

COPY OF

WESTGATE MINES LTD. PROPERTIES IN  
THE GOLDEN MINING DIVISION, B. C.

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REPORT ON THE  
WESTGATE MINES LTD. PROPERTIES  
IN THE GOLDEN MINING DIVISION, B. C.

BY

A. C. A. HOWE & ASSOCIATES LTD.

A.C.A. Howe, P. Eng.

VANCOUVER, B.C.  
REPORT NO. 27

OCTOBER 20, 1966

A. C. A. HOWE & ASSOCIATES LTD.

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## INTRODUCTION

The Company owns four properties in the Golden Mining division of British Columbia. Three of these contain copper mineralization and the fourth gold.

The gold property, known as the Flying Dutchman, and the Spruce Tree Creek copper property are situated approximately one mile apart on the Bobbie Burns Creek. The Warren Creek copper property is situated about 5 miles to the south-east, and the Baldy (formerly Wolfenden) copper property is situated 35 miles further south on Frances Creek.

During the summer of 1961, an exploration program was carried out on properties along the Bobbie Burns Creek Valley, namely the Warren Creek section.

The writer supervised this program and was impressed with the potential of the area for three major reasons. Firstly, the high frequency of occurrence of rich copper, gold and lead-silver mineralization; secondly, the very interesting geology including the violent deformation and folding of the rocks and the presence of replacement-type mineralization in some limestone beds. Thirdly, the fact that very little exploration has been done in the area since the discovery of these high-grade lenses at the beginning of the century.

Therefore, here is an area in which the geological formation and structure, plus the presence of known mineralized zones, indicate that large replacement-type bodies could also be present, and yet has never been investigated by modern exploration methods.

The reason for the neglect appears to be because of the inaccessibility of many of these properties in the past, due to their location near the summits of hills. Also, because most of the old workings have caved in or are buried by slides so that there is very little evidence of the extent of mineralization to show to interested mining companies.

During the past few years, logging companies in the area have been constructing wide gravel roads further and further into these hills to reach new timber stands. Consequently, the old properties are now easily accessible.

Other properties in the area consist of:

1. Columbia River Mines (formerly the Ruth-Vermont) where current work has developed a silver-lead-zinc replacement deposit reported to contain 500,000 tons with a gross value of \$40 per ton.
2. Giant Mine, a former lead-zinc producer, where currently barite is being produced from treatment of the old tailings plant.
3. Mineral King, lead-zinc-silver producer.
4. The Sullivan Mine, one of the world's largest lead-zinc deposits, is situated 40 miles south of Frances Creek.



Plan of properties

**WESTGATE MINES LTD.**

REVELSTOKE AREA GOLDEN MIN. DIST. B.C.

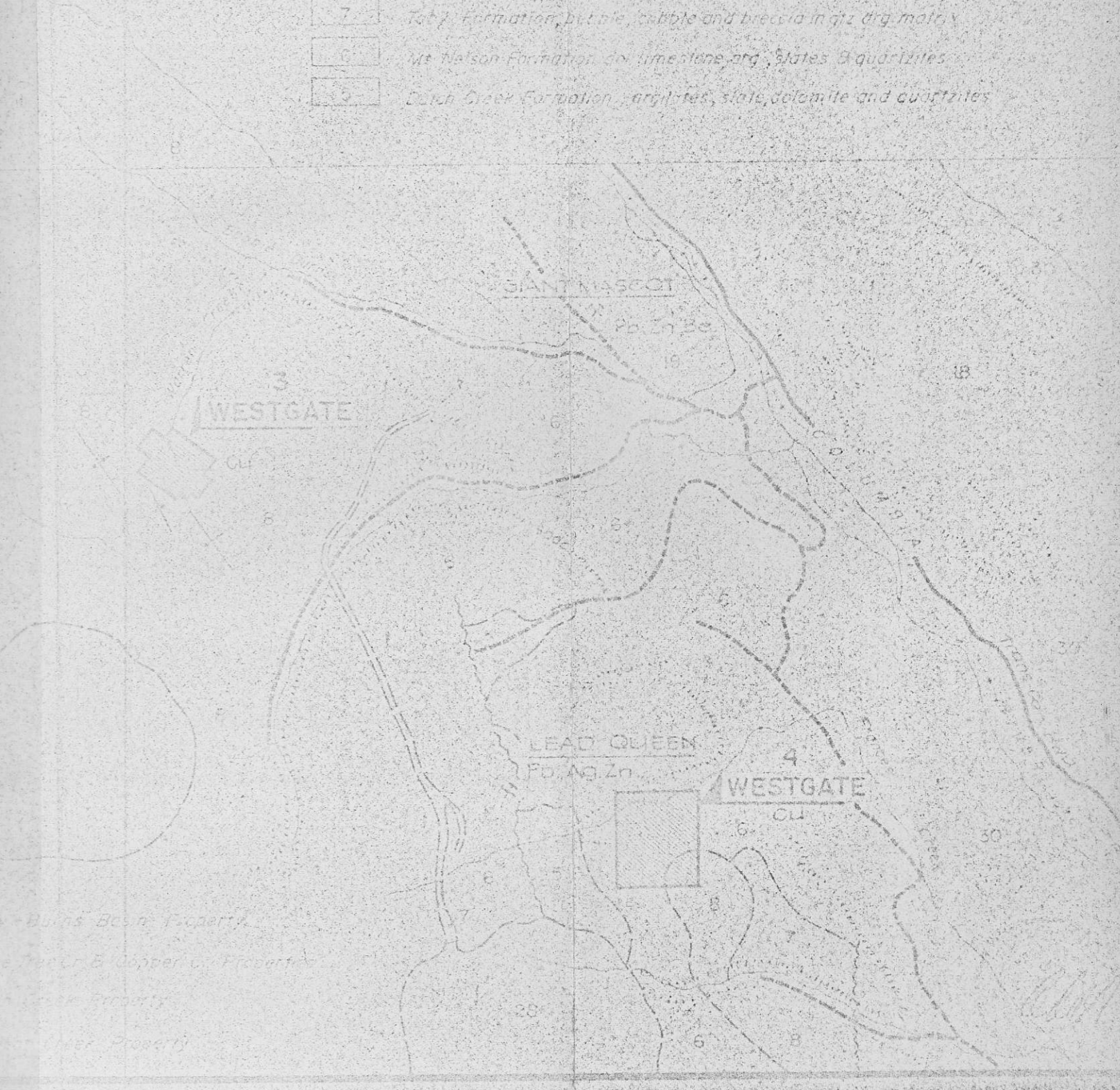
by  
A. C. HOWE & ASSOC.



- 1. B.C. ...
- 2. Sp ...
- 3. ...
- 4. ...

**LEGEND**

- Roads paved, others
- 5000 elevation
- Drift
- Quartz monzonite, granodiorite
- McKay Group limestones
- Horsethief Creek Series slates, argillites, sandstone, etc.
- Taly Formation, bit. shale, siltstone and breccia in qtz drg matrix
- Mt Nelson Formation, sh, limestone, arg. slates & quartzites
- Deer Creek Formation, argillites, slate, dolomite and quartzites



NAPOLEON CREEK PROPERTY  
(WOLFENDEN COPPER PROPERTY)

BY

A. C. A. HOWE & ASSOCIATES LTD.

A. C. A. HOWE, P. ENG.

Vancouver, B.C.

October 20, 1966.



## INTRODUCTION

The Wolfenden Copper occurrence is situated on Frances Creek, about 15 miles west of Briscoe. The property consists of 110 claims, known as Baldy 1 - 110, and is accessible by means of a logging road along Frances Creek. A tractor road has been built up the side of the hill from the Creek to the showing.

## GEOLOGY OF THE AREA

The area is underlain mainly by Mt. Nelson formation of the Upper Purcell series. This consists of limestones, with interbedded argillites and quartzites. The western side of the area is bounded by younger slates and quartzites of the Horsethief Creek series, while the eastern side is bounded by drift of the Columbia valley and the younger dolomites of the Jubilee formation.

In general, the strata are folded into a broad geanticline. This explains the exposure of the older rocks in the centre of the district. Numerous minor folds are superimposed on the major structure, and are found in both the older limestones in the centre, and the surrounding younger series. The folds and faults in the area have a general north-westerly trend.

A large granitic intrusive forms a circular batholyth at the southwest end of the area of interest. The mineral occurrences examined by the writer lie just north of this intrusive, within an area of folding and faulting. Silver-lead mineralization occurs as a replacement type deposit in the limestone, and copper mineralization occurs within slates

of the Mt. Nelson formation.

DESCRIPTION OF PROPERTY

The mineral occurrence is situated on the top of a hill, about 1,000 ft. above the Frances Creek valley.

