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GEOLOGY, GREAT WESTERN PROJECT,

NELSON MINING DISTRICT, BRITISH COLUMBIA (82F/6 W/2)

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GEOTEX CONSULTANTS LIMITED CONSULTING GEOLOGISTS

ABSTRACT

Geological mapping near the junction of the west and main forks of Giveout Creek shows that disseminated sulphide mineralization and associated gold values lie in three mineralized zones in basic volcanics of the upper Elise Formation of the Lower Jurassic Rossland Group adjacent to the Early Jurassic Silver King quartz diorite porphyry. The northwesterly trending, well foliated phyllite and phyllitic greenstone comprise a medium to dark green chlorite phyllite unit (**dg**) which locally carries 5% disseminated sulphides in unit (**dgs**), a green foliated augite porphyry greenstone (**px**), a light to medium grey-green chlorite-sericite phyllite with up to 5% disseminated sulphides (**lg**), a yellow-ochre weathering sericite phyllite and quartz-feldspar-calcite±sericite phyllite with up to 25% disseminated sulphides (**lgs**). The last two units (**lg** and **lgs**) form three northwesterly striking mineralized zones which are from northeast to southwest: (a) Giveout Creek, North and South zones, (b) Black Witch Zone, and (c) Starlight Zone. The mineralized zones are foliated, deformed, and likely formed by replacement of originally more calcareous horizons in the basic lithic tuff sequence with minor augite porphyry flows. The sequence is probably inverted and lies on the southwest limb of a southeasterly plunging regional syncline. Giveout Creek Zone has been stripped and drilled over a 520-metre length with mineralized thicknesses ranging between 5 and 25 metres. Both its length and depth are open. The recently stripped Black Witch Zone contains a gold-bearing quartz vein lying in the foliation of a 75-metre wide zone of quartz-sericite phyllite with disseminated sulphides. The poorly exposed zone, which has not been drilled, has a probable length exceeding 600 metres which includes a gold soil geochemistry anomaly. Starlight Zone contains a quartz vein lying in the foliation, has been trenched over a 200 metre length, and has an exposed thickness of 45 metres of sericite-quartz and chlorite-sericite phyllites with disseminated sulphides in Starlight Adit. It has not been drilled and its limits are unconstrained.

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1. INTRODUCTION:

This report on the geology of the Great Western Project embodies the results of 14 days of fieldwork in the period May 16 to 29, 1988 and 10 days of office work thereafter. The fieldwork and report were undertaken at the request of S.R. Ford, Director of Lectus Developments Ltd. Eight days were spent on surface geological mapping at 1:1000-scale, which included joint investigations with Peter Dasler and two other geologists of Searchlight Resources Inc., and a half-day trip with T. Höy and K. Andrew of the British Columbia Ministry of Energy, Mines and Petroleum Resources. The remaining six days were spent logging about 3000 metres of drill core from the property. The terminology of rock units is based solely on field criteria and would undoubtedly be improved by thin section petrography.

2. LOCATION:

The property lies approximately six kilometres south of Nelson near the junction of the two branches of Giveout Creek and between 1300 and 1700 metres. The claims incorporated within the Great Western Project and the area covered by the present geological investigation are outlined in Figure 1. Snow cover in the valley bottoms above 1320 metres and on the slopes above 1500 metres limited surface mapping. West of the main branch of Giveout Creek all surface geology was located by chain and brunton measurements from surveyed points shown on the 1:1000-scale topographic map. East of Giveout Creek, the location of all surface geology depended upon chain and brunton measurements from the soil geochemistry grid lines. Road locations on this side are locally very inaccurate and were not used in locating geology. Because the formline contours are misplaced by amounts exceeding the formline interval of 2 metres, altimeter readings cannot be used as an aid to location.

