMENT OF MINES AND PETROLEUM RESOURCES
VICTORIA, B.C.

M. 92H/10W

LAWLESS CREEK MINERAL CLAIMS
SIMILKAMEEN MINING DIVISION

CLAIMS - LOCATION

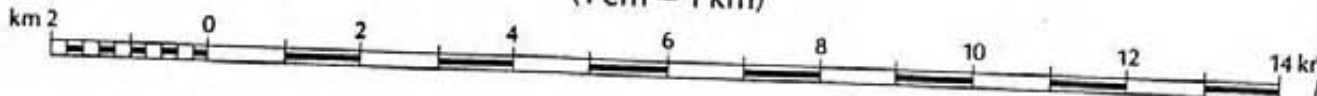
DRWN: WJW 10 Nov/83
SCALE: As Shown

TULAMEEN

MAP 92 H / NE

Scale 1:100 000

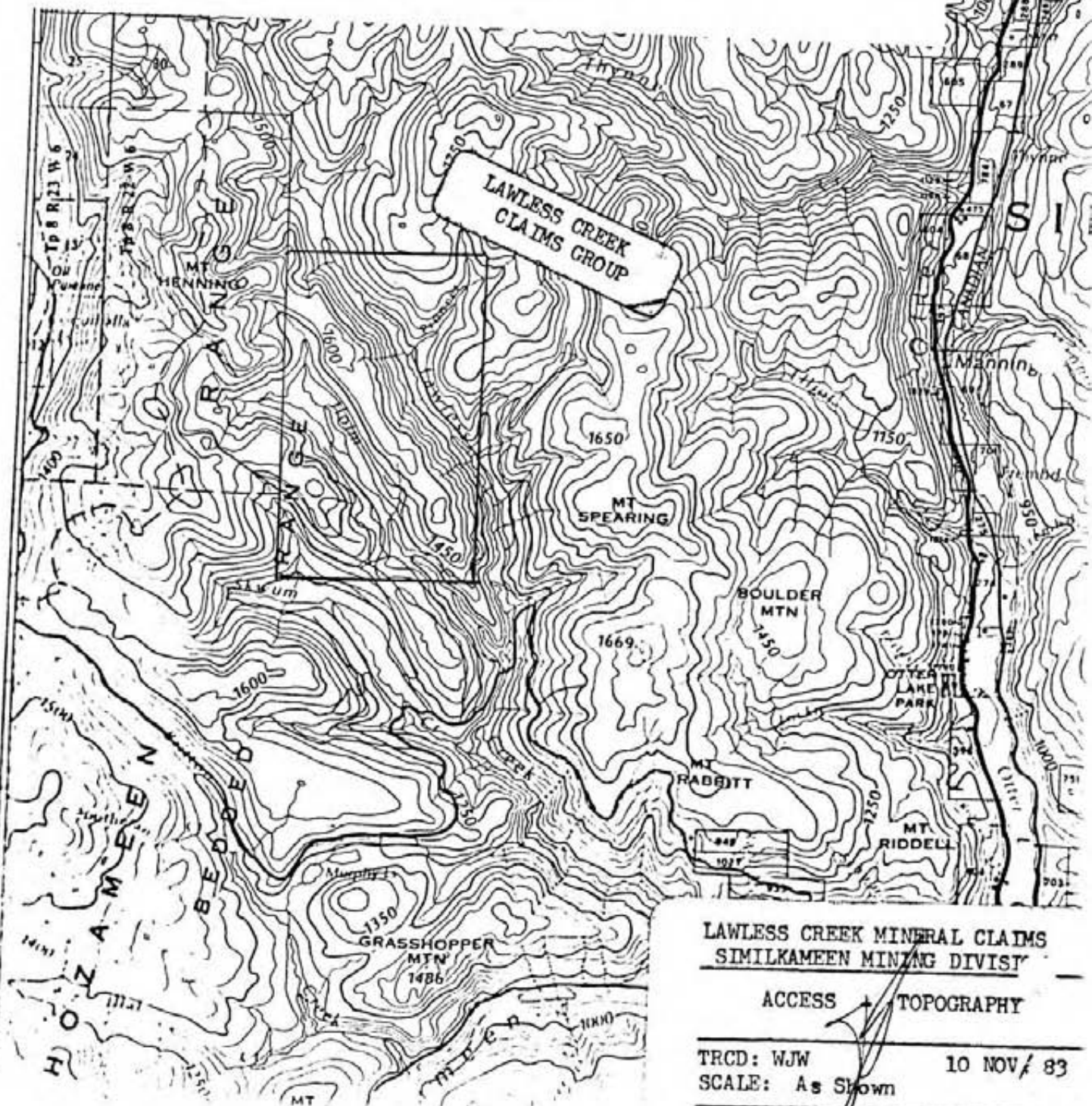
(1 cm = 1 km)