It consists of malachite, azurite and chalcopyrite within a bed of slates and argillites.

The mineralization is associated with quartz stringers in the slates, which are parallel to the bedding. The widest zone of mineralization occurs at the north end of the showing where malachite is spread across a width of 11 ft. in the wall of a rock-cut. A sample across this zone assayed 5.90% copper.

A summary of the samples taken follows:

<u>NO.</u>	<u>WIDTH</u>	<u>ASSAY</u>	<u>DESCRIPTION</u>
	Feet	% Cu.	
1	2.0	7.35	Chalcopyrite and pyrite in quartz vein 12" wide containing slate inclusions, and also in adjoining slates.
2	2.0	8.00	Malachite and hematite mineralization scattered over 6 ft. wide zone of interbedded quartz and slates. Sample taken across 2 ft. in centre consisting of very finely laminated slates and quartz stringers.
3	11.0	5.90	Finely laminated and brecciated slates, with quartz injections. Malachite, and minor azurite, pyrite and chalcopyrite scattered throughout.

CONCLUSIONS AND RECOMMENDATIONS

The copper mineralization appears to be associated with quartz injections in a brecciated and possibly sheared section of a slate bed. The full width of the slate bed is not known as only the upper portion is exposed above slide material. It is not, therefore, certain whether the copper mineralization is confined only to the sections sampled or whether it is spread across the full width of the slate bed. The widest mineralized zone exposed lies at the north end of the showing where it disappears under overburden.

There are no records of previous exploration on the property, other than the rock cuts described above, and a short adit reported to be below the cuts and trenches.

The property, therefore, warrants exploration work to determine the size and grade of the copper zone. Since the copper is deposited in a slate bed, the mineralization may cover a large area and therefore have considerable tonnage possibilities.

The grades of the assay results are surprisingly high, and if representative of the slate beds as a whole, would indicate a high grade ore body. The writer took the samples tabulated above during a visit to the property in 1961. During a recent visit to the property two more samples were taken as checks on the previous ones. The results though have not been received yet.

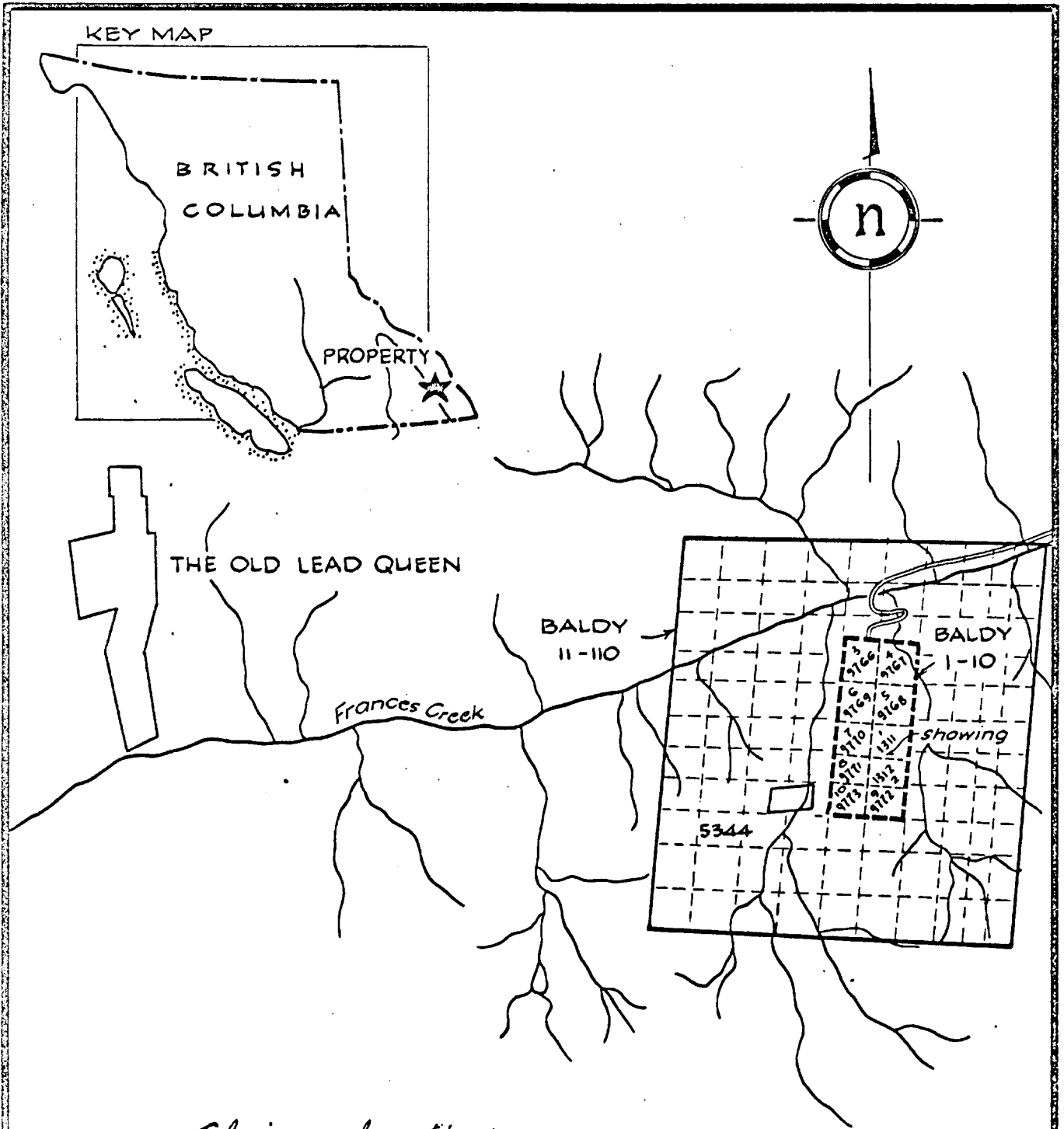
The exploration program should consist of:

1. Geological mapping and prospecting of the property to outline the formations, structure and faulting. In addition the mountains on

the opposite sides of the two valleys, which parallel the mineralized bed, should be prospected for a re-occurrence of this bed elsewhere.

Estimated cost-- \$15,000.00

2. Diamond drilling of the mineralized bed by a series of vertical holes from above the horizon. Initially a program of 2,000 ft. is recommended to test whether the copper mineralization is widespread or not. Addition drilling would depend on the results obtained. Estimated cost of 2,000 ft. including sampling, supervision and assays-- 20,000.00
3. An allowance should be made for an additional 10,000 feet of drilling to follow up on the initial work, and this is estimated to cost 100,000.00



*Claims location map*

# **WESTGATE MINES LTD.**

**NAPOLEON CREEK PROPERTY, BALDY CLAIMS**

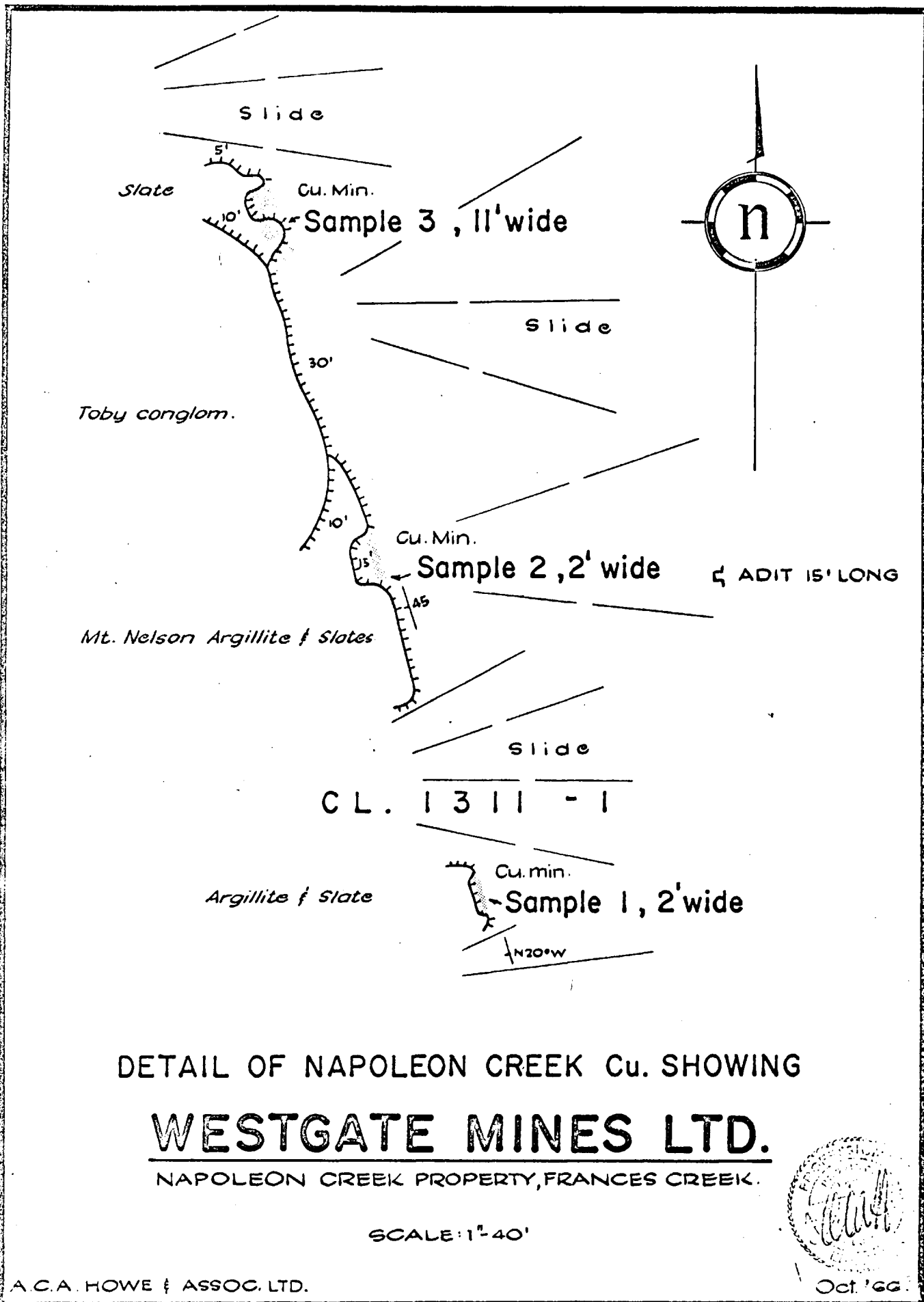
GOLDEN MINING DIVISION  
B.C.