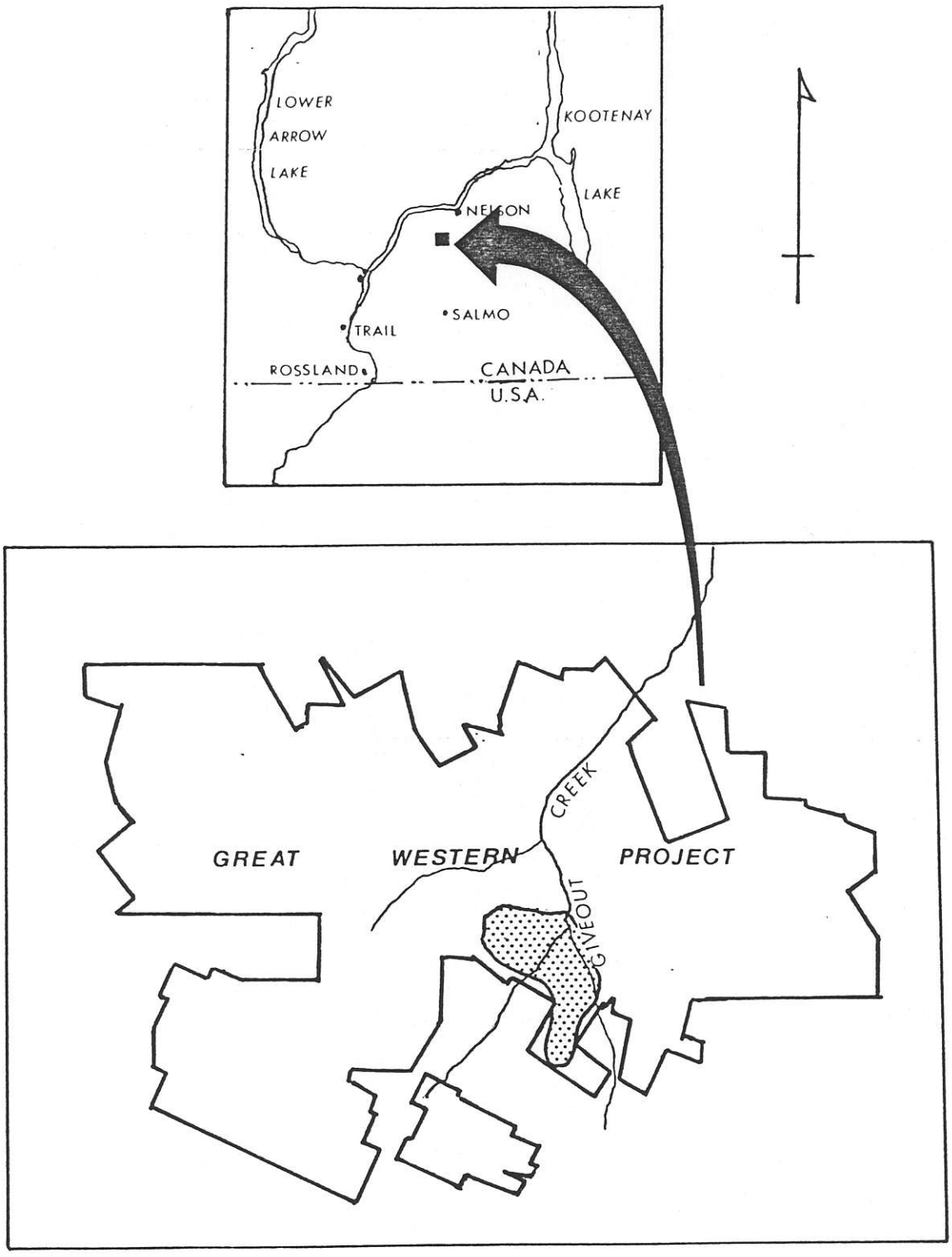

Figure 1: Location of the Great Western Project and stippled area covered by 1:1000-scale geological mappping.

3. REGIONAL GEOLOGY:

The detailed geological mapping of Little (1974), and Andrew & Höy (1988) provide the regional geological setting of the Great Western Project. The bedrock consists of well-foliated basic volcanics of the upper Elise Formation of the Rossland Group of Early Jurassic age. Within the detailed stratigraphy developed by Andrew and Höy (1988), the rocks underlying the property belong to units Je3 to Je6. They lie on the southwestern side of the marginally deformed and metamorphosed Silver King Porphyry of probable Early Jurassic age. In support of this age, Andrew and Höy stated that clasts of the Silver King Porphyry occur in the Lower Jurassic Hall Formation (pers. comm., May 1988). The property probably lies on the southwest limb of a southeasterly plunging syncline which southeast of the property contains Hall Formation in the core of the fold.

4. PROPERTY GEOLOGY:

In the mapped area, the northwesterly trending and foliated Silver King Porphyry lies in the northeast, and the northwesterly foliated phyllite and phyllitic greenstone of the upper Elise Formation of the Rossland Group underlie the southwest (Maps 1 and 2). Within the phyllite and greenstone are three northwesterly trending mineralized zones of sulphide-bearing phyllite and local quartz veins.

(a) Rossland Group:

A medium to dark green chlorite-rich phyllite (**dg**) with less than 2% disseminated sulphides is the most widespread rock type. Its protolith was probably mostly a basic lithic tuff with sparse plagioclase crystals, and to a minor extent a basic volcanic breccia. The unit is unbedded except for a few places in drill core (Appendix A), and in a waterwashed outcrop in the west fork of Giveout Creek and at 106.1 m in the core of DDH 87-11 where there is possible graded bedding. Within the disseminated sulphide zones, the green chlorite phyllite may carry up to 10% disseminated sulphides (**dgs**).

With an increase in sericite, quartz, feldspar and calcite, the original basic volcanics become medium to light grey-green. The disseminated sulphide content commonly increases to less than 5% (**lg**). Where the rocks are yellow-ochre weathering, light grey on fresh surface, the disseminated sulphide content can reach 10% and the rocks range in composition from a sericite phyllite to a rock composed mainly of quartz-feldspar-calcite (**lgs**).

In a few places in the stripped areas of Giveout Creek South Zone, are thin (1-6 cm) fine grained (1 mm) white marble lenses (**c**) up to several metres long. Where they are surrounded by green phyllite (**dg**), they are sulphide-free, but within disseminated sulphide-bearing units such as **lgs**, they carry sulphides as well.

Medium green foliated augite porphyry greenstone (**px**) with 10 to 25% augite phenocrysts up to 15 mm long mainly represent original augite porphyry flows, but some augite crystal bearing lithic tuffs may be present. The rocks are intercalated with basic lithic tuffs (**dg**) and underlie a strip closest to the southwest margin of the Silver King Porphyry.

(b) Foliated quartz-plagioclase-biotite porphyry (qfp):

This thin but distinctive unit consists of 2 to 3 mm quartz and plagioclase phenocrysts (50 to 75%) and less than 5% biotite booklets. The metre thick unit has contacts which parallel foliation and imply that it is either a sill or flow. Each drill hole which penetrates the augite porphyry greenstone (**px**) has a single intersection of unit **qfp** close to the first appearance of **px**, but because of sparse exposure the unit does not outcrop.

(c) Silver King Porphyry (EJqd):

Undeformed Silver King Porphyry is a feldspar megacryst-bearing hornblende quartz diorite porphyry. However, on the property, the intrusion is crudely gneissic to locally strongly foliated where it is a light grey-green chlorite-sericite quartz-feldspar gneiss or schist. Compositionally, the intrusion is not a syenite as stated by Salazar and Beauchamp (1988, p. 20).

(d) Probable Eocene Intrusions (Edi and Ele):

Within the Silver King Porphyry is a 6 to 8 metre wide melanocratic dike composed of a fresh medium-grained biotite-augite diorite core with a chilled selvedge of fine-grained biotite-augite amygdaloidal diorite (Edi). Although the unit does not outcrop, intersection in drill holes 87-2, 87-8, 87-9, 87-10, 87-11 indicate that it subcrops along the east bank of Giveout Creek south of the junction.

Within the Rossland Group and generally close to the mineralized zones are thin sills, 0.3 to 2 metre thick, composed of a biotite phenocryst-bearing lamprophyre (minette or kersantite) (Ele). The sills mainly lie along the foliation, but locally cut across the foliation along joints which leaves the incorrect impression that the sills are faulted. In the stripped areas, the sills can be followed for 140 metres. The lamprophyre sills carry numerous xenoliths which encompass not only inclusions of wall rock with disseminated sulphides but also far-travelled xenoliths from the Nelson Intrusions. The lamprophyres are definitely post-mineralization in age. Salazar and Beauchamp's observation (1988, p. 21) that a lamprohyre intersected in DDH87-18 between 83.93 and 84.58 m carries up to 5% pyrite and some gold is based on the mis-identification of a massive basic lithic tuff (dg) as a lamprophyre. Both Edi and Ele are probably part of the Eocene Coryell Intrusions.