1 km = 0.6214 mi.

Universal Transverse Mercator Projection

Contour Interval 50 m



**LAWLESS CREEK MINERAL CLAIMS
SIMILKAMEEN MINING DIVISION**

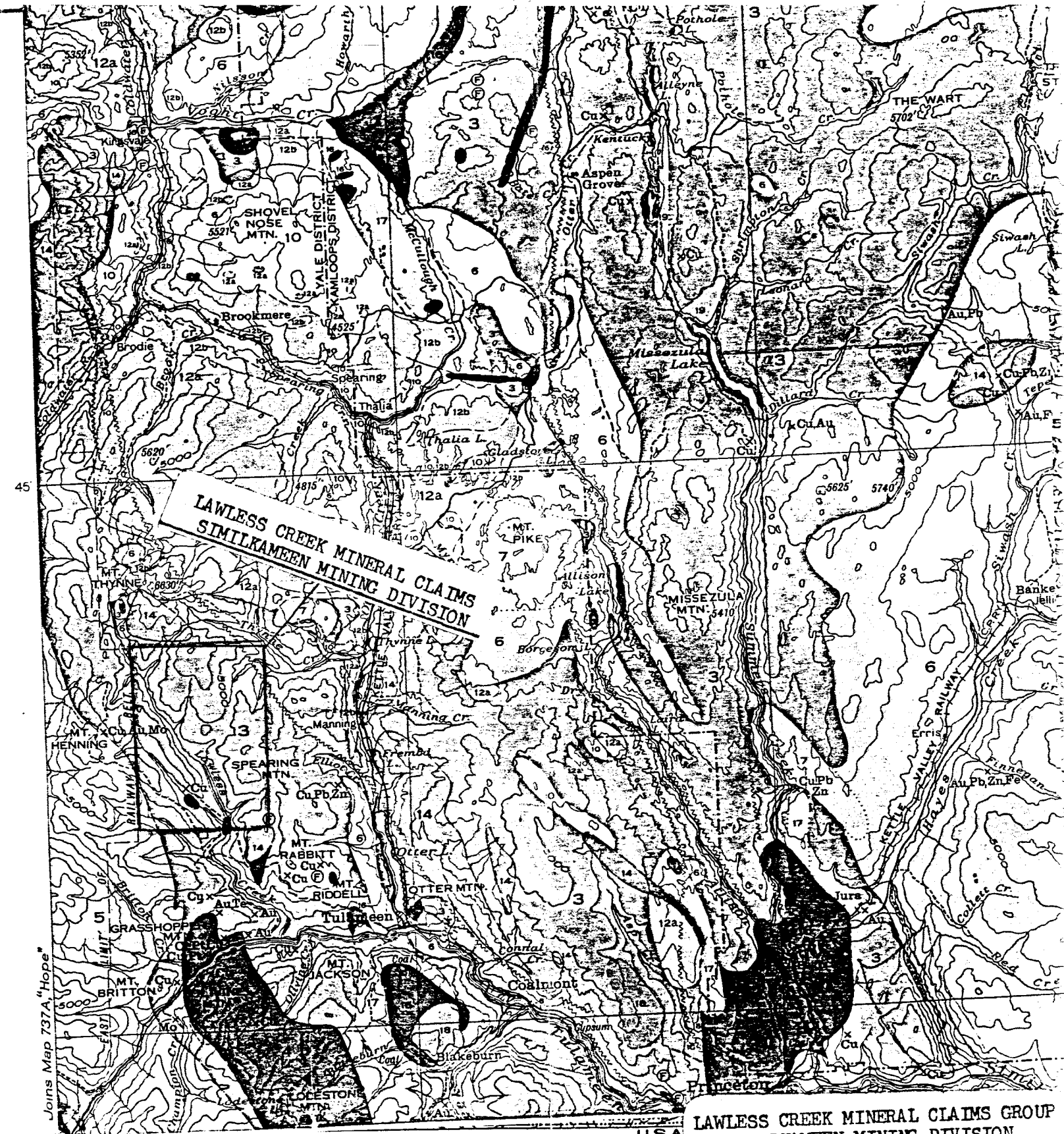
ACCESS TOPOGRAPHY

TRCD: WJW 10 NOV/83
SCALE: As Shown

FIGURE 3

LEGEND

- CENOZOIC**
- TERTIARY**
MIOCENE OR LATER
- 19 Valley basalt: vesicular, varicoloured basalt
 - 18 Plateau basalt: amygdaloidal, brown basalt
- MIOCENE OR EARLIER**
PRINCETON GROUP
- 16, 17 Mainly shale, sandstone, and conglomerate; coal
 - 17, Varicoloured andesite and basalt
- CRETACEOUS OR TERTIARY**
UPPER CRETACEOUS OR LATER
- 14, 15 OTTER INTRUSIONS: pink and grey granite and granodiorite
 - 15, LIGHTNING CREEK INTRUSIONS: grey quartz diorite
- CRETACEOUS**
LOWER CRETACEOUS
KINGSVALE GROUP
- 12a-b, 13 12a, mainly volcanic breccia; 12b, mainly andesite and basalt porphyry
 - 13, Andesite and basalt porphyry and volcanic breccia