Scale: 1 inch to 1 mile



A.C.A. Howe & Assoc. Ltd.

(Ref. map 131.) Oct. '66



DETAIL OF NAPOLEON CREEK Cu. SHOWING

# WESTGATE MINES LTD.

NAPOLEON CREEK PROPERTY, FRANCES CREEK.

SCALE: 1" = 40'



SPRUCE TREE CREEK PROPERTY

GOLDEN AREA, B.C.

BY

A. C. A. HOWE & ASSOCIATES LTD.

A. C. A. HOWE, P. ENG.

Vancouver, B.C.

October 20, 1966.

### INTRODUCTION

The property consists of 172 contiguous mineral claims forming a block 8 miles long by  $1\frac{1}{2}$  miles wide. They are situated in the Golden Mining Division of British Columbia, and straddle the Bobbie Burns Basin, Bobbie Burns Creek and Copper Creek, at about 60 miles southwest of Golden.

Access to the property is presently possible only by helicopter or packhorse, however, a road is presently being bulldozed to the property by a mining company holding claims to the west of the property. A good logging road passes along Vowell Creek approximately 15 miles from the property, and the new road will connect with the logging road, which in turn connects with Parsons, on the Golden-Radium highway.

### HISTORY

Exploration work has been performed on the property at various periods since 1890, when mining companies first entered the area. Three adits are reported to have been driven on the property, and the chalcoppyrite hand sorted, and sent by wagon train into Spillimacheen. A report of the Minister of Mines 1917, mentions these workings under the name of the Tarheel and Tennessee groups. It is reported that one trial shipment sent from the Tennessee group to Trail assayed 11.92% Cu. This appears to have come from the lower adit, which is located about 4,500 feet north of Bobbie Burns Creek.



### GEOLOGY OF THE AREA

The area is underlain mainly by Mt. Nelson formation of the Purcell series. This consists of limestones, with interbedded argillites and quartzites. The western side of the area is bounded by younger slates and quartzites of the Horsethief Creek series, while the eastern side is bounded by drift of the Columbia valley and the younger dolomites of the Jubilee formation.

In general, the strata are folded into a broad geanticline. This explains the exposure of the older rocks in the centre of the district. Numerous minor folds are superimposed on the major structure, and are found in both the older limestones in the centre and the surrounding younger series. The folds and faults in the area have a general north-westerly trend.

A large granitic intrusive forms a circular batholyth at the southwest end of the area of interest. The mineral occurrences examined by the writer lie just north of this intrusive, within an area of folding and faulting. Silver-lead mineralization occurs as replacement type deposits in the limestone and argillites, and copper mineralization occurs within slates of the Mt. Nelson formation.

### GEOLOGY OF THE PROPERTY

The dominant rock types are slates (also shales and argillites) and quartzites. They are interbedded and have a general strike of N 40 W, but have a variable dip due to an anticlinal fold which runs across the property. The foliation is approximately parallel with the bedding, but has a persistent dip to the N.E. of 70° - 80°. Numerous quartz veins

were noticed, and these generally cut across the direction of strike of the country rock. The majority of the quartz veins strike in a direction either N 30 W or N 45 E.

Pyrite mineralization occurs in both the slates and quartzites, either as scattered cubes or in thin seams along bedding planes. Chalcopyrite and pyrite occur as narrow seams and aggregates in some of the quartz veins, particularly along the walls of the veins.

The axis of an anticlinal structure, including several drag folds, passes through the mineralized zones near the lower adit. It strikes at about N 40 W and appears to control the formation of the major quartz veins and hence also of the sulphide mineralization. This anticlinal structure can be clearly seen in Creek A, and where exposed consists of 3 successive anticlines and synclines. The western arm of each anticline dips almost vertically to the west, whereas each eastern arm has a flat dip ( $10^{\circ}$  -  $15^{\circ}$ ) to the east. The foliation is parallel in strike with the bedding, but dips consistently N.E. at  $80^{\circ}$ . Quartz veins can be seen lying along the crests of the folds and also, one vein system dips steeply west parallel with the bedding, and the other system dips steeply east parallel with the foliation. Sulphides occur in both sets of vein systems and also in the slates and quartzites.

At the junction of Spruce Tree Creek, and Creek B, a series of quartz veins outcrop, and these contain seams of massive chalcopyrite. An adit, now closed, has been driven along one of the veins, and appears to be the one mentioned in the Department of Mines Report, 1917, on the Tennessee group. The mouth of the adit is now covered by fill, however, a 4" seam of massive chalcopyrite can be seen running into the tunnel along

the west wall. The quartz veins appear to occur on the nose of an anti-clinal fold, which is recumbent and having the crest to the west. The drag folding seen on Creek A is probably part of the same structure. Near the adit the beds have a distinct roll, being nearly vertical at the top of the rock face above the adit, and dipping at  $35^{\circ}$  to the east beside it. Three of the quartz veins dip at  $60^{\circ}$  to the N.E., and one dips at  $60^{\circ}$  to the S.W. This vein follows Spruce Tree Creek down the hill (southeastwards) for a distance of 1000'. Green malachite staining can be seen along it, particularly at the junction of Spruce Tree with Creek C. The other three veins can be seen continuing northwestwards up the hill from the adit until they disappear under overburden. One of these veins appears to be the same one explored by a tunnel on the Tarheel claims, about 3000' to the northwest. The Department of Mines Report, 1917, states that 120' of tunnelling was done on one vein, and 100' on another about  $\frac{1}{2}$  a mile further still to the northwest. The writer could find only one of these former Tarheel adits, called the "upper adit", which is 120 ft. long, with a cross-cut 15 ft. long at the face. The adit was driven along a quartz vein, mineralized with chalcopyrite and malachite. At the face, the cross-cut was driven east to intersect another parallel quartz vein. The two veins appear to lie within a shear or fault zone in argillites. The argillites consist of a bed 12 ft. wide between two beds of quartzite. The dips appear to be  $70^{\circ}$  E. Pyrite mineralization was observed in both the argillites and quartzites. A sample was taken across the vein on surface, but the assay results have not been received as yet.

CONCLUSIONS AND RECOMMENDATIONS

The area of the Bobbie Burns basin is one in which considerable copper and gold mineralization has been found in the past. The only exploration methods used were trenching and tunnelling; no diamond drilling has ever been attempted. Extensive underground work was done on two properties nearby, the Ruth-Vermont and Crown Point Mines, for lead-silver. These were mined at the turn of the century, when the output had to be rawhided or packed by horses to the nearest wagon road. No work has been done in the area for over 60 years due to inaccessibility, until last year when underground exploration at the Ruth-Vermont property discovered a replacement type orebody of lead-zinc-silver in calcareous argillites.

The chalcopyrite mineralization seen in the Tennessee adit, and on the nearby dump, indicates that rich stringers occur in the quartz veins. Old workings further to the northwest, in the same basin, have indicated extensive gold mineralization also in the quartz veins in this area. In addition to the old workings north of Bobbie Burns Creek, copper showings occur to the south in the next valley, which is Copper Creek.

The violent structural deformation in the area as evidenced by the anticlinal folding near the adit, indicates a strong possibility of major shear or breccia zones nearby which could carry economic mineralization. The area is, in my opinion, an ideal one for exploration using modern techniques.

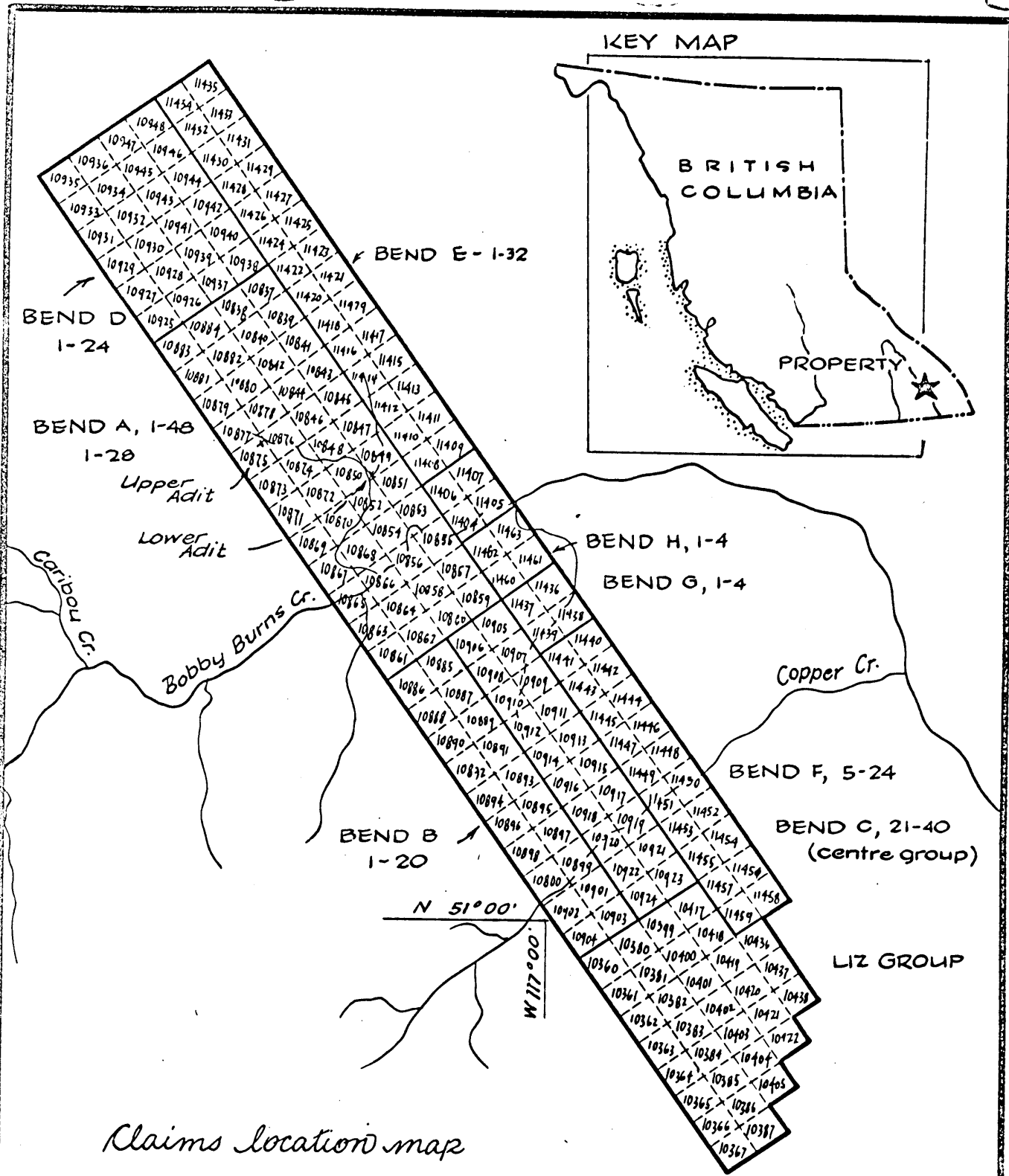
It is, therefore, recommended that a preliminary exploration program should commence with geological mapping and prospecting, using

photographs as an aid, to:

1. Locate all old workings and mineralized showing.
2. Locate and map all limestone, shales or calcareous argillites which may be suitable host rocks for a replacement-type orebody.

The cost of this program is estimated at \$25,000.00.

Further recommendations would be dependent on the results of this program, but should consist of reconnaissance geochemical and magnetometer surveys, followed by diamond drilling. An allowance should be made for a further \$50,000.00 for this work.



Claims location map

# WESTGATE MINES LTD.

SPRUCE TREE CR. & COPPER CREEK PROPERTIES  
GOLDEN MINING DIV., B.C.

Scale: 1 mile - 1 inch

*ACA*

WARREN CREEK PROPERTY  
GOLDEN MINING DIVISION, B.C.

BY

A. C. A. HOWE & ASSOCIATES LTD.

A. C. A. HOWE, P. ENG.

Vancouver, B.C.

October 20, 1966.

PROPERTY, LOCATION AND ACCESS

The Company owns 39 contiguous mining claims designated as follows:

BOB nos. 1 to 4, inclusive

LIZ nos. 166 to 200, inclusive

These form a rectangular block approximately 2 miles long in a N. W. -- S. E. direction, and  $1\frac{1}{2}$  miles wide.

The claims cover the area of the headwaters of Warren Creek. They are located approximately 15 miles due west of Spillimacheen in the Golden Mining District of British Columbia. The northern end of the property, on Warren Creek, can be reached by road from either Spillimacheen or Parson. A good gravel road, built by Crestbrook Lumber Co. of Parson, passes eight miles west of the property and a jeep road has been constructed from there to the old adits. The total distance by road from Parson is 30 miles.

GEOLOGY OF THE PROPERTY

The main rock types visible on the property are quartzites and slates which have been classified as part of the Horsethief Creek series on government geological maps.

It was observed by the writer that the two rock types vary considerably in texture and composition. The quartzites vary from pebble conglomerates, with quartz pebbles up to  $\frac{1}{2}$ " diameter, to grits, and fine grained siliceous shales. The slates vary from black or banded varieties



to argillites and shales and siliceous shales. In fact, the quartzites and slates grade from one to the other both along strike and across strike. This makes it difficult to correlate individual beds in the area.

The quartzites and slates occur in beds varying in thickness from a few feet up to 100 ft. The strike of the bedding is N 35° W. All the rocks are strongly foliated and schisted in the direction N 50° W and dip at 70° - 85° to the southwest. This foliation roughly parallels the axes of several folds which traverse the property. The fold axes strike between N 35 W and N 50 W, and dip to the southwest causing overturning of the folds.

Quartz veins are very common, either parallel with the bedding or cutting across it. Two varieties of vein occur; the common one consists of white quartz up to 2 ft. in width which generally strikes at either N 65° E or N 35° W. The second variety consists of quartz containing inclusions of quartzite and slates. These are generally buff or red in colour due to weathering of the slates and occur in widths up to 50 ft. The sulphide mineralization is confined to these veins. The two main directions of strike are either due N-S or due E-W, and cut across the beds of the country rock. They also occur parallel to the bedding, usually on the overturned arm of the folds. An example of this is the Warren Creek occurrence.

Pyrite and chalcopryite mineralization appear to be confined to the outer edges of the veins, close to the walls. The sulphides occur in bands and massive aggregates up to 2 ft. in diameter, also disseminated in the quartz in 1/5" diameter blebs. Concentrations of sulphides have occurred at the junctions of E-W and N-S veins, and in areas of strong

structural movement, such as folding or faulting. These concentrations appear to be limited in size, and as they are confined to the walls of the quartz vein do not give an economic grade of copper when averaged across the full width. Silver values up to 1 oz. per ton have also been found associated with the sulphides.

SUMMARY OF PREVIOUS WORK

Copper and gold mineralization have been known on the Warren Creek property since the year 1900. Two tunnels have been driven in the past to extract high grade copper sulphides within the quartz veins. Old dumps contain massive sulphides which have given assays of up to 7% copper per ton.

In recent years exploration work was carried out by St. Andrew Mining Co. This work was commenced in 1959 when a ground E.M. Survey was performed on the Warren Creek Zone at the north end of their property, and an airborne E.M. Survey was performed south of the Warren Creek Zone, on the Rocky Point Creek (Copper Butte) area of the St. Andrew property. The ground survey did not indicate any new mineralized veins on the Warren Creek Zone, but the airborne survey indicated several interesting conductors in the areas known as the Copper Butte and C zones, however separated from the known copper showings.

In 1960, a program of exploration was commenced to check the known mineralized showings and also the new airborne electromagnetic anomalies.

A road, eight miles long, was built to the Warren Creek Zone to facilitate exploration on the vein there. This road connected with a good gravel road leading to Parson on the main highway. In addition the mine road was extended a further  $2\frac{1}{2}$  miles past the Sykes zone to zone C.

Diamond Drilling of the Warren Creek zone outlined a sulphide lens 500 ft. long, averaging 20 ft. in width. The deepest hole, A 9, at that time indicated a vertical depth of at least 250 ft. This drilling showed that the chalcopryrite mineralization did not extend across the full width of the quartz vein but was concentrated within 3 or 4 ft. near each wall. Although assays of 3 - 4% copper across 5 ft. were obtained, and even as high as 9.5% across 1 ft. in hole A 5, the average across the full width of the quartz vein varied between  $\frac{1}{2}$  - 1% copper in each hole. This indicated that mining across the full width of the vein would not be economic, though a process of 'high-grading' by a small operator might be possible. However, Hole 9 A, the deepest hole drilled, obtained the best intersection to that date with assays of 1.73% copper, 0.005 ozs. gold, and 1.17 ozs. silver across 13 ft. or 1.08% copper and 1.15 ozs. silver across 22 ft. It was therefore, considered possible that values may increase with depth since leaching could explain the lower values near surface. Hole A 11 was commenced to intersect the vein 350 ft. vertically below A 9. However, the drill had to be stopped at a hole depth of 571 ft., as it was found to be too light to penetrate the hard quartzite at that depth.

During 1961, it was decided that further work should be done on the Copper Butte and C zones to check the airborne anomalies and mineralized veins, also that hole A 11 on the Warren Creek vein should be completed. Geophysical and geological surveys were performed on both the Warren Creek and Copper Butte zones, and prospecting was done on the C zone. Several mineralized quartz veins which were found during geological mapping, and several conductors found by the geophysical survey indicated that the Copper Butte zone warranted a drill program. It was estimated that with the funds available a total of 5 holes could be drilled. In order to obtain the most information from these holes, they were not located directly under the known copper mineralization in the quartz veins, but from 100 ft. - 400 ft. away from it, in areas where the quartz vein was covered by overburden. Hole B 5 was the only one drilled under a known showing and it obtained the best results averaging 0.46% copper across 40 ft. In addition, two holes were drilled to check geophysical conductors, and these both intersected pyrite bands within slate beds.

To complete the program the drill was moved to the Warren Creek zone, and two holes were drilled. The first was located 200 ft. east of the previous drilling, in an area where no vein outcropped on surface, in order to extend the known lens by a further 200 ft. if possible. The results were poor, however, core recovery was only 40% in the expected vein location. Sludge samples were taken and assayed 0.05% copper over 11.0 ft.

Hole No. 11 was deepened to determine whether the interesting values obtained in Hole A 9, would continue to depth. Again the results were poor, and again core recovery was low in the vein area. The quartz

sulphide zone was intersected between 654 - 675 ft., and chalcopyrite observed from 663.5 - 667.0, however, 2 ft. of core was lost in this 3.5 ft. section. Sludge assays were 0.17% Cu. across the 3.5 ft.

#### CONCLUSIONS AND RECOMMENDATIONS

Previous exploration work on the property, notably in 1961, was directed mainly towards determining A) the size and grade of known copper bearing quartz veins, and B) the cause of several strong airborne E.M. anomalies, and particularly whether these indicated concealed sulphide zones.

Three copper-bearing veins were drilled by St. Andrew Mining Co. during the 1960 and 1961 seasons. In each of these the mineralization was found to have similar characteristics; while high grade patches of chalcopyrite mineralization ( assays of 3%, 4% and 9% copper in 1960 ) were obtained, these were confined to the 3 or 4 ft. close to the walls of the quartz veins. The averages across the complete width of the veins, varying from 20 ft. - 50 ft., were found to be generally in the range of  $\frac{1}{2}$ % copper, with also  $\frac{1}{2}$  oz. per ton in silver.

Core recoveries were in general, very poor in the 1961 drill program. However, Hole A 9, the deepest of 1960, intersected a zone averaging 1.73% copper, 0.005 ozs. gold, and 1.17 ozs. silver across 13 ft. The average across the full 22 ft. width of the vein was 1.08% copper, trace gold, and 1.15 ozs. silver. An intersection of this grade and width indicates that further work is warranted on this zone.

The airborne E.M. anomalies were tested by geophysical work and by drilling. It had been hoped by St. Andrew Mining Co. that these anomalies would represent copper sulphides in rock formations other than quartz veins. Although sulphides were found within black slate beds, nothing of economic value was associated with the pyrite. However, several anomalies remained untested notably in zone C, which is situated near the southern end of the present property.

From the geological mapping and the results of drilling on the Warren Creek vein, it was found that some of the mineralized quartz veins occur on the limbs of drag folds. These veins were found to pinch out near the crests or troughs of the folds. Since several of these folds traverse the property, it is possible that quartz veins may occur on the limbs of other folds and be concealed below surface. The airborne anomalies may have indicated some of these concealed veins, however, it is also possible that replacement-type bodies may be indicated. The copper bearing quartz veins consist of quartz-filling within a wide fracture or fault zone. The fracture zones are strong and persist for great distances on strike and consequently should persist at depth. Copper bearing solutions have also passed along these fracture zones, and it is quite feasible that these solutions may have spread out from the fracture and along one of the sedimentary horizons intersected by the fracture.

Consequently further work on the Warren Creek property should be carried out with the purpose of locating large replacement-type copper bodies within the sedimentary horizons.

Preliminary mapping of the property was carried out by St. Andrew Mining Co. in 1961, and some reconnaissance resistivity surveys. It is,

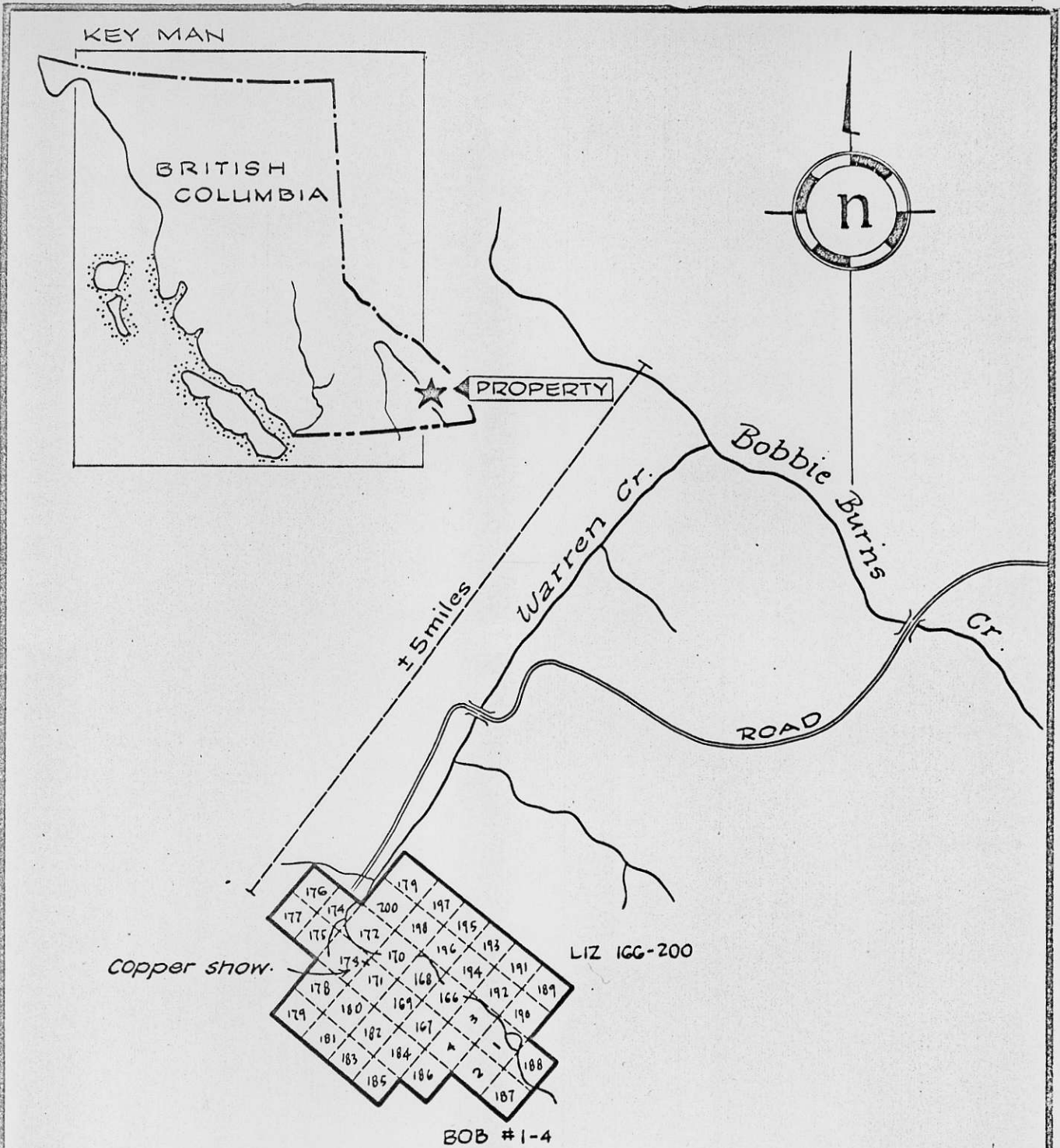
therefore, recommended that this work be supplemented by photogeological interpretation to outline faults, fractures and other structures not previously mapped. In addition, reconnaissance geochemical surveys should be carried out to locate areas in which the copper content of the soils and stream sediments is anomalously high.