4. STRUCTURE:

A moderate to steep southwesterly dipping foliation pervades all but the probable Tertiary intrusions. The foliation is regionally developed and is axial plane to the regional southeasterly plunging syncline which passes through the property. Because of its regional development and geometric relationship to the axial plane of a regional syncline, the foliation does not result from local shear zones. The foliation is visible in all outcrops and was measured in most. The measurements were grouped into two areas: (a) an area west of the west fork of Giveout Creek which includes cross-sections D-D' and E-E', and (b) an area between the two branches of Giveout Creek

which includes cross-sections A-A', B-B' and C-C'. The measurements from each area were subjected to a least-squares best fit analysis to determine the best-fitting average plane (Appendix B). West of Giveout Creek, the best fit is 318/61°SW with a standard deviation of 5.3°, and between the branches, it is 314/67°SW with a standard deviation of 3.3°. Although the two values lie within a standard deviation of each other (Fig. 2), two values, rather than a single value, have been used to orient five cross-sections perpendicular to the strike of the foliation through the drilled area (Figures 3 to 7). Because the disseminated sulphides are deformed by and lie in the foliation plane, geological data off the section has be brought into section along the strike of the foliation. **Note that no assay data has been projected into section using this basis.**

A fine crinkle lineation and compositional streaking locally forms on the foliation. Although only seven measurements were made throughout the area, the least-squares best fit line to these data is 147/31°SE with a standard deviation of 3.4° which probably represents the direction of the southeasterly plunging axis of the regional syncline on the property (Appendix B and Fig. 2).

The few observations of bedding in drill core (87-11, 87-14, 87-15, and 87-16) show that it is parallel to foliation. Combining these observation with the possibly inverted graded bedding in hole 87-11 at 106.1 m and in the west fork of Giveout Creek indicates that the property lies on the southwest and inverted limb of a southeasterly plunging syncline with the inverted rocks younging to the northeast. This structural setting contrasts sharply to the southwesterly dipping and younging sequence suggested by Salazar and Beauchamp (1988, p. 19).

The contact of the Silver King Porphyry is unexposed and has an assumed position on the map in the area of section A-A' to D-D' based on projection of drill hole intersections to surface. To the southeast, a questionable outcrop at coordinates 6792mE and 4203mN (Map 1) strongly controls the attitude of the assumed position of the contact which strikes at 335°. If the questionable outcrop was instead erratics,

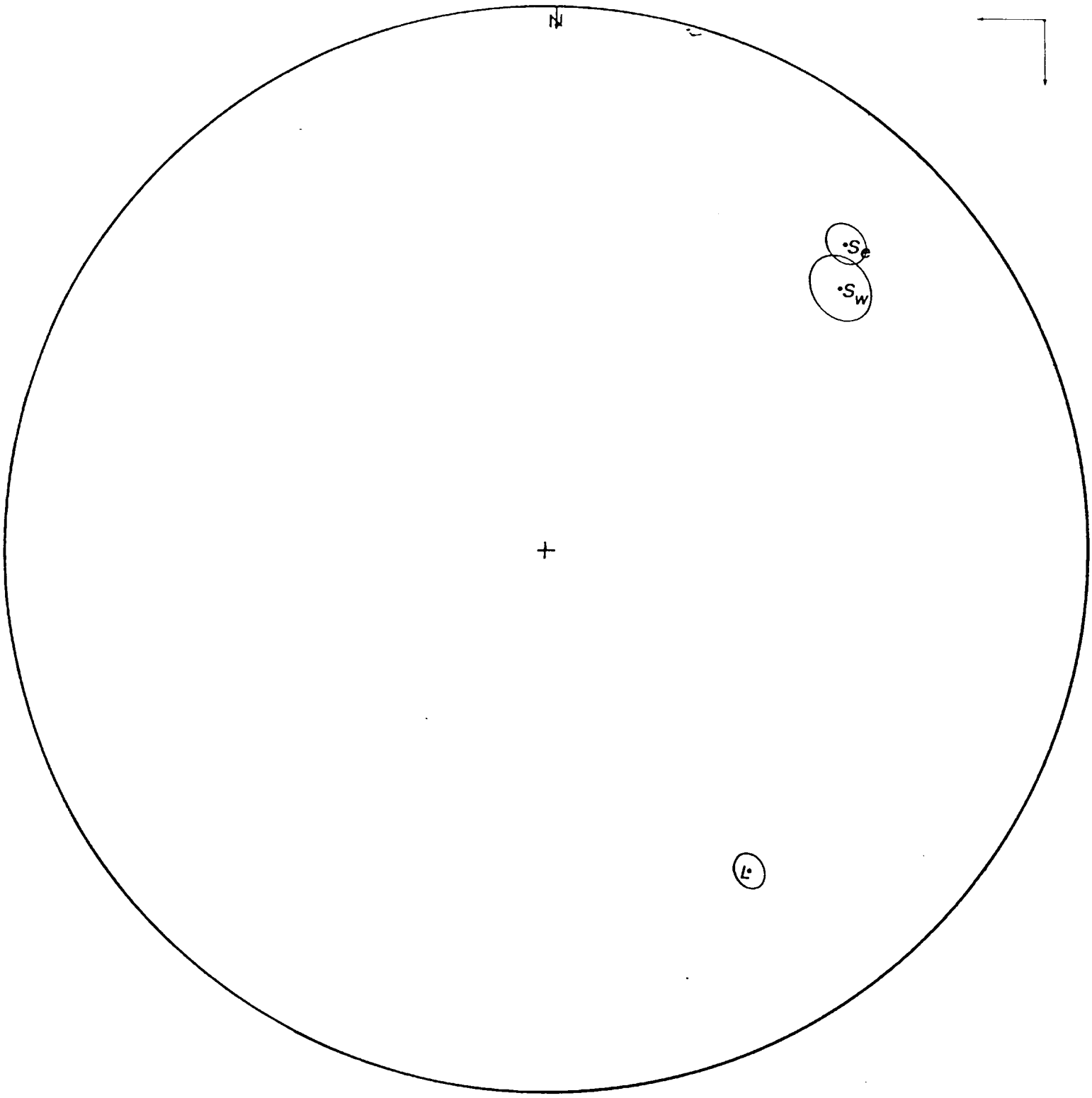

Figure 2: Lower hemisphere equal-area stereographic projection of the least-squares best fit poles to foliation planes west (S_w) and east (S_e) of the west fork of Giveout Creek, and the least-squares best fit lineation (L) which parallels the regional fold axis. The ellipses surrounding these directions represent the limit of one standard deviation.

QUATERNARY
PLEISTOCENE AND RECENT

Qs — Unconsolidated sediments: glacial deposits, colluvium and alluvium

TERTIARY
EOCENE

Ele — Biotite lamprophyre sill

Edi — Biotite augite diorite dikes with amygdaloidal margins

JURASSIC
EARLY JURASSIC

qfp — Foliated quartz-plagioclase-biotite porphyry

SILVER KING PORPHYRY:
EJqd — Marginally foliated, porphyritic (plagioclase) hornblende quartz diorite

LOWER JURASSIC
ROSSLAND GROUP
Elise Formation
px — Green, foliated augite porphyry flows, minor augite crystal-bearing lithic tuff

dg — Medium to dark green chlorite phyllite and fine-grained schist with less than 2% disseminated sulphides

dgs — Medium to dark green chlorite phyllite and fine-grained schist with more than 2% disseminated sulphides

c — Thin white marble layers, commonly sulphide-bearing, locally chloritic

lg — Light to medium grey-green chlorite-sericite phyllite and fine-grained schist with disseminated sulphides

lgs — Yellow-ochre weathering, quartz-rich±calcite±sericite phyllite and fine-grained schist with more than 2% disseminated sulphides

Geological boundary — defined ····· approximate ····· assumed ·····

Bedding, facing determined — inclined ····· vertical ····· overturned ·····

Bedding, facing undetermined — inclined ····· vertical ·····

Foliation — inclined ····· vertical ·····

CROSS-SECTION LEGEND

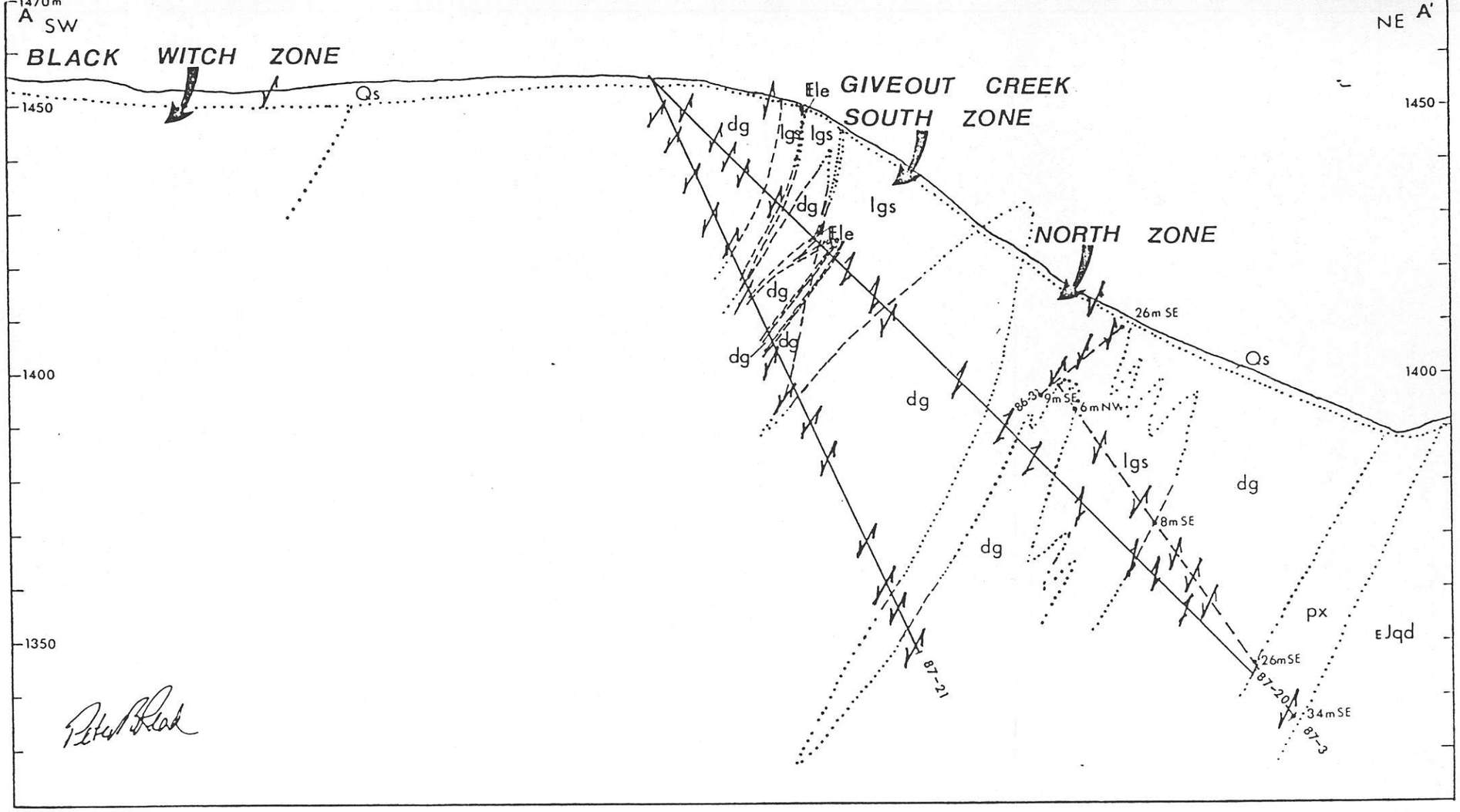

Figure 3: Section A-A'. Horizontal scale = vertical scale = 1:1000

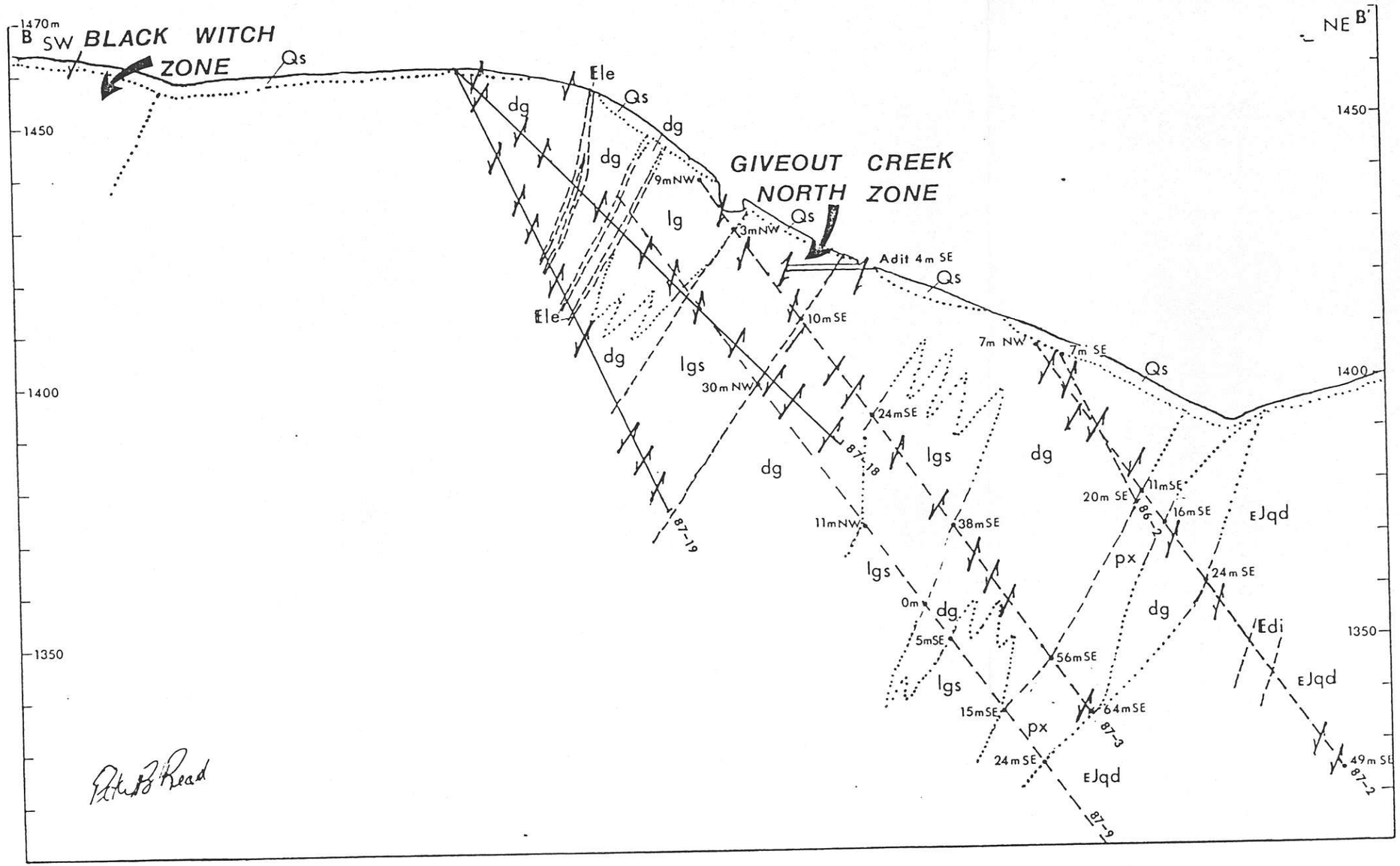

Figure 4: Section B-B'. Horizontal scale = vertical scale = 1:1000

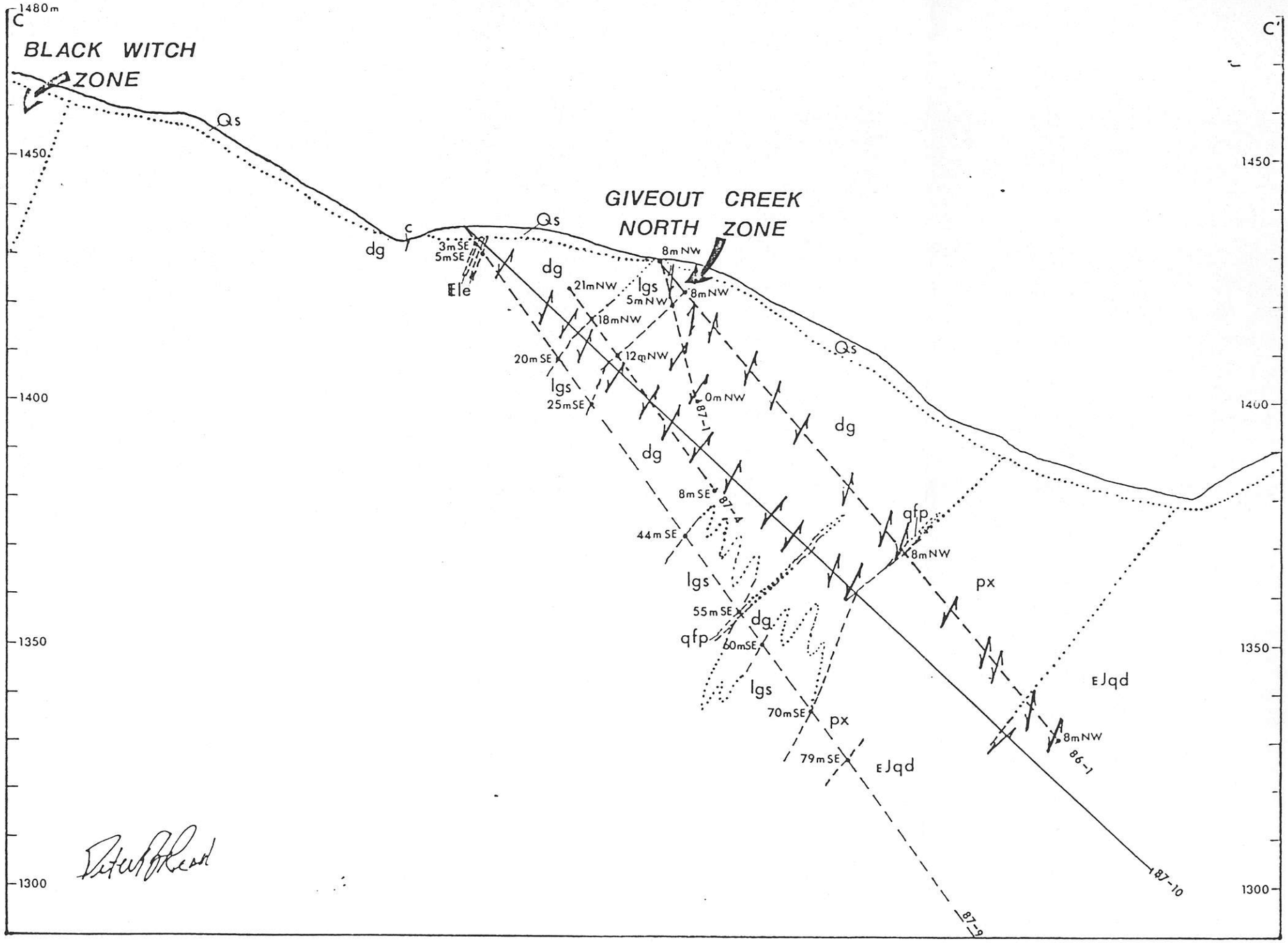

Figure 5: Section C-C'. Horizontal scale = vertical scale = 1:1000

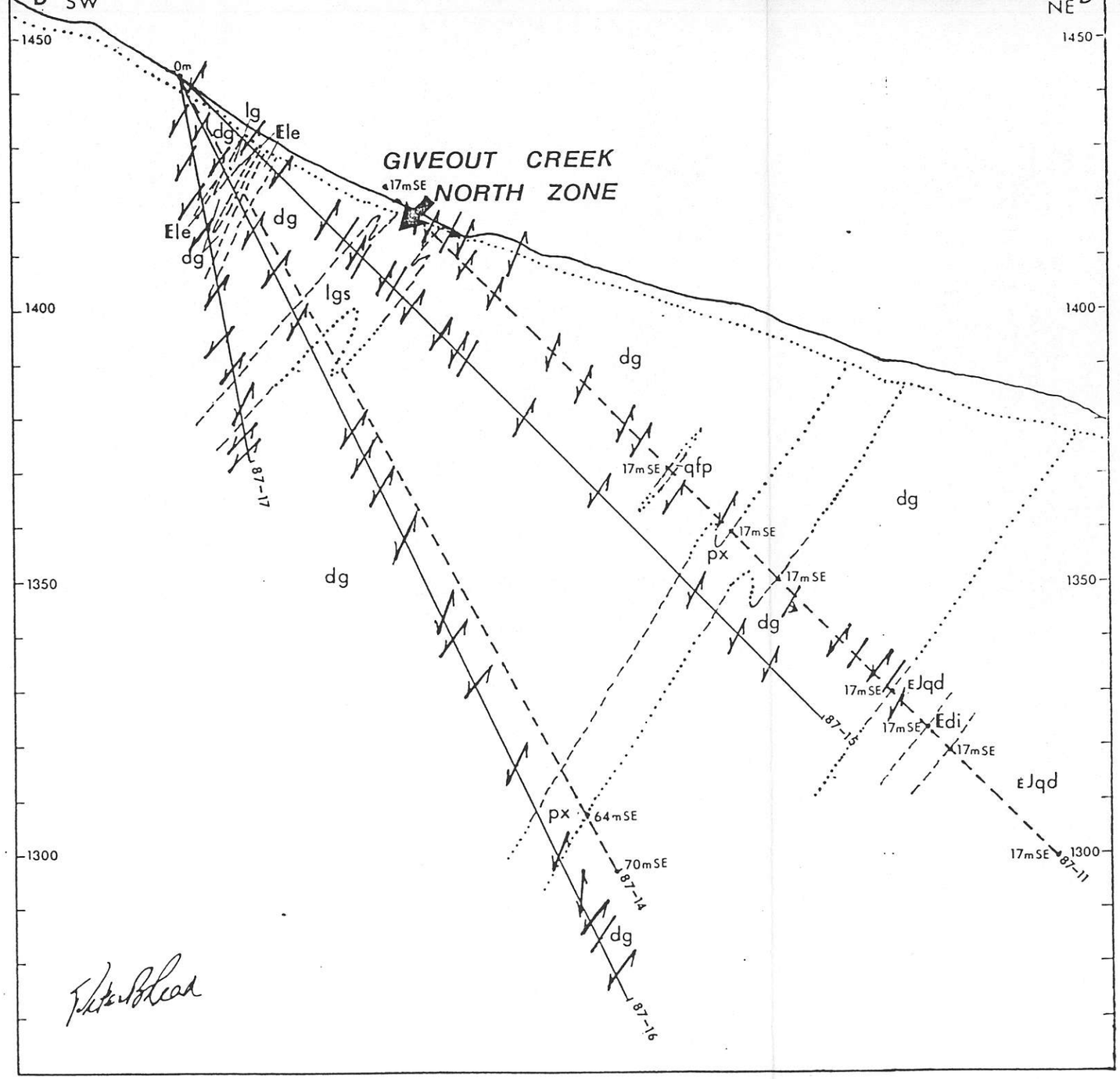

Figure 6: Section D-D'. Horizontal scale = vertical scale = 1:1000

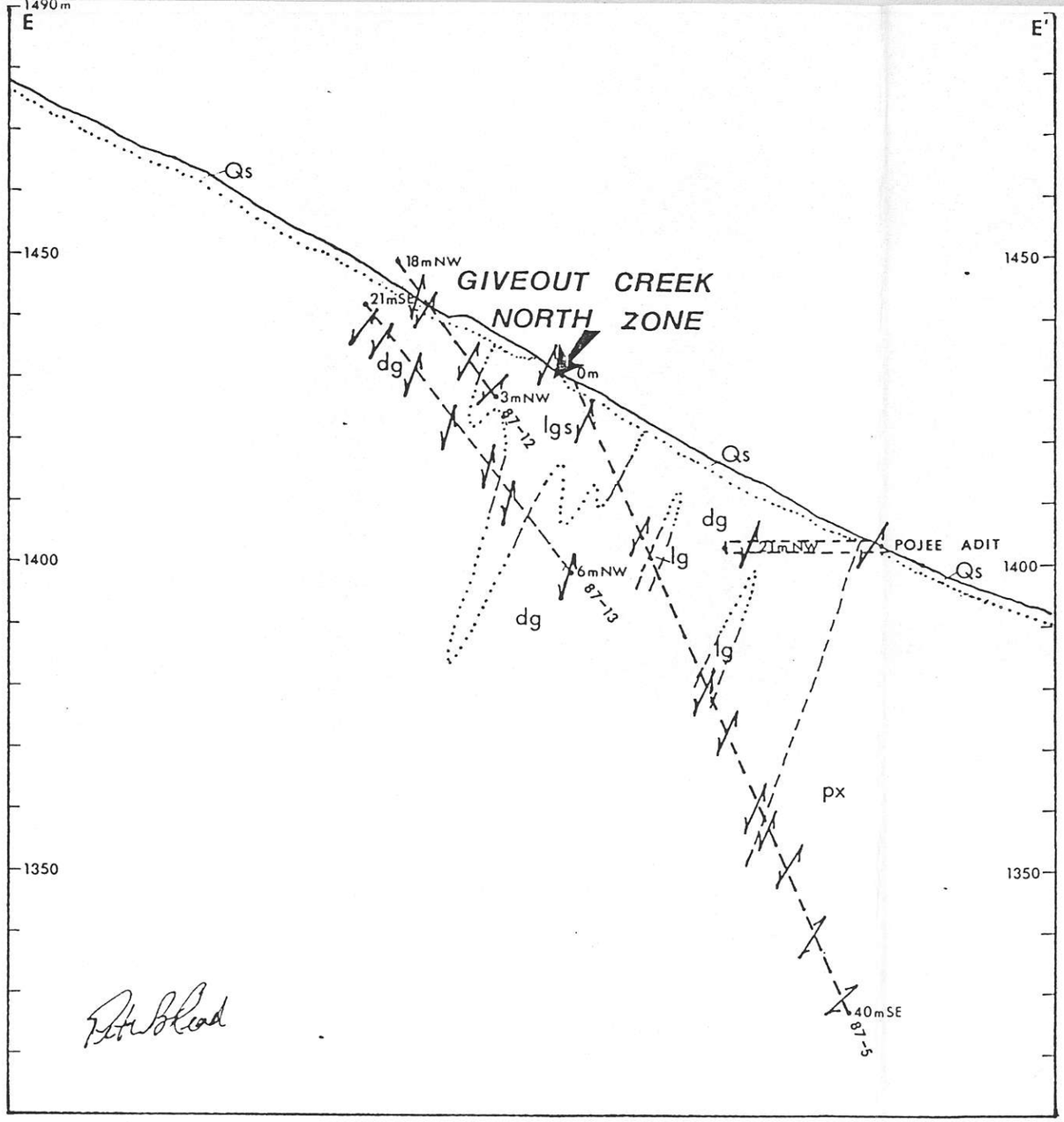

Figure 7: Section E-E'. Horizontal scale = vertical scale = 1:1000

then the contact could assume a strike closer to 315° and only Trench #2 at 6855mE and 4295mN would limit its position. This uncertainty in the position of the contact of Silver King Porphyry has important ramifications for the southeastward extension of Giveout Creek Zone (see Recommendation (a) p. 18).

5. MINERALIZED ZONES:

Three major northwesterly trending mineralized zones lie within the mapped area. From northeast to southwest these are (a) Giveout Creek: North and South zones, (b) Black Witch, and (c) Starlight. All are characterized and defined by an irregular zone of disseminated sulphide-bearing sericite phyllite and sericite-quartz-feldspar-carbonate rock (lgs) and minor sericite-chlorite-quartz-rich phyllite (lg). The Black Witch and Starlight and northwest end of Giveout Creek North Zone each have a concordant quartz vein.

(a) Giveout Creek: North and South Zones:

A combination of outcrops and new extensive stripped areas expose sulphide-bearing rocks up to 15 metres in width for a length of 150 metres in the North Zone and 120 metres in the South Zone which both lie south of the junction of the two branches of Giveout Creek. The sulphide-bearing rocks are well foliated as a result of being involved in the regional deformation, and drill core shows that the sulphide-bearing rocks possess the same relict textures as the adjacent but unmineralized basic lithic tuff. These structural and textural features suggest that the sulphide-bearing rocks are a deformed replacement deposit. The presence of thin marble lenses adjacent to and within the mineralized zones may indicated that a more calcareous original lithology was replaced close to the margin of the Silver King Porphyry. A syngenetic hypothesis for the origin of the mineralization is possible and is consistent with the foliated and deformed nature of the sulphide-bearing rocks. However, because it does not explain the similarity in textures of the mineralized and adjacent unmineralized rocks, a replacement hypothesis is preferred. There are no textural or

structural features present which indicate that the mineralized zone was ever a shear zone. In spite of an uncertainty as to the genesis of the mineralization, the fact that the mineralization has been deformed means that the shape of the mineralized zones should be controlled by the regional deformation and specifically the folding. As a result of the property lying on the southwest limb of a southeasterly plunging syncline, where the mineralized zones are controlled by folding, they will be elongate in the direction of the lineation which is 147/31°SE. In addition, any parasitic folding associated with the southwest limb of the regional syncline would create parasitic folds with a N-shape profile looking down-plunge to the southeast and these folds will yield a righthand offset to the mineralized zones. A righthand offset would displace mineralized zones to the south proceeding southeastwards (Figure 8). The North and South zones have this spatial association with the South Zone offset to the south (Maps 1 and 2) which implies that the two are linked by a parasitic fold. Random replacement could also produce such a pattern, but if the righthanded en echelon pattern develops in a number of places to the exclusion of lefthanded offsets, then a structural origin is more likely.

The North Zone crosses the west fork of Giveout Creek, and although unexposed for the next 200 metres, reappears in a newly stripped area on the road above Pojee Adit. Drill holes 87-5, 87-12, and 87-13 on section E-E' all intersect the zone in the unexposed 200 metre interval (Fig. 7). However, the 6-metre intercept in 87-13 suggests that the mineralized zone may diminish northwest of the newly stripped area on the road. Cross-section E-E' clearly shows that the reported mineralization in Pojee Adit is not part of the North Zone.

Southeast of the stripped areas, Silver King Porphyry intrusion will ultimately terminate both zones if they extend that far. The assumed position and 335° strike for the contact best fits drill hole data and a single questionable outcrop, and results in the least possible southeastward extension of the zones. If the strike of the contact is

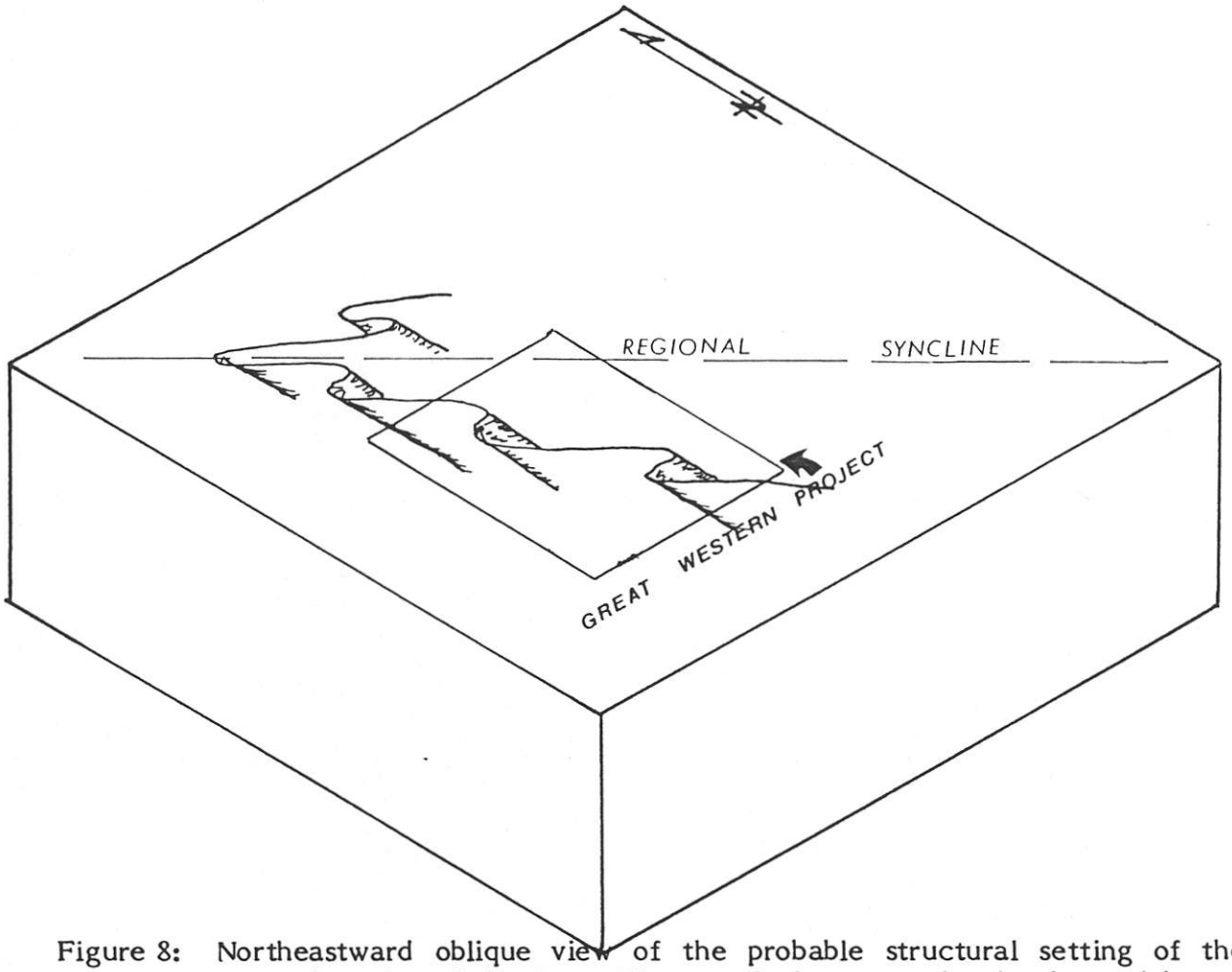

Figure 8: Northeastward oblique view of the probable structural setting of the mapped portion of the Great Western Project area showing its position on the southwest limb of the regional syncline outlined by a marker horizon which exhibits N-shaped parasitic folds that would develop on this limb.

closer to 315°, then the possible southeastward extension of the North and South zones is significantly increased (see Recommendation (a), p. 18)

(b) Black Witch Zone:

A newly stripped area around the Black Witch Shaft exposes quartz-sericite phyllite with disseminated sulphides (lgs) for 65 metres along the foliation and 18 metres in width. The newly exposed Black Witch quartz vein lies in the foliation as deformed lenses or boudins, up to 0.5 metres thick and a few metres long, which have a slight right hand offset relative to each other. Accompanying the quartz boudins are medium to dark grey "feldspar porphyry" boudins with a groundmass largely composed of tourmaline. The boudins result from deformation of a quartz vein and a tourmalinized zone which existed before the formation of the foliation and folding of the rocks. The combination of new trenches and pits and the recently discovered Black Witch Adit yield an outcrop width of about 75 metres for the Black Witch Zone. If the trend of the zone lies along the foliation, as it does for the Giveout Creek Zone, the next exposures of the zone are over 500 metres to the southeast on the east bank of the west fork of Giveout Creek and on the road to the Starlight Adit where sericite-chlorite (lg) and sericite (lgs) phyllite outcrop. Immediately northeast of this area is a an unexplored gold soil geochemistry anomaly (Salazar & Associates, 1987, Fig. 7.1) (see Recommendation (b), p. 18).

(c) Starlight Zone:

The Starlight Zone outcrops for 200 metres along strike in a trench, roadcut and pits. Starlight Adit intersects the zone underground and exposes a 0.3 to 0.5 metre thick undeformed quartz vein lying in the foliation of a 45-metre-thick mixed zone of mostly chlorite-sericite (lg) and less sericite-quartz (lgs) phyllites with disseminated sulphides that is intruded by biotite lamprophyre sills. The attitude of the zone parallels that of the other two.

6. RECOMMENDATIONS:

As a result of the geological framework developed in this report, the following areas appear worthy of further investigations:

(a) The southeastward extension of Giveout Creek North and South zones between the recently stripped areas and the contact of the Silver King Porphyry (Map 1). Up to 150 metres strike length of the mineralized zones are presently untested in this area. If the assumed position of the Silver King contact is incorrect, then the strike length of the mineralized zones may be significantly greater.

(b) The southeastward extension of the Black Witch east of the west fork of Giveout Creek has a gold soil geochemistry anomaly on its northeast side. This area requires further investigation.

(c) Although this report indicates the attitudes and directions of extension of the mineralized zones, further stripping and drilling elsewhere than the above recommended areas are strongly dependent upon the assay results from the recently stripped areas.

(d) To assess the spatial association between the units **Lgs** and **lg** and gold values, the assay data should be plotted on cross-sections A-A' to E-E'.

(e) Any further investigations which produce surface exposures or result in drill holes should be treated in a manner similar to that used herein so that the geological framework of the property can be modified and improved as new geological data are accumulated.

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APPENDIX A: DRILL LOGS

APPENDIX B: LEAST-SQUARES BEST FIT DATA

AUTHOR'S STATEMENT OF QUALIFICATIONS

I, PETER B. READ, do hereby certify:

1. That I am employed by Geotex Consultants Limited with offices at #1200 - 100 W. Pender Street, Vancouver, B.C.

2. That I graduated from the University of British Columbia with a BASc (1957) and MASc (1960) in Geological Engineering, and from the University of California, Berkeley with a PhD (1966) in Geology.

3. That I have practiced my profession from 1965 to 1974 in various teaching positions in the universities of Otago, Dunedin, New Zealand; Carleton, Ottawa; and British Columbia, Vancouver. Since 1974, I have been president of Geotex Consultants Limited and been involved with geology as an academic study for the Geological Survey of Canada, and as an applied study for engineering purposes for B.C. Hydro, for structural geology for various major and junior mining companies in British Columbia and parts of United States, and for industrial minerals for mining companies and the British Columbia government.

4. My experience specific to the Nelson area resulted from consulting for the Geological Survey of Canada in the Kootenay Arc from 1961 to 1982. This experience is summarized in publically available reports in various publications of the Geological Survey of Canada from 1962 to 1982.

5. That I am a Fellow in good standing of the Geological Association of Canada, and a member of various other geological and mineralogical societies.

6. That I hold no interest in the properties or securities of Lectus Developments Ltd. or affliates thereof, nor do I expect to receive any directly or indirectly.

7. That written permission from the author is required to publish this report or any parts thereof in any Prospectus or Statement of Material Facts.

Dated at Vancouver, British Columbia this 10th day of June 1988.

Peter B. Read