- PASAYTEN GROUP**
Mainly grit and shale; 11a, mainly purple lava, tuff, and breccia
- 11
- SPENCE BRIDGE GROUP**
- 10 Hard, reddish andesite and basalt
- JURASSIC (?) AND CRETACEOUS**
UPPER JURASSIC (?) AND LOWER CRETACEOUS
DEWDNEY CREEK GROUP
- 9 Tuff, volcanic breccia, grit, argillite; 9a, mainly conglomerate
- JURASSIC OR LATER**
- COPPER MOUNTAIN INTRUSIONS: syenogabbro, augite diorite, pegmatite
- COAST INTRUSIONS:** 5, grey, slightly gneissic granodiorite; 6, mainly reddish, coarse-grained, siliceous granite and granodiorite; 7, light coloured granodiorite, quartz diorite, and gabbro
- 5, 6, 7
- Peridotite, pyroxenite, gabbro
- TRIASIC**
UPPER TRIASSIC
NICOLA GROUP
- Varicoloured lava; argillite, tuff, limestone; chlorite and sericite schist



Joins Map 737A, Hope

MAP 88A
PRINCETON
YALE, KAMLOOPS, SIMILKAMEEN,
AND OSOYOOS DISTRICTS
BRITISH COLUMBIA
Scale. 251/40 or 1 Inch to 4 Miles
Miles

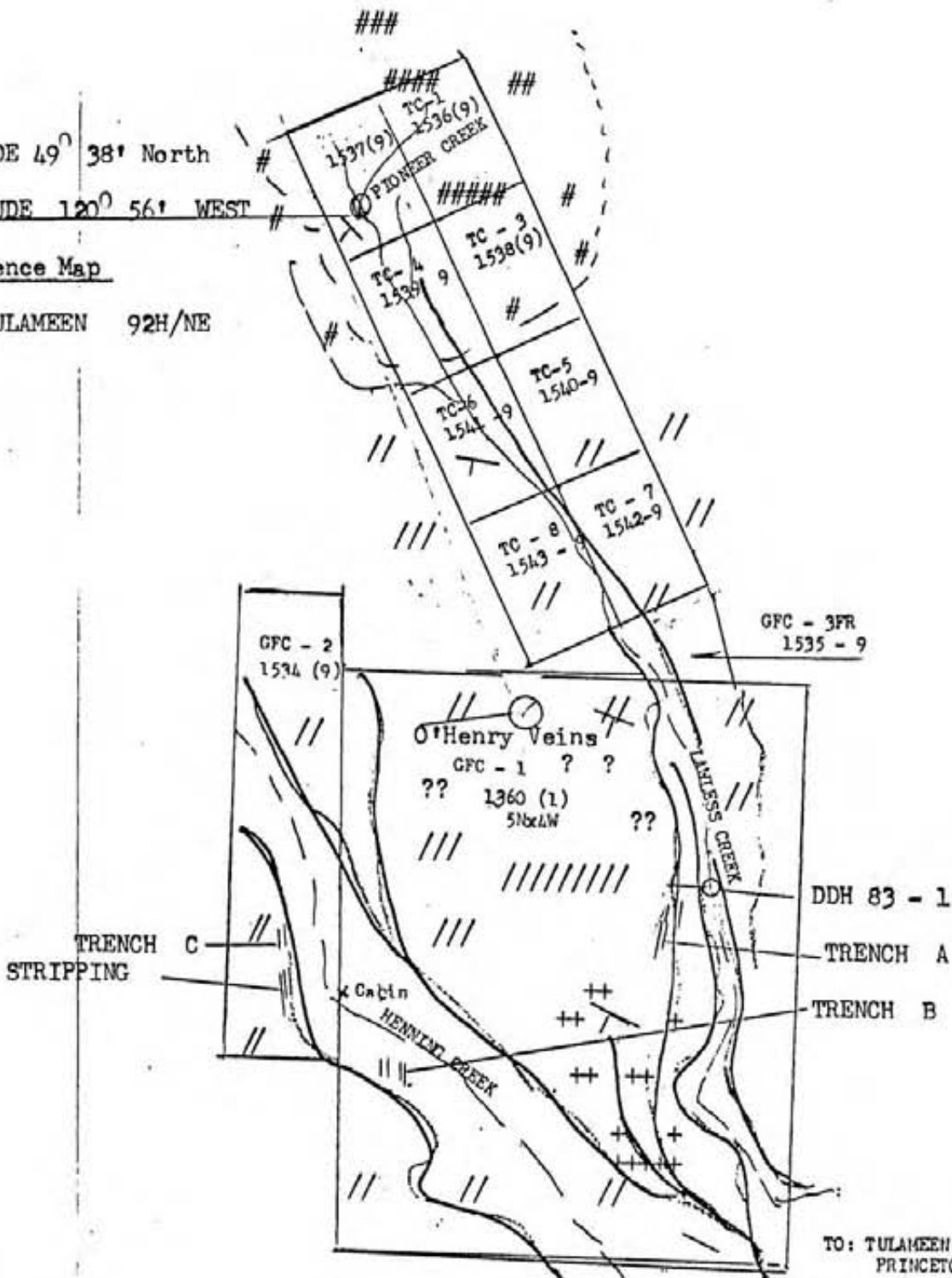
LAWLESS CREEK MINERAL CLAIMS GROUP
SIMILKAMEEN MINING DIVISION
REGIONAL GEOLOGY
DRWN: WJW
SCALE: As Shown
10/11/83
FIGURE: 4

*LATITUDE 49° 38' North

*LONGITUDE 120° 56' WEST

Reference Map

TULAMEEN 92H/NE



GFC - 3FR
1535 - 9

DDH 83 - 1

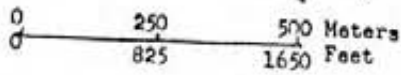
TRENCH A

TRENCH B

TO: TULAMEEN - 12 Miles
PRINCETON

LEGEND

- ## OTTER RED GRANITE
- ++ NICOLA META SEDIMENTS AND VOLCANICS
- +/+ PERIDOTITE, PYROXENITE, GABBRIO
- ||| TRENCHES - STRIPPING
- DIAMOND DRILL HOLE
- LOGGING ROADS
- ~ CREEKS AND TRIBUTARIES



LAWLESS CREEK MINERAL CLAIMS
SMILKAMEEN MINING DIVISION
CLAIMS GEOLOGY-WORKS
DRWN: WJW 20/11/83
SCALE: As Shown