Follow-up work, if copper anomalies are obtained, should consist of detailed geochemical work in the area of interest, accompanied by magnetic and Induced Polarization surveys.

The estimated cost of the initial work is:

1. Photogeological interpretation	\$ 1,500.00
2. Geochemical reconnaissance prospecting	5,000.00
3. Supervision, contingencies	5,000.00
4. Prospecting and geological mapping	<u>5,000.00</u>
BALANCE	<u><u>\$16,500.00</u></u>

Additional work cannot be recommended until the above work has been completed but an allowance of \$50,000.00 should be made for follow-up Magnetic and I.P. Surveys.



*Claims location map*

# WESTGATE MINES LTD.

WARREN CREEK CLAIMS, BOBBIE BURNS AREA

GOLDEN MINING DISTRICT  
B.C.

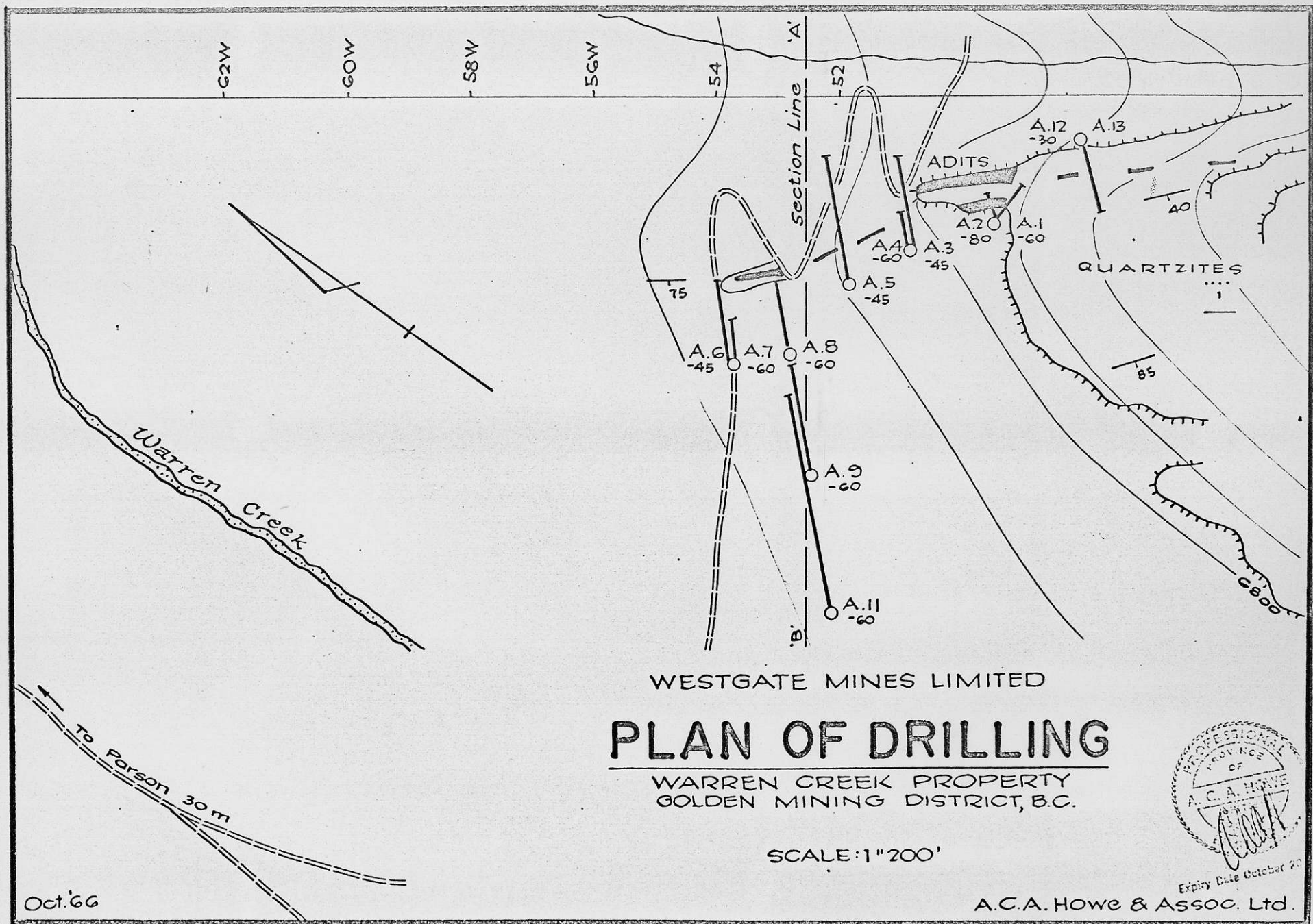
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A.C.A. HOWE & ASSOC. LTD.

OCT. 10, 66







WESTGATE MINES LIMITED

# PLAN OF DRILLING

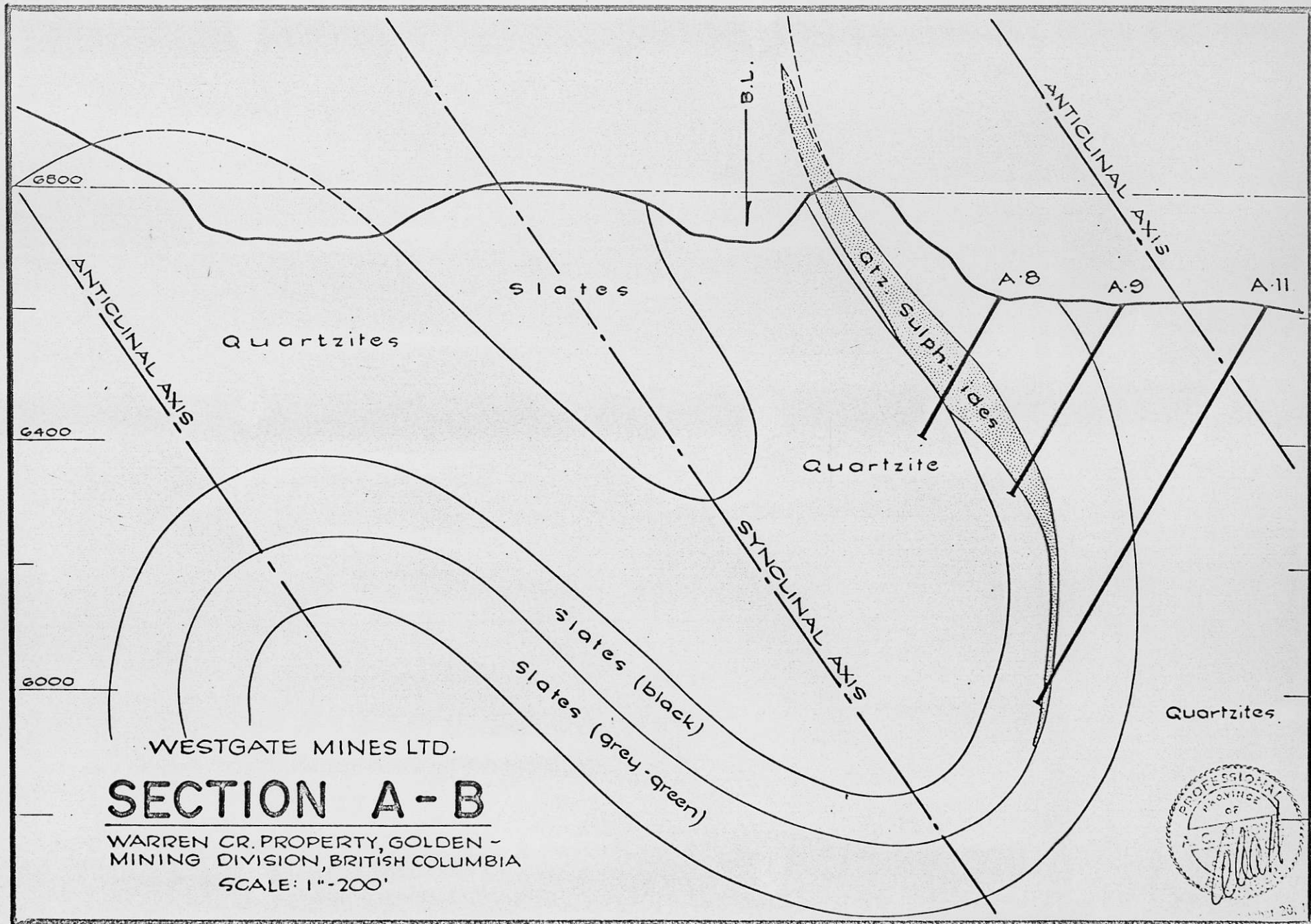
WARREN CREEK PROPERTY  
GOLDEN MINING DISTRICT, B.C.

SCALE: 1"=200'



Oct. 66

A.C.A. Howe & Assoc. Ltd.



FLYING DUTCHMAN PROPERTY  
BOBBIE BURNS BASIN  
GOLDEN MINING DIVISION, B.C.

BY

A. C. A. HOWE & ASSOCIATES LTD.

A. C. A. HOWE, P. ENG.

Vancouver, B.C.

October 20, 1966.

PROPERTY, LOCATION AND ACCESS

The property consists of one Mineral Lease known as the Flying Dutchman claim, and totalling 156 acres.

It is situated on the Bobbie Burns Creek about 20 miles south of Golden. The claim is situated on the southern edge of a basin shaped depression (glacial cirque) in the mountains, known as the Bobbie Burns Basin. Old reports indicate that the Creek flowing from this basin was known as the Bobbie Burns in the last century, and hence, the name of the basin. This creek forms a tributary of the main Creek in the area, known previously as the Middle Fork of the Spillimacheen River, and today re-named Bobbie Burns Creek.

Access to the property is available by road along the Bobbie Burns Creek. The road has been completed this year and ends at the Bobbie Burns Basin. It connects with an all-weather gravelled road 15 miles east of the property which, in turn, connects with the main highway at Parson, a total distance of 40 miles by road from the property.

HISTORY

The claims in the Bobbie Burns Basin have been the subject of numerous reports dating back to 1890. Several gold bearing quartz veins have been described.

In the year 1891, a 5 stamp mill was erected in the Basin. This mill, with 750 lb. heads, was driven by a Felton wheel and contained an amalgam plate with which to collect the gold. Old reports indicate, however, that the gold recovery was low since the gold was contained in pyrite and no production is recorded. Work ceased in the area in 1896, and no

work other than prospecting and property examinations has been done since then.

#### GEOLOGY OF THE PROPERTY

The Burns Basin overlies sedimentary beds of the Horsethief Creek Series. The gold bearing quartz veins occur in a shear zone in metamorphosed slates and schists. These slates and schists are overlain by quartzites, however the quartzites can only be observed around the rim of the basin, but have been eroded in the centre by glacial action, and hence, forming the basin-shaped depression.

The strike of the slates and schists is northwesterly, and dip is flat. Foliation appears to be about  $45^{\circ}$  to the northeast. The veins occur as two series, the older series strike N 15 W to N-S with a dip varying from vertical to  $75^{\circ}$  W. The other veins strike NE at right angles to the older veins and dip steeply to the N.W. The older, primary vein system is larger and stronger, with widths varying from 2 to 8 ft. They are mineralized with pyrite and gold of variable quantity, however heavy mineralization occurs at the intersections of the veins.

The mineralization on the quartz veins consists of auriferous pyrite, arsenopyrite and galena. The gold values appear to be entirely associated with the pyrite, although old reports indicate that free gold was observed in vugs within the quartz. Presumably this free gold occurred as a result of weathering of the pyrite, and misled the old-timers into building a mill with an amalgam plate. The amalgam plate is a traditional method of collecting free gold, however the cyanide process was barely known in the 1890's.

PREVIOUS WORK

Development in the Basin consisted of open cuts along the veins on the old Bobbie Burns group, and an adit on the Flying Dutchman.

There are two main cuts, situated about half a mile above the mill site. One cut is about two hundred feet long, with an average depth of 8 ft. Old reports indicate that about 1,000 tons were mined altogether from the cuts, of which about 300 tons were transported by wagon to the mill.

On the Flying Dutchman a cross-cut adit was driven for 150 ft. and drifts run on veins of the two vein systems.

Samples taken, and reported previously on the area are as follows:

<u>No.</u>	<u>Description of Sample</u>	<u>Gold oz. per Ton</u>	<u>Sampled by</u>
1	Mill run of 70 tons plates & tailings	0.752	J. L. Wills, M. E.
2	Burns Mine	3.50	Reported by Minister of Mines, 1926
3	Dump No. 1 cut	1.416	W. Pellew Harvey, M.E.
4	Average Dirt No. 1 cut	0.34	W. Pellew Harvey, M.E.
5	Picked surface	4.45	W. Pellew Harvey, M.E.
6	Sorted Ore	3.05	W. Pellew Harvey, M.E.
7	Dump No. 2 cut	1.17	W. Pellew Harvey, M.E.
8	Average dirt at same	0.262	W. Pellew Harvey, M.E.
9	Average surface	0.858	W. Pellew Harvey, M.E.
10	Average surface	0.652	W. Pellew Harvey, M.E.

<u>No.</u>	<u>Description of Sample</u>	<u>Gold oz. per Ton</u>	<u>Sampled by</u>
11	Clean ore from upper dumps	1.94	E. A. Haggan, M.E. J. M. Iles, M.E.
12	Clean ore from mill dump	1.58	J. M. Iles, M.E.
13	Flying Dutchman Tunnel	1.90	W. Fleet Robertson, Prov. Mineralogist
14	Flying Dutchman Tunnel	0.62	J. M. Iles, M. E.
15	Burns vein where out-cropping in bed of Spillimacheen River, general sample over whole 2350 feet vertically below top cut.		E. A. Haggan, M.E.
		27.05	W. Pellew Harvey, M.E.
		18.25	W. Pellew Harvey, M.E.
		14.60	W. Pellew Harvey, M.E.

CONCLUSIONS AND RECOMMENDATIONS

Gold is known to occur within the numerous quartz veins of the Bobbie Burns Basin. The average value of assays in old reports appears to be in the order of 0.5 ozs. per ton. The adit on the Flying Dutchman claim is situated 1,650 ft. lower in elevation than the open cuts which supplied the old mill, but appears to be following the same vein. Hence, the persistence of the veins in both strike and dip directions is very strong.

No exploration work has been carried out on the various veins in the Basin since the 1890's until now. At the present time, Far East Minerals Ltd. are carrying out an exploration program on the remainder of the Basin (other than the Flying Dutchman). The results have not been published. If old sample results are representative, there are

sufficient veins in the Basin to provide tonnage for one mill, which could be operated on a custom basis for the various properties.

Therefore, exploration of the Flying Dutchman claim is warranted to establish the average grade of the quartz veins. Since an adit has previously explored two veins, this would provide a convenient place to commence work. All veins on the claim should be channel sampled to obtain their indicated grade. Also, the property should be geologically mapped to establish the relation of the veins to each other, and to delineate faults and other structures which may control mineralization. Providing assay values from sampling indicate gold values are present, diamond drilling is warranted to test the veins at depth.

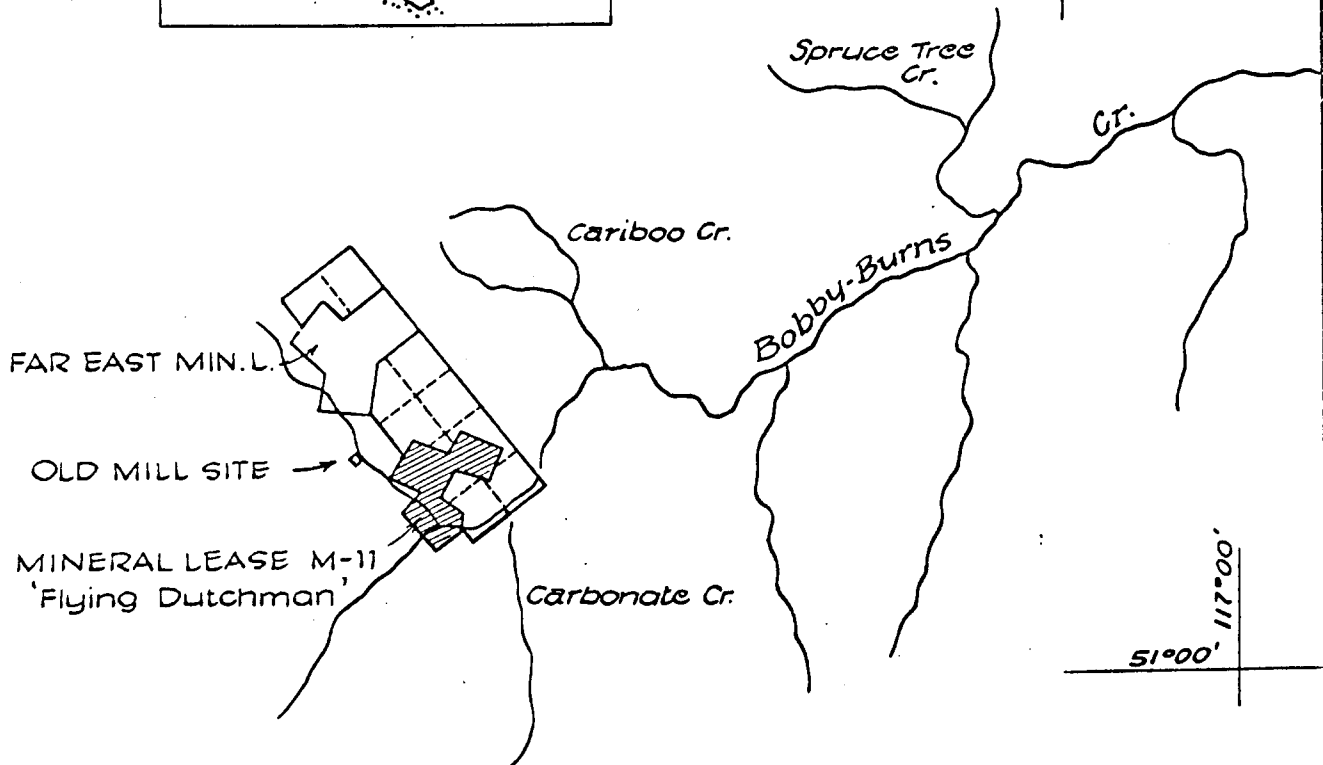
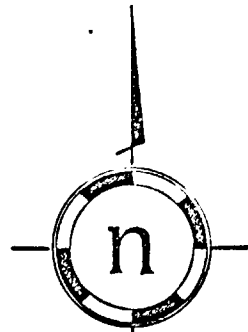
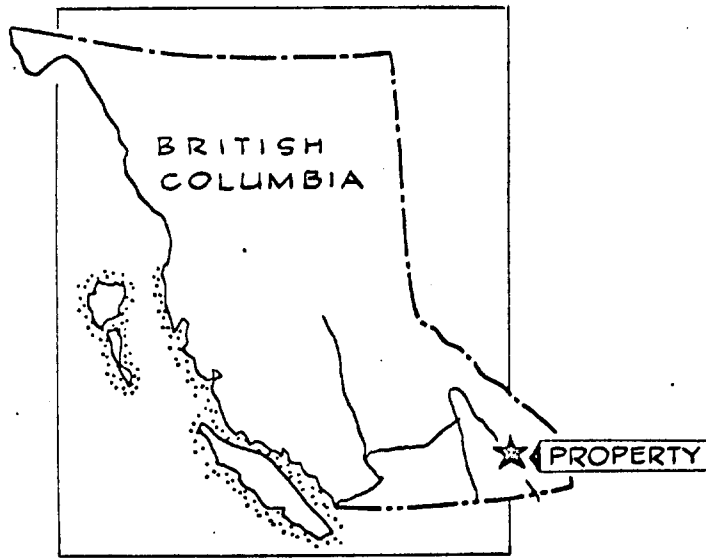
The estimated cost of this work is:

1. Rehabilitation of adit	\$ 5,000.00
2. Sampling and assaying of all veins	2,000.00
3. Geological mapping	1,000.00
4. Diamond drilling. Estimated 2,000 ft. at \$10.00	<u>20,000.00</u>
TOTAL	<u><u>\$28,000.00</u></u>

Additional work will be dependent on the results of the above program, but if the results indicate the veins have economic values, then they should be further investigated by an adit from the bottom of the valley. An adit from the Bobbie Burns Creek valley would provide over 1,000 ft. of backs for mining. Estimated cost of 1,000 ft. of drifting and 1,000 ft. of raising is \$100,000.00.



KEY MAP



*Claims location map*

# WESTGATE MINES LTD.

BOBBY BURNS BASIN, GOLDEN MIN. DIV., B.C.

Scale: 1 inch - 1 mile



CONCLUSIONS AND RECOMMENDATIONS

The properties lie within a belt containing numerous other small but rich copper showings. This belt extends for a distance of 30 miles in a northwesterly direction and includes the Warren Creek, Spruce Tree Creek, and the Baldy Claims owned by Westgate Mines Ltd.

All of these copper showings occur within quartz veins. However, given favourable structural conditions there is no reason why copper sulphides should not be found in other rocks. Pyrite mineralization has been observed in black slates on all the Westgate properties. Copper sulphides have been found within slates on the Baldy Claims. In addition, limestone beds have been seen in the area and these are generally considered favourable loci for sulphide mineralization. The violent structural deformation which has occurred in the area, as evidenced by the drag folding on the Spruce Tree Creek and Warren Creek properties, may have produced brecciated zones of sufficient size that sulphides deposited within them would be economic.

It is my opinion therefore, that the whole 30 miles of favourable belt should be investigated by an exploration program. This program should consist initially of an airborne E.M. and magnetometer survey followed by prospecting and geological mapping to outline the geological structure of selected areas, favourable for copper sulphide mineralization. Follow-up work on areas of interest should be done with a light Packsack Diamond Drill, which can be transported by horses or helicopter. There are several old adits in the area which were mined at the beginning of the century and these could also be drilled where warranted to discover the nature and grade of copper sulphides present. No diamond drilling has ever been performed in this

belt, other than by St. Andrew in 1966, and recently by Columbia River and Far East Minerals. The area, therefore, has great potential.

The following program of work is therefore recommended:

1. Airborne survey using E.M. and magnetometer over whole 30 mile belt. Estimated cost	\$ 75,000.00
2. Follow-up work on new areas such as on geophysical anomalies discovered. Estimated cost	25,000.00
3. Work on individual properties of Westgate as detailed earlier in this report, as follows:	
a) Warren Creek, First phase	16,500.00
Depending on results of first phase	50,000.00
b) Flying Dutchman, First phase	28,000.00
Depending on results of first phase	100,000.00
c) Napoleon Creek (Wolfenden) first phase	35,000.00
Depending on first phase	100,000.00
d) Spruce Tree Creek, first phase	25,000.00
Depending on results of first phase	<u>50,000.00</u>
TOTAL	<u>\$504,500.00</u>

The total cost of the first phases of programs on each property, and the airborne survey is \$204,500.00. The remainder of the money should be available for follow-up work. Although it is difficult to predict the amount of work required for the second phases at this time, it is my opinion that follow-up work will definitely be required. Some properties will probably require more than the estimated amounts and others less. The money, however, should be made available so that programs may be expanded as soon as encouraging results are obtained.

Respectfully submitted,

A. C. A. HOWE & ASSOCIATES LTD.,

A handwritten signature in cursive script, appearing to read 'A. C. A. Howe', is written over a circular professional seal. The seal contains the text 'PROFESSIONAL ENGINEER' and 'REGISTERED IN BRITISH COLUMBIA'.

A. C. A. Howe, P. Eng.

Expiry Date October 20, 1966

Vancouver, B.C.

October 20, 1966

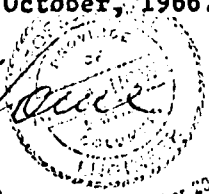
C E R T I F I C A T E

I, A. C. A. Howe, of the City of Toronto, in the County of York, Province of Ontario, hereby certify that:

1. I am a Mining Engineer with offices at 201, 543 Granville Street, Vancouver, British Columbia, and at 826-159 Bay Street, Toronto, Ontario.
2. I am a graduate of London University, England, B. Sc. in 1949.
3. I am a member of the Associations of Professional Engineers of Ontario and British Columbia.
4. I have no interest, direct or indirect, in either the property or securities of Westgate Mines Ltd., nor do I expect to receive any such interest.
5. This report is based on the results of previous exploration work carried out in the area, some of it under the direction of the writer and visits to the properties by the writer in September, 1966.

DATED at Vancouver, British Columbia, this 20th day of October, 1966.

  
A.C.A. Howe, P. Eng.

  
Expiry Date October 20, 1969