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Ministry of Energy and Mines
BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Geological, Geochemical, Prospecting

TOTAL COST:

AUTHOR(S): Alicia Carpenter, Craig A. Lynes

SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): No Surface Disturbance

YEAR OF WORK: 2016

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5643634

PROPERTY NAME: Lode Star

CLAIM NAME(S) (on which the work was done): Lode Star 1036571, Monashee Star 1039166, Gold Star 1044860

COMMODITIES SOUGHT: Au, Ag

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 082LSE021, 082LSE040

MINING DIVISION: Vernon

NTS/BCGS: 082L 01/W 082L.019

LATITUDE: 50 ° 07 '48 " **LONGITUDE:** 118 ° 19 '03 " **(at centre of work)**

OWNER(S):
1) Craig A. Lynes
2)

MAILING ADDRESS:
Box 131, Grindrod, B.C. V0E 1Y0

OPERATOR(S) [who paid for the work]:
1) Cayenne Capital Corp.
2)

MAILING ADDRESS:
200-551 Howe Street
Vancouver, BC V6C 2C2

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
Paleozoic Harper Ranch Group, Upper Triassic Slocan Group, Upper Triassic Nicola Group, northwest trending, tuffaceous mudstone, chert, limestone, arc derived sandstone, conglomerate. north trending steeply west dipping Bevan Fault, Jurassic Nelson batholith, Cretaceous Whatshan batholith, Quartz-carbonate-pyrite-arsenopyrite-Gold veining, feldspar porphyry hosted mineralization, west-north west trending gold anomalies.

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: 5279, 10530, 10871, 11645, 11752, 12338, 13040, 13545, 18079, 20445, 27421, 27419, 27705, 28197, 28555, 36024

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TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping	8 ha. 1:2,500 and 200 ha. 1:10,000	1036571, 1039166, 1044860	$6,380.00
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil	42	1039166	$3,640.00
Silt			
Rock	58	1036571, 1039166, 1044860	$20,000.00
Other	1	1044860	$1,050.00
DRILLING (total metres; number of holes, size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic	9	1036571, 1044860	$3,512.70
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)	820 Ha	1036571, 1044860 1039166, 1044860	$22,430.00
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail			
Trench (metres)	2- 1x10m, 3-1x5m, 1-1x8m		$6,500.00
Underground dev. (metres)			
Other			
		TOTAL COST:	$63,512.70

2016 GEOLOGICAL AND GEOCHEMICAL ASSESSMENT REPORT ON THE LODE STAR PROPERTY

Event Number: 5643634
Claims Worked On: 1036571, 1039166, 1044860

Located in the
Vernon Mining Division
British Columbia, Canada

NTS Map Sheet 082L 01/W
BCGS Map Sheet 082L.019
50° 07' 48" North Latitude
118° 19' 03" West Longitude

Prepared for:
Cayenne Capital Corp
200-551 Howe Street,
Vancouver BC V6C 2C2

Prepared by

Alicia Carpenter, P.Geo., B.Sc.
Consulting Geologist
And
Craig A. Lynes
Prospector

June, 2017

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1.0 INTRODUCTION

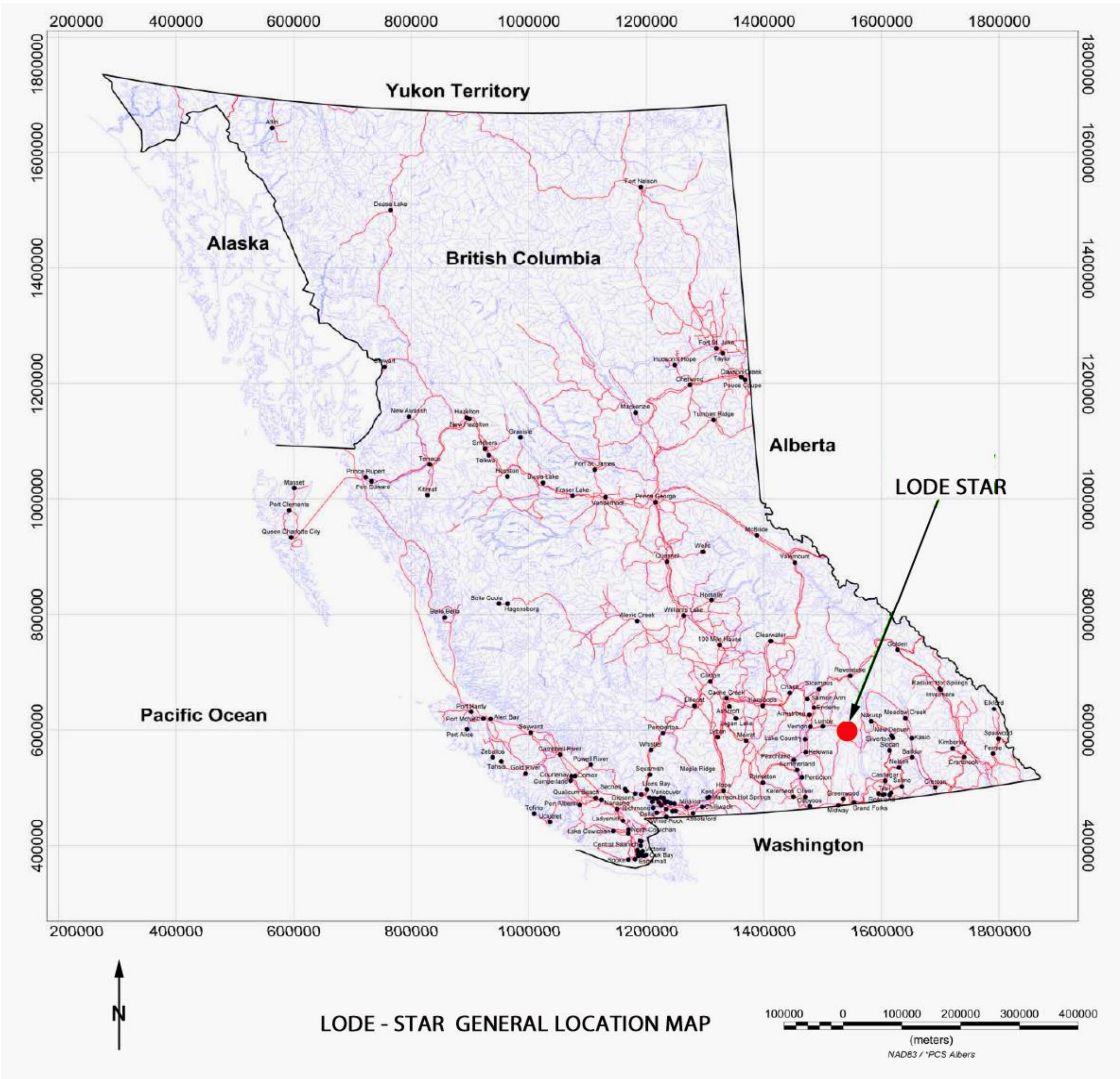
The Lode Star property is located in the Whatshan Range of the Monashee Mountains of southern British Columbia. The project area is 70 kilometers east-southeast of Vernon, and 27 kilometers northwest of the Needles ferry on Arrow Lake.

The Lode Star property consists of 5 mineral claims totaling 1015.15 hectares owned by Craig A. Lynes on behalf of Rich River Exploration Ltd. (Rich River). Cayenne Capital Corp. entered into an option agreement with Rich River in October 2015, to acquire a 100% interest in the Lode Star property. The 2016 field program on the Lode Star property was completed under the direction and effort of Cayenne Capital corp., with Rich River as the primary contractor.

The property is accessed via the Keefer Lake FSR, which leaves Provincial Highway 6 approximately 32 kilometers west of the Needles Ferry. The property is 24 kilometers up Keefer Lake FSR. Access into the claim blocks is excellent due to an array of well-maintained logging roads operated by Pope and Talbot to the east, and Tolko Industries to the west. Although four-wheel drive is recommended, most of the roads are accessible with two-wheel drive.

This report documents the geological mapping and sampling program completed between June 20, 2016 and October 16, 2016 on the Lode Star property. The work on the Lode Star claims was conducted on mineral claims 1036571, 1039166 and 1044860.

Figure 1: General Location Map



2.0 LOCATION, ACCESS & PHYSIOGRAPHY

The Lode Star property is located in the Whatshan Range of the Monashee Mountains of southern British Columbia. The project area is 70 kilometers east-southeast of Vernon, and 27 kilometers northwest of the Needles ferry on Arrow Lake (See Fig. 1).

Access into the claim blocks is excellent due to an array of well-maintained logging roads operated by Pope and Talbot to the east, and Tolko Industries to the west. The property is accessed via the Keefer Lake FSR, which leaves Provincial Highway 6 approximately 32 kilometers west of the Needles Ferry. The property is 24 kilometers up Keefer Lake FSR. Although four-wheel drive is recommended, the majority of the roads are accessible with two-wheel drive.

The City of Vernon has good accommodation and logistical support including a source of supplies, helicopters and a hospital. Vernon has a population of 58,540 and equipment and supplies needed to support mine development are available.

Elevations on the Lode Star property range from 1,350 m to 1,900 m. The property hosts a forest comprised mostly of spruce, pine and fir trees which are in various states of growth. The north part of the property is the highest point that traces a north trending ridge crest. Most of the property has moderate slopes of 10- 30°, but flattens to less than 10° below 1,420 m elevation. The lowest elevation of the Lode Star property is 1,350 m elevation in the south edge of the property located near Holmes Lake, which is approximately 1km long. Much of the property has been timber harvested by Pope and Talbot as operators.

The Lode Star property experiences cool to cold moist winters and warm to hot dry summers. Winter snow falls on the property area by November and stays on the ground intermittently until April. Weather data for Kelowna, 75km west south-west of the property, at an elevation of 344m, lists annual average temperatures as 4 °C as the low, and 15 °C as the high. Average total precipitation for Kelowna is 345 mm (13.6 inches).

Although the till cover generally seems to be thin, most of the rock outcrops are in road cuts, creeks and ridge crests. Till thickness increases (greater than 2 meters depth), in lower elevation portions of the property, where the average slope gradient is below 10 degrees.

3.0 EXPLORATION HISTORY

Multiple creeks surrounding the Lode Star property have recorded placer production. Eureka Creek had a recorded production of 870 grams gold between 1931 and 1945 (Minfile #082LSE046). Barnes and Holding Creeks have a combined total production of 2582 grams of gold between 1925 and 1945 (Minfile #082LSE053). These are located outside of the current Lode Star Claim boundary.

Earliest hard rock mineral exploration activity on the Lode Star mineral property took place in 1973. Geological mapping and geochemical rock and soil sampling fieldwork were carried out by Duncanex Resources Ltd (Morrison, 1974). An inferred fault complex trending N, NW and ENE was identified approximately 250-1,000 m east of the KL Minfile (082LSE021, 405224 E, 5554174 N). Quartz diorite and quartz diorite feldspar porphyry are found near the inferred fault complex. Locally, pyritization, silicification and chloritization are in evidence where the igneous rocks cut hornfels. Rock sampling identified anomalous gold and silver values. Soil Sampling was conducted during the program, and Intrusive dyking and local faulting were observed in the anomalous area (Morrison, 1974).

Between 1982 to 1984 several companies completed geochemical surveys over claims that are now part of the Lode Star property. In 1982 the claims were staked as the Keefer claims, and a small soil sampling program was conducted on behalf of the owner, F. Marehard. Anomalous gold values of 120-230ppb were returned from the western edge of the current Monashee-Star claim (McGoran, 1982). In 1983 Cominco collected soil samples on the Kee 1-6 claims. This sampling program identified six arsenic anomalies in an area underlain by black argillites with limestone lenses (Wynne, 1983). Demus Petroleum Resources conducted two geochemical sampling programs in 1983 and 1984. The 1983 program identified anomalous gold and arsenic assay values north of Holmes Lake (Burton Consulting, 1983). In 1984 another geochemical sampling program attempted to identify more anomalies north of the previous years' grid. The correlation between gold and silver values, with those of the previous survey, were lower than expected and no new anomaly was identified (Schildhorn, 1984).

In 1985 the claims were re-staked as the snow 1-4 claims. In 1988, Ocean Crystal Resources Ltd carried out geological mapping and collected 47 soil and nine (9) rock samples for geochemical analysis on the Snow claims. The highest gold values obtained from the soil samples collected in 1988 were 310 ppb and 235 ppb. The corresponding arsenic values were 780 ppm and 420 ppm. Only one silver value exceeded 1 part per million. The rock source for anomalous soil samples has not been determined. Further sampling is suggested for areas of arsenic anomalies and additional exploration is warranted to locate the source of gold in soil (Caltagirone, 1988).

In 2003 to 2005, Columbia Yukon Explorations Inc. “Columbia Yukon” conducted exploration programs which included soil sampling, prospecting, and trenching on the Barnes, and KBM claims. Some of these surveys were conducted over ground that is now part of the Lode Star property.

In 2003, Columbia Yukon conducted a large soil sampling program. The main gold and arsenic anomaly discovered occurs within the boundaries of the current Lode Star property. This anomaly occurs in the southwest corner of the property, the Gold Star claim, with soil samples up to 340ppb Au coincident with a significant arsenic anomaly (Augsten, 2003a). The sampling program was followed up by 900m of trenching of the newly discovered Au-As anomalies. Trench 38E contained narrow quartz veins with visible gold, returning assays of 52.8g/t Au and 254.92 g/t Au (Augsten, 2003b).

In 2004 Columbia Yukon continued exploration in the area including soil geochemical sampling, trenching, prospecting, and the completion of four drill holes. Two main target zones within the Lode Star claim boundaries were identified during this program; the Holmes Lake Zone (Lode Star North), and the Barnes Zone (Gold Star claim). Soil samples were collected and analyzed from the Holmes Lake grid, the northeast quadrant of the Lode Star claims. The Holmes lake grid discovered several gold-silver-arsenic +/- antimony +/- copper anomalies (Fig. 5). More soil samples were collected from a grid that extended northwestward from the 2003 grid on the KBM claims, a small portion of which were collected within the Lode Star claim boundaries. This grid, called the Barnes grid extension, discovered Au-As anomalies in the portion of the grid contained within the current Gold Star claim, an extension to the anomaly identified during the 2003 sampling program.

Approximately 150m of trenching was completed in the Barnes Zone (Gold Star claim) as part of a rock geochemical sampling program. This trenching identified narrow gold-bearing quartz veins hosted in a structurally disturbed argillite. Veins are northeast trending, and moderately dipping towards the southeast. Several samples with significant gold values ranging from 1 to 26.5 g/t were collected from trenches in both the Barnes and Holmes areas (Augsten, 2004).

To follow up the positive trench sample results, four drill holes were completed in the Barnes (Gold Star) zone. Two of these drillholes, 04BC-1, and 04BC-4, were collared on the current Lode Star claim blocks. These two holes were collared in argillaceous siltstone with pyrite>pyrrhotite, but both quickly encountered a shallow angle fault below which pyrrhotite>pyrite. No significant mineralization was observed in these holes (Augsten, 2004).

In 2005, further geochemical sampling expanded the Holmes Lake Grid. In March 2005, part of the original soil anomaly was trenched. The Holmes Lake Grid covers an area of approximately 1.7 kilometers by 1.3 kilometers. The 2004-2005 soil grid coverage had identified several significant gold and arsenic soil anomalies. The most important of these is a broad west-northwest-trending anomaly, approximately 650 meters by 200 meters in size, in the northern part of the soil grid. The anomaly has potential to continue both to the west-northwest and east-southeast. Quartz veins occur at the southeast portion of this anomaly and corresponded to high gold in soil values of 1,280 ppb Au with accompanying elevated silver and arsenic. There is a positive correlation between gold and arsenic in soil samples. Outcrop exposure over the Holmes Lake anomaly is limited.

Anomalous Au-As soil samples collected during the 2005 program are underlain by feldspar porphyry or feldspar porphyritic diorite bedrock, and minor argillaceous sediments. On the southern part of the soil grid there is another northwest-trending anomaly parallel to, but more poorly defined than, the northern anomaly (See Fig. 5) is best described as a series of anomalous clusters of gold and arsenic soil anomalies trending west-northwest. Within the southern anomaly, high values of 365ppb gold and 300ppm arsenic were obtained, and visible gold was panned from the 365 ppb Au in soil sample site (406,900 E, 5,552,500 N) (Augsten, 2005a). The gold anomalies identified are completely covered by the Current Lode-Star north claim group.

Trenching on the Holmes Lake Grid in 2005 was carried out by Columbia Yukon Exploration Inc. and several gold bearing quartz veins were discovered. Gold bearing quartz-sulphide vein material in trenches coincided with a strong west-northwest trending gold-arsenic-silver soil anomaly (Augsten, 2005). A total of 300 meters (1-3 meters deep, and 1-3 meters wide), of trenching was completed in the spring of 2005. Subsequent trenching of these anomalies resulted in the discovery of gold-bearing quartz-sulphide veins hosted in a fine-grained feldspar porphyritic quartz diorite which intrudes structurally disturbed argillaceous siltstone.

Trenching in 2005 discovered a new gold-bearing structure with gold and silver-bearing quartz veins as well as strongly altered wallrock. The most northerly trench (TR33N) contained smaller quartz veins that host the broadest area of intensely altered wallrock. The apparent width and intensity of this alteration zone suggests a strong hydrothermal system. The veining discovered in these trenches occurs proximal to the trace of a major north-trending normal fault, the

Bevan Fault, and more specifically in the hanging wall of that fault. This fault may be an important control on the gold mineralization discovered here.

Columbia Yukon Exploration Inc. collared an exploration drill hole approximately 60 meters north of the east-central portion of Trench 33 N (Easting 407,650 E, Northing 5,553,292 N, 1,610 meters elevation above sea level). There is no public documentation of drill logs or geochemical analysis from this drill hole.

In 2015, Rich River Exploration Ltd. was commissioned by Cayenne Capital Corp to conduct an exploration program of geological mapping, and geochemical rock, silt and soil sampling on the property for the identification of base and precious metal bearing mineralization.
A total of 10 hectares (24.7 acres) was mapped at a scale of 1:5,000 and 12 rock chip samples were taken on the south and central parts of property. The focus of this program was to follow up on trenching completed by Columbia Yukon in 2005 and to explore outcrop recently exposed by a new logging road (Kikauka, 2016). Quartz sulphide veins collected from west of Barnes Creek returned values of up to 18.8 g/t Au.

4.0 LAND TENURE AND CLAIM STATUS

The Lode Star property consists of 5 mineral claims totaling 1015.15 hectares. The claims are listed in Table 1 and displayed on a claim map in Figure 2. This report covers work completed on the Lode Star property between June 20, 2016 and October 16, 2016.

The Claims are currently owned by Craig A. Lynes on Behalf of his Company Rich River Exploration Ltd. ("Rich River"). The property is currently operated by Cayenne Capital Corp. entered into an option agreement with Rich River in October 2015, to acquire a 100% interest in the Lode Star property.

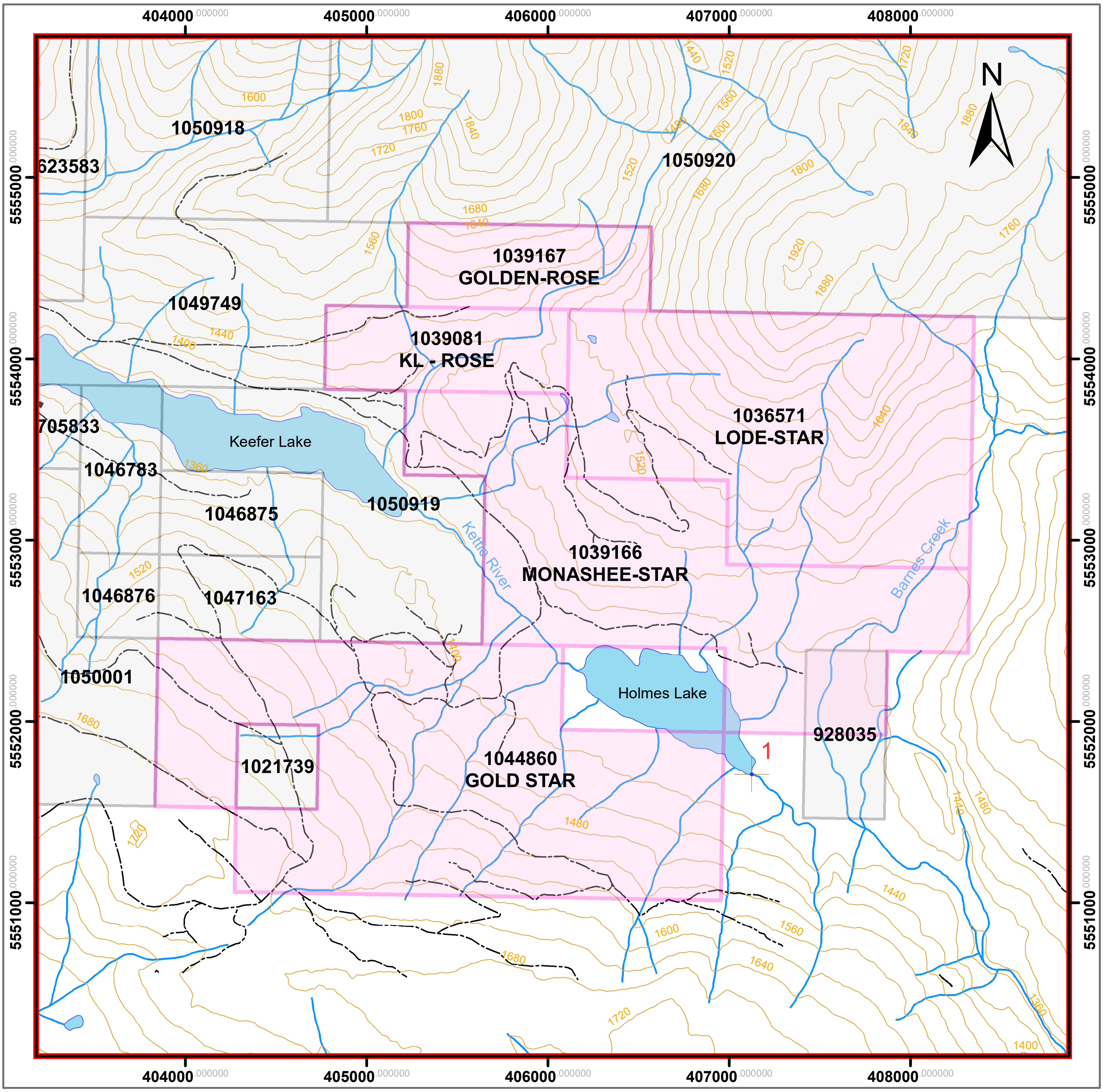
In June 2016, an additional claim was added to the property, the GOLD STAR claim, covering the area of the historic Barnes claim block.

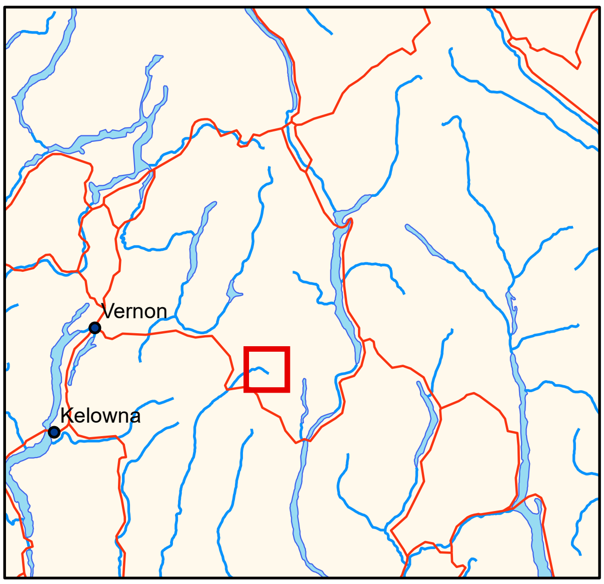
The 2016 field work conducted on the Lode Star claims consisted of geological mapping at varying scales, and 110 samples collected for geochemical ICP and Au analyses of Rock, soil, and pan concentrate samples, and petrographic analyses. The work was conducted within mineral claims 1036571, 1039166 and 1044860 (Figure 3) and applied to the 5 Lode Star property claims listed below in Table 1, held by Craig A. Lynes, Under Event Number 5643634. Expiry dates are to be advanced to Jan 24, 2025, subject to government approval of this report.

Table 1: Lode Star Property Claims

Title Number	Claim Name	Owner	Title Type	Issue Date	Good To Date*	Area (ha)
1036571	LODE-STAR	116233 (100%)	Mineral Claim	2015/JUN/05	2025/JAN/24	269.2846
1039081	KL - ROSE	116233 (100%)	Mineral Claim	2015/OCT/04	2025/JAN/24	62.1381
1039166	MONASHEE-STAR	116233 (100%)	Mineral Claim	2015/OCT/07	2025/JAN/24	269.3255
1039167	GOLDEN-ROSE	116233 (100%)	Mineral Claim	2015/OCT/07	2025/JAN/24	62.133
1044860	GOLD STAR	116233 (100%)	Mineral Claim	2016/JUN/20	2025/JAN/24	352.2688
5	Mineral Claims				Hectares:	1015.15

* Good to date pending government approval.





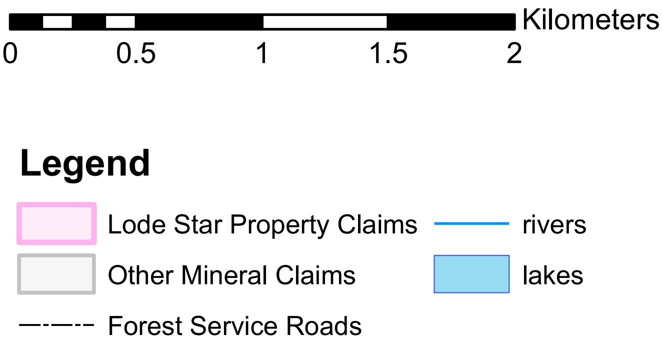


Figure 2: Lode Star Property Claim Map

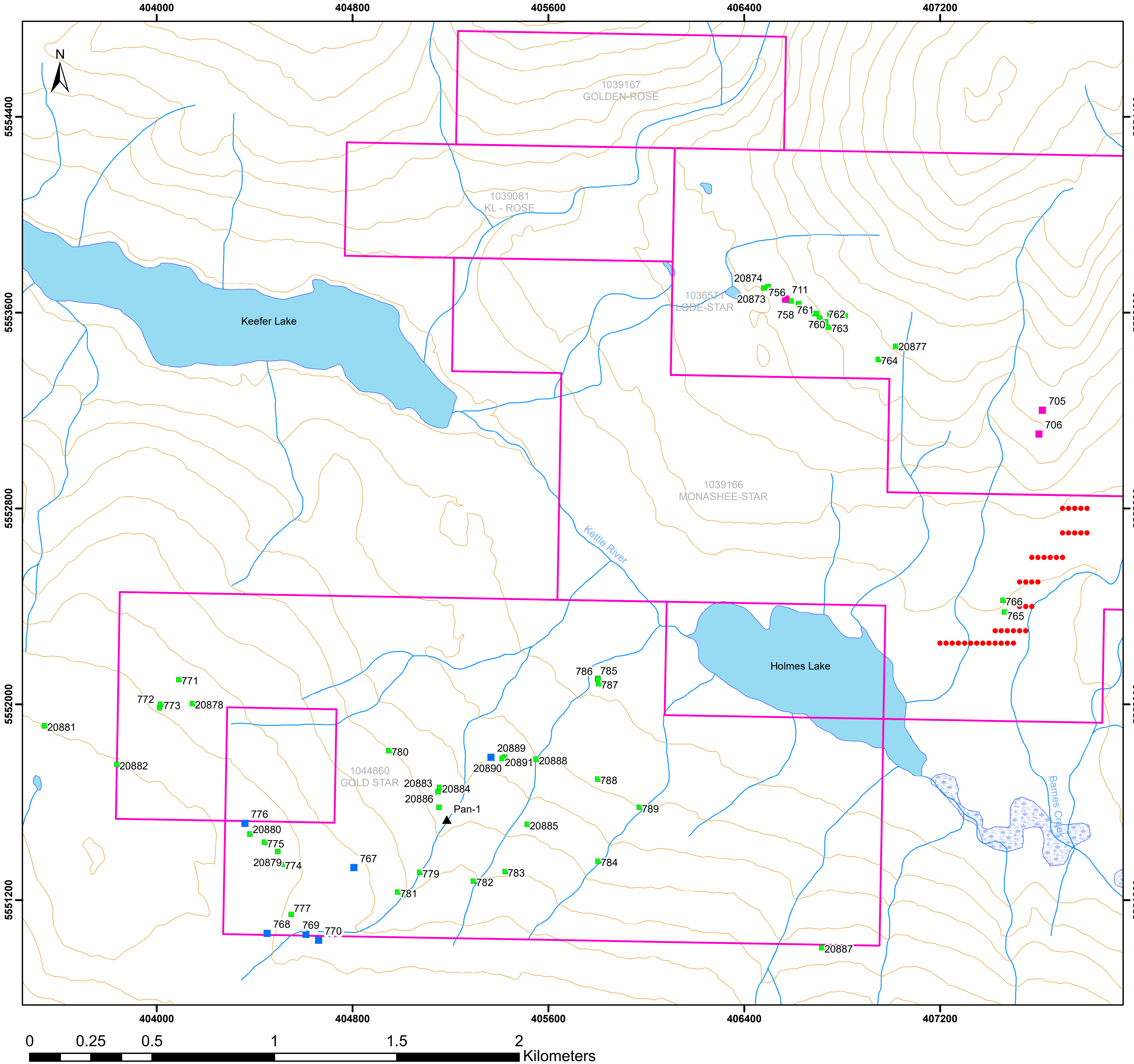


Figure 3
Cayenne Capital Corp
Lode Star Gold Project
2016 Sample Types and Locations

Legend

- 2016 Petrographic Samples
- 2016 Petrographic & ICP Sample Location
- 2016 Pan Concentrate Sample
- 2016 Rock ICP Samples
- 2016 Soil ICP Samples

- Rivers
- Swamp
- Lakes
- Load Star Claims
- Forest Service Roads

Nad 1983, Zone 11, Scale 1:15,000
Compiled by: A. Carpenter, May 31, 2017

5.0 2016 SUMMARY OF WORK

Field work on the Lode Star Property for Cayenne Capital Corporation was completed by Rich River Resources. Geological mapping was completed in the Lode Star West, and Gold Star zones. A total of 110 samples were collected. 58 rock samples, consisting of 27 outcrop samples and 31 angular float samples, were collected for ICP and Au analysis. Nine samples were collected for petrographic analysis from a subset of 2015 and 2016 ICP sample locations, and 42 soil samples were collected in the Holmes Lake area. Mapping and sampling were completed between June 20th and October 16th, 2016 on mineral claims 1036571, 1039166 and 1044860 at a cost of $63,512.70. This report discusses the work completed during this period. Details of the reported assessment work expenditures can be found in Appendix II.

On March 30, 2017, under Event Number 5643634, $90,686.02 ($63,512.700 of assessment work and $27,173.32 of PAC credits) was filed on the five Lode Star Property Claims advancing their expiry dates to Jan 24, 2025, upon government approval of this assessment report (See Table 1 for details).

Exploration work in the Lode Star West Zone focused on an 8 hectare area encompassing outcrop exposed by a recently created logging road. This area was mapped at 1:2,500 scale, over an Au-As soil anomaly identified by Columbia Yukon Exploration Inc. in 2005 (Augsten, 2005a). Limited sampling had been conducted in this area by Rich River Resources during the 2015 program. The area is dominated by fine grained feldspar porphyry associated with the Cretaceous Whatshan Batholith.

Further geological mapping at 1:10,000 scale and sampling was conducted in the newly acquired Gold Star claim. Au-As soil anomalies were identified here during Columbia Yukon Exploration Inc. 2003 and 2004 exploration programs (Augsten, 2004). The area is underlain by metasediments of the Paleozoic Harper Ranch Group.

A small 42 sample soil grid was conducted in the Holmes Lake Area. This grid is a SE extension of sampling conducted by Columbia Yukon (Augsten, 2005a).

In addition, nine samples were sent for petrographic analysis in order to characterize the mineralization style and host rocks observed in the study areas.

6.0 GEOLOGY

6.1 Regional Geology

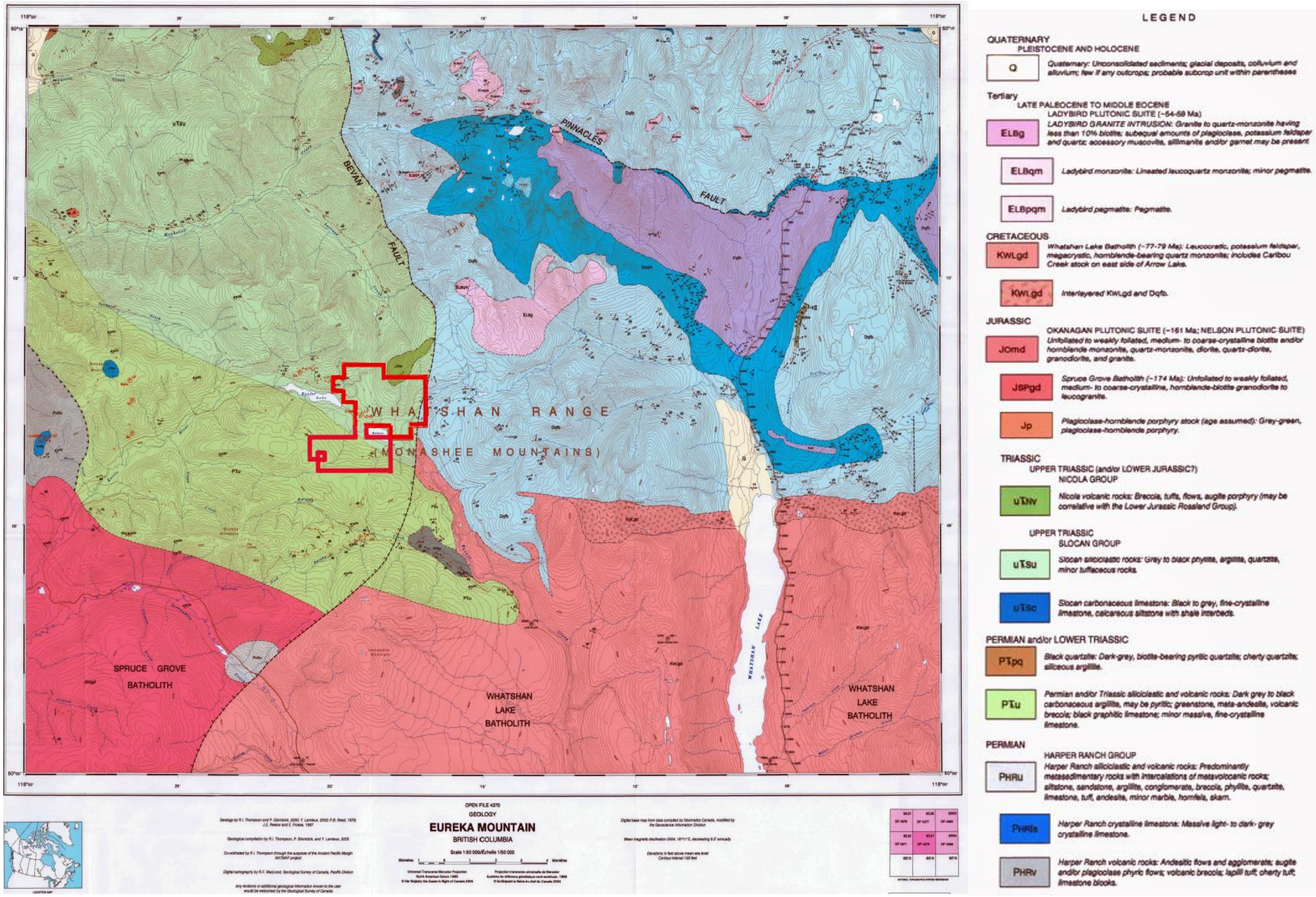
The Lode Star property lies within a west-northwest trending, 16 km (10 mile) wide, belt of Devonian-Permian Harper Ranch Group and Upper Triassic Nicola-Slocan Group, weak to moderately metamorphosed volcanic and sedimentary rocks. This trend extends from Holmes Lake to Cherryville, 26 km (16 miles) to the west-northwest of the claim group. The Mesozoic Nicola Slocan Group of rocks have faulted contacts with Monashee Group gneisses lying towards the northeast, most notably the N-S trending Bevan fault which crosses the eastern edge of the Lode Star claims (Fig 4). Intrusive rocks of the Cretaceous Whatshan Batholith (potassium feldspar megacrystic, hornblende-bearing quartz monzonite), and Jurassic Spruce Grove (Hornblende-biotite granodiorite to leucogranite) surface 4km to the South of the claims, and directly to the East of the Bevan Fault.

The Devonian-Permian Harper Ranch Group is characterized by a thick sequence of argillaceous sediments, with minor intercalated limestone and andesitic volcanic rocks. A variety of the argillaceous sediments contain large limestone inclusions ranging from 5 centimeters (2 inches) to 3.05 meters (10 feet). The Upper Triassic Nicola Group volcanics are characterized by augite porphyritic breccias, tuffs and flows. The Upper Triassic Slocan Group consists of siliciclastic rocks; grey to black phyllite, argillite, quartzite and minor tuffaceous rocks (Thompson et al. 2003).

Low grade metamorphism of the sedimentary and volcanic rocks has been caused by emplacement of Jurassic and/or Cretaceous granodiorite, quartz diorite, diorite intruding the Paleozoic Harper Ranch Group and the Triassic Nicola and Slocan Groups.

Regionally, the metamorphic grade varies from amphibolite facies for the Monashee Complex metamorphic rocks, mid to lower greenschist for the Harper Ranch Group rocks, and mid to upper greenschist for Slocan and Nicola Group rocks.

Figure 4: Regional Geology of the Lode Star Property (Thompson et al, 2003)



6.2 Property Geology

The most recent regional geological interpretation of the Lode Star property is based on 1:50,000 mapping compilation by the GSC (Thompson et al, 2003). This interpretation shows most of the property to be underlain by Upper Triassic Slocan Group siliciclastic rocks (uTrNsf) comprised of grey to black phyllite, quartzite, and minor tuffaceous rocks, with local upper Triassic Nicola Group volcanics along ridges (uTrJN). The southern portion of the claim group is underlain by the Upper Paleozoic Harper Ranch Group, and consists of siliciclastic and volcanic rocks, including locally pyritic argillite, meta-andesite, and variable limestones. The Harper Ranch Group was identified as the Thompson assemblage in earlier reports on the area (Hoy et. al, 1994). The N-S trending Bevan Fault surfaces on the eastern edge of the property, and marks the western boundary of the Monashee metamorphic complex. This sequence of Paleozoic and Mesozoic volcanic, sedimentary, and metamorphic rocks is intruded by apotheoses (stocks, dikes-sills) of Jurassic Nelson batholith and/or Cretaceous Whatshan batholith. Kilometer-scale areas of Jurassic and Cretaceous intrusive rock with lithologies including granodiorite, minor quartz diorite, granite and porphyritic phases, outcrop extensively south of the Lode Star property (Augsten, 2005a). Tertiary (Miocene to Pliocene) plateau basalts cap portions of the intrusive rocks and the intrusive-Harper Ranch contact to the south.

In the northern portion of the claim blocks, Upper Triassic Nicola and Slocan Group argillites are intruded by fine-grained feldspar porphyry (Kwhfp) and microdiorite (KWh) with minor metamorphic layering (weak fabric and recrystallization texture developed). Quartz diorite fine grained dykes occur in the creek valleys on the western side of the property. Both medium grained and porphyritic varieties of quartz diorite occur. Intrusive dykes cause alteration of the surrounding sedimentary rocks, with an assemblage of quartz, chlorite, kaolinite, montmorillinite, ankerite, and calcite. Crude layering observed in intrusive and meta-sedimentary rocks roughly trends northwest. The intrusive and meta-sedimentary rocks are cut by late-stage quartz-sulphide veining/brecciation that dip steeply to the east-south east.

The southern portion of the Lode Star property (Gold Star and Monashee Star claims) is underlain by Devonian-Permian Cache Creek Harper Ranch Group & Triassic Nicola Group siltstone and limestone metamorphosed to phyllite and marble. The area is weakly mineralized, and quartz veining contains sparse sulphides consisting of pyrite and minor pyrrhotite. The quartz veining occupies fractures and dilatant zones that dip steeply to the east. The compositional layering of meta-sediments trends west-northwest and the fractures and quartz veins are in most places perpendicular to layering. Steeply dipping east-northeast faults were observed in the east portion of the Gold Star Zone. The metamorphosed limestone in this area contains sparse pyrite and trace amounts of graphite, representing an area of deformation adjacent to Holmes Lake.

Locally along ridges, Upper Triassic Nicola group Andesites are exposed (UTrJN). The most common variety of andesite is massive medium grained, and has been metamorphosed to greenstone. The andesite is crumbly in outcrop, whereas the argillaceous sediments tends to break along cleavage planes. A fine-grained, highly fractured and weakly silicified andesite occurs at the western edge of volcanic exposures metamorphosed to greenstone. Near fault zones, some serpentinization of altered mafic volcanics are reported (Morrison, 1973). Traces of quartz and calcite as 0.1-1.0 cm wide veinlets are widespread in this rock. Quartz veins are emplaced as fracture filling related to structural extension (dilatant) zones. A porphyritic variety of andesite occurs near the southeastern corner of the claim group. The rock contains 10% augite phenocrysts (2 mm.) and 20% plagioclase phenocrysts (2 mm.).

Mineralized quartz veins are hosted by intrusive phases in the northern portion of the Lode Star property and are associated with the feldspar porphyry unit. Quartz veining is associated with quartz-pyrite-calcite alteration. The highest-grade gold mineralization occurs in strongly fractured quartz vein sets with low sulphide contents, but trace amounts of very fine fracture-controlled visible gold.

Pyrite, arsenopyrite, chalcopyrite, galena and tetrahedrite are the principal sulphides found in the quartz gangue**.** Silver grades appear to correlate with tetrahedrite content; however, some of the gold may be electrum**.** Gold values are closely related to high antimony, arsenic, and lead values.

Veins are generally narrow, tabular or splayed and occur as sets of parallel and offset veins**.** Individual mineralized veins are approximately 10cm in width within intrusive host rock, and 1cm in width when hosted in argillite. The quartz-sulphide fissure veins present on the property trace fissures and faults that are mainly north to northeast trending. (Augsten 2005b). At this time, the extent of the mineralized trends is unexplored.

6.2.1 Lode Star Property Lithology Legend

(Kikauka, 2016)

MiPiCvb Miocene to Pliocene Chilcotin Group basalt

KWh Cretaceous Whatshan Batholith, granodiorite, quartz diorite, diorite

Kwhfp fine grain feldspar porphyry

MJgd Middle Jurassic Nelson Batholith, granodiorite, quartz diorite, diorite` granite, porphyritic phases

uTrJN Upper Triassic Nicola Group volcanic rocks (greenstone)**

uTrNsf Upper Triassic Nicola & Slocan Group mudstone, siltstone, shale**

DTrHsf Devonian-Permian Cache Creek
Harper Ranch Group medium & coarse grain argillaceous siltstone, black siltstone(phyllite), limestone(marble)*

DTrHvb Devonian-Permian Cache Creek
Harper Ranch Group andesite (greenstone)*

PrPzMpg Proterozoic-Lower Paleozoic
Monashee Complex paragneiss***

Mzpe Mesozoic pegmatitic granitic Intrusive rocks***

PrPzMqz Proterozoic-Lower Paleozoic
Monashee Complex quartzite, quartz arenite***

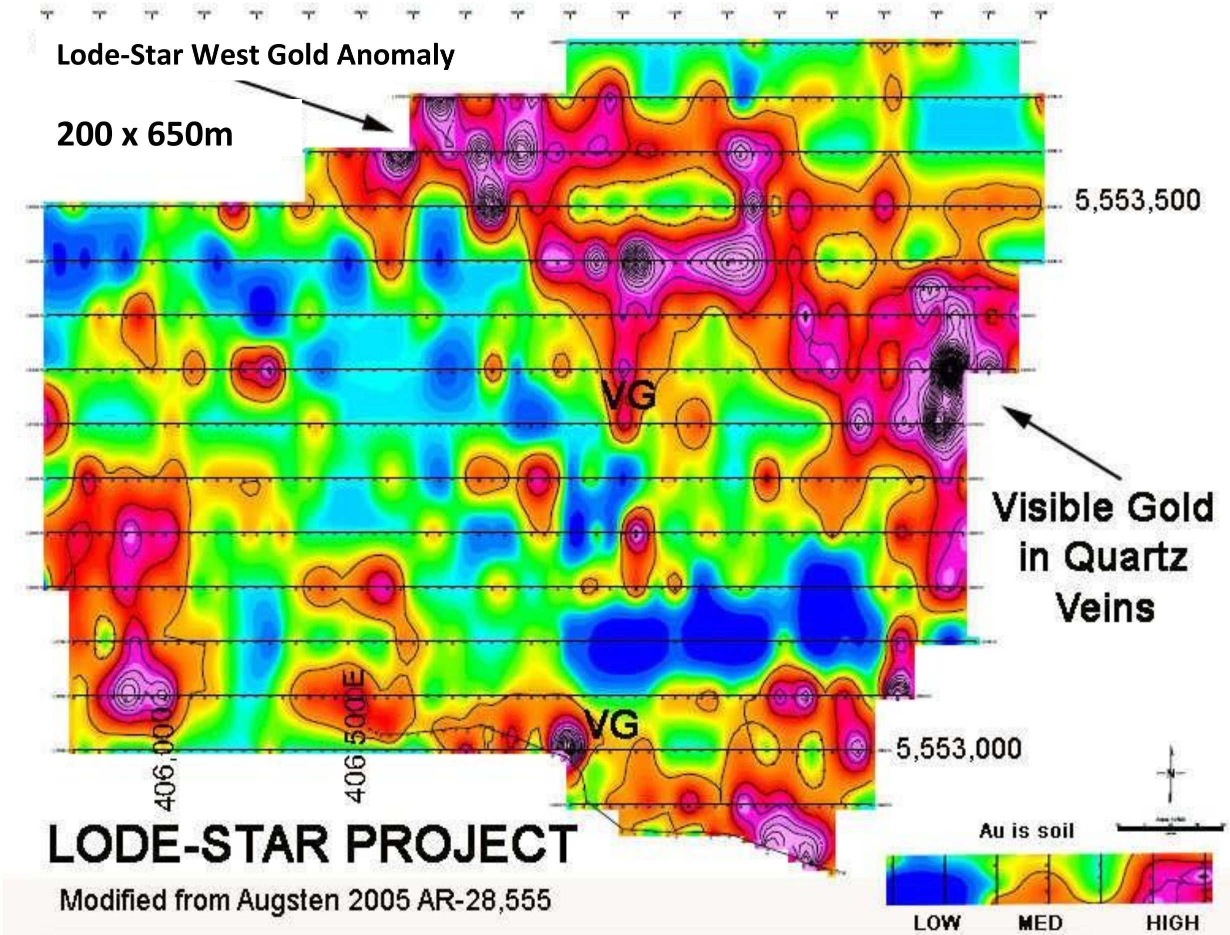
Metamorphic grade:
* 250-375 degrees C, 2-6 Kbar
**250-450 degrees C, 2-8 Kbar
*** 400-700 degrees C, 2-12 Kbar

7.0 2016 EXPLORATION PROGRAM

The 2016 exploration program at the Lode Star Property was commissioned by Cayenne Capital Corp. and completed by Rich River Exploration Ltd. Field work was carried out between June 20 and October 16, 2016. The sampling program consisted of mapping and geochemical sampling in the western portion of the Lode Star claim, in the Monashee Star claim, and over the area of the Gold Star claim.

Work on the Lode Star claim (MTO tenure number 1036571) focused on mapping and rock sampling outcrop exposure along a new logging road trending ESE through the west portion of the claim at 1,525-1,580m elevation. The new road cuts through the west portion of the ESE trending Lode-Star West Au-As soil anomaly. This anomaly was identified by soil results from Columbia Yukon Exploration Inc. 2005 program on the Holmes Lake Grid (Figure 5) (Augsten, 2005a). Soil geochemical sampling was completed in the Monashee Star claim to extend the same historical sampling grid at its southeast extent. A continuous network of previously existing logging roads gives good access to the newly acquired Gold Star claim (MTO tenure number 1044860). The Gold Star claims have also been the focus of previous work by Columbia Yukon Exploration Inc. Mapping and geochemical sampling during the 2016 program was completed to identify the source of several Au-As soil anomalies identified from historical sampling results (Augsten, 2004).

Figure 5: Historic Holmes Lake Grid Au Anomalies



Geological mapping was completed in the Lode Star West zone over 8 hectares at a scale of 1:2,500, and in the Gold Star claims over 200 hectares at a scale of 1:10,000. 58 rock samples were taken for ICP-MS (27 outcrop samples and 31 samples of angular float), and 9 samples were collected for petrographic analysis from ICP sample locations to support the mapping program. Rock type, alteration, and structural data was collected at all sampling locations. In addition, 42 soil geochemistry samples were collected at the SE extent of the Holmes Lake Grid completed by Columbia Yukon Exploration in 2005 (Augsten, 2005a), and one pan-concentrate sample was collected from a creek running through the centre of the Gold Star Claim.

The main objectives of mapping, rock sampling and petrographic study were to characterize the geological controls on the Au-As soil anomalies identified by Columbia Yukon Exploration between 2003-2005, and to determine the extents of gold mineralization and favorably altered rock identified during the 2015 program.

Sampling and mapping were completed by geologist Andris Kikauka, and prospector Craig A. Lynes of Rich River Resources.

7.1 Geological Mapping

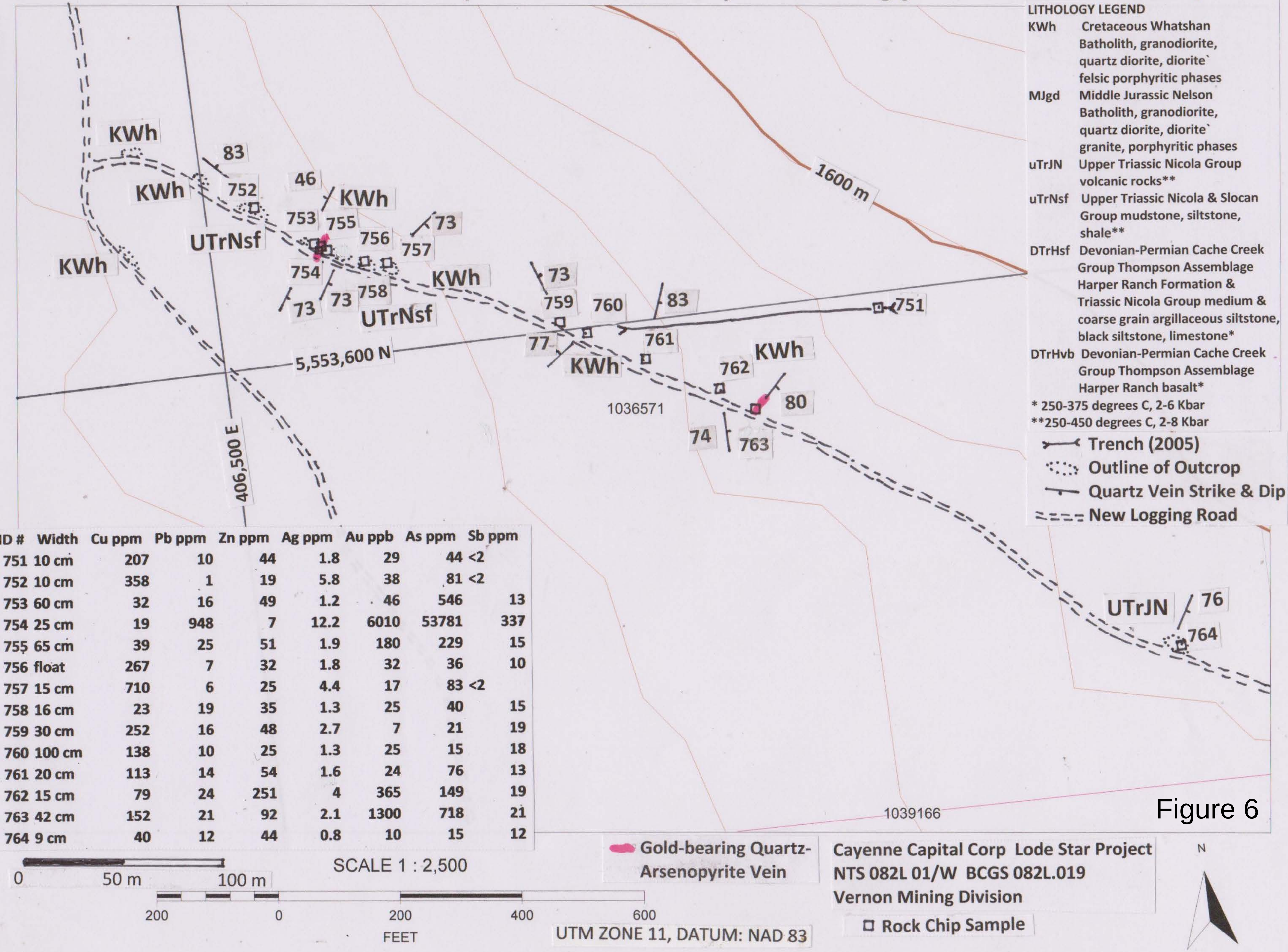
Geological Mapping was conducted in the western Lode Star claim over an 8 hectare area along a recently constructed logging road at a scale of 1:2,500 (Fig. 6). Relatively abundant outcrop is exposed in the steeper west portion of the new roadcut. When the roads levels out above 1,560 meters elevation, there is less outcrop and increased depth of overburden (> 3 meters). The west portion of the new road is underlain mainly by porphyritic phases of the Cretaceous Whatshan batholith. There are several 1-10m scale inclusions of hornfels and schists that are part of Upper Triassic Nicola & Slocan Group (metamorphosed sandstone, and siltstone), and they occur as large-scale inclusions or smaller scale xenoliths with reaction rims. The east portion of the new road has limited exposure of outcrop that consists of metamorphosed andesitic volcanic rock (chloritic greenstone).

The Cretaceous intrusive consists of fine-grained texture (microdiorite) with minor metamorphic layering (weak fabric and recrystallization texture developed). Crude layering observed in intrusive and meta-sedimentary rocks roughly trends NW. The intrusive and meta-sedimentary rocks are cut by late-stage quartz-sulphide veining/brecciation that follow fractures that dip steeply and trend N to NE.

A total of approximately 200 hectares was mapped at a scale of 1:10,000 in the Gold Star claim (Fig. 7). The area is underlain by Devonian-Permian Cache Creek Harper Ranch Group & Triassic Nicola Group siltstone and limestone metamorphosed to phyllite and marble. The area is weakly mineralized, and quartz veining contains sparse sulphides consisting of pyrite and minor pyrrhotite. The quartz veining occupies fractures and dilatant zones that trend N, and dip steeply. The compositional layering of meta-sediments trends WNW and the fractures and quartz veins are in most places perpendicular to layering. ENE trending, and steeply dipping faults were observed in the east portion of the Gold Star Zone where metamorphosed limestone contains sparse pyrite and trace amounts of graphite, and represents an area of deformation adjacent to Holmes Lake.

Geological features such as strike and dip of veins and lithological contacts, alteration mineral assemblages, and sulphide mineralization were identified at all sampling stations.

Lode Star West Zone (new roadcut) Geology & Rock Samples



ID #	Width	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm	Sb ppm
751	10 cm	207	10	44	1.8	29	44	<2
752	10 cm	358	1	19	5.8	38	81	<2
753	60 cm	32	16	49	1.2	46	546	13
754	25 cm	19	948	7	12.2	6010	53781	337
755	65 cm	39	25	51	1.9	180	229	15
756	float	267	7	32	1.8	32	36	10
757	15 cm	710	6	25	4.4	17	83	<2
758	16 cm	23	19	35	1.3	25	40	15
759	30 cm	252	16	48	2.7	7	21	19
760	100 cm	138	10	25	1.3	25	15	18
761	20 cm	113	14	54	1.6	24	76	13
762	15 cm	79	24	251	4	365	149	19
763	42 cm	152	21	92	2.1	1300	718	21
764	9 cm	40	12	44	0.8	10	15	12

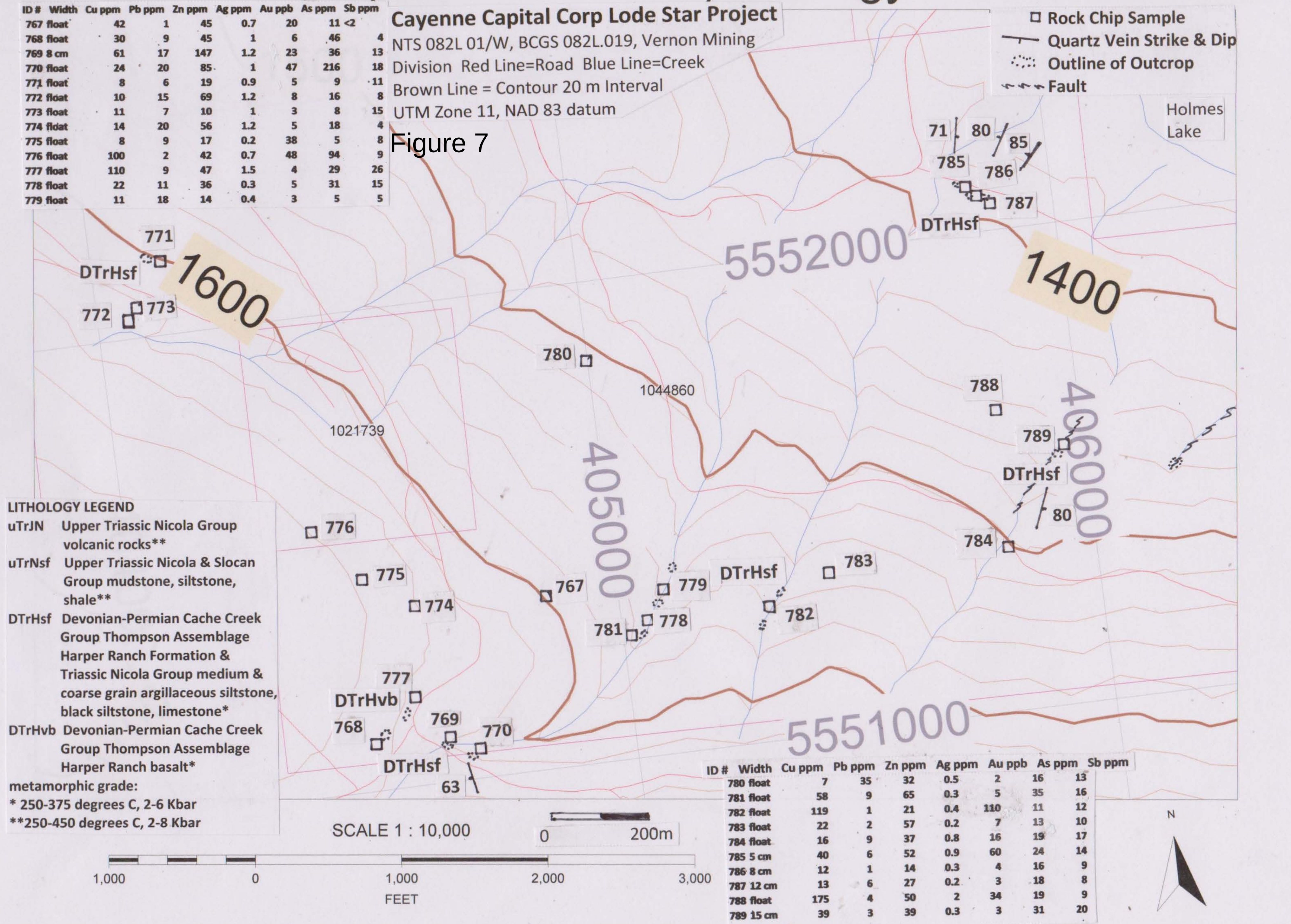
Figure 6

Lode Star South (Gold Star Zone) Geology & Mineralization

ID #	Width	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm	Sb ppm
767	float	42	1	45	0.7	20	11	<2
768	float	30	9	45	1	6	46	4
769	8 cm	61	17	147	1.2	23	36	13
770	float	24	20	85	1	47	216	18
771	float	8	6	19	0.9	5	9	11
772	float	10	15	69	1.2	8	16	8
773	float	11	7	10	1	3	8	15
774	float	14	20	56	1.2	5	18	4
775	float	8	9	17	0.2	38	5	8
776	float	100	2	42	0.7	48	94	9
777	float	110	9	47	1.5	4	29	26
778	float	22	11	36	0.3	5	31	15
779	float	11	18	14	0.4	3	5	5

Cayenne Capital Corp Lode Star Project
NTS 082L 01/W, BCGS 082L.019, Vernon Mining Division Red Line=Road Blue Line=Creek
Brown Line = Contour 20 m Interval
UTM Zone 11, NAD 83 datum

Figure 7



LITHOLOGY LEGEND

- uTrJN Upper Triassic Nicola Group volcanic rocks**
- uTrNsf Upper Triassic Nicola & Slocan Group mudstone, siltstone, shale**
- DTrHsf Devonian-Permian Cache Creek Group Thompson Assemblage Harper Ranch Formation & Triassic Nicola Group medium & coarse grain argillaceous siltstone, black siltstone, limestone*
- DTrHvb Devonian-Permian Cache Creek Group Thompson Assemblage Harper Ranch basalt*

metamorphic grade:
* 250-375 degrees C, 2-6 Kbar
**250-450 degrees C, 2-8 Kbar

ID #	Width	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm	Sb ppm
780	float	7	35	32	0.5	2	16	13
781	float	58	9	65	0.3	5	35	16
782	float	119	1	21	0.4	110	11	12
783	float	22	2	57	0.2	7	13	10
784	float	16	9	37	0.8	16	19	17
785	5 cm	40	6	52	0.9	60	24	14
786	8 cm	12	1	14	0.3	4	16	9
787	12 cm	13	6	27	0.2	3	18	8
788	float	175	4	50	2	34	19	9
789	15 cm	39	3	39	0.3	3	31	20

7.2 Rock Geochemical Sampling

Rock samples were selected to identify the extent and styles of mineralization, and to characterize the units mapped during the 2016 program. Roadcuts sampled in 2015 (Kikauka, 2015) were sampled in more detail, and a general sampling program was conducted in the Gold Star Claim, acquired in June 2016. Additional samples were collected around the Holmes Lake soil grid. Of the 58 samples collected for ICP, 27 were outcrop, while 31 samples of angular float were collected. The high proportion of float samples is due to limited exposure in the claim area and till coverage in the southern portion of the claims. The results of the rock geochemical sampling program can be viewed in Figures 9 and 10. Assay certificates can be viewed in Appendix V, and sample descriptions in Appendix IV.

7.2.1 Rock Sample Preparation and Analysis

Approximately 1-2 kilograms of rock was collected from each sample location. The samplers collected acorn sized rock chips perpendicular to the strike of mineralization for all outcrop samples. Angular float samples were collected where no outcrop was available. Rock samples were carefully collected to avoid contamination, placed in a marked poly ore bag, and shipped to Pioneer Labs in Richmond, B.C. for multi-element ICP-MS and gold geochemical analysis.

Upon arrival at Pioneer Labs, Samples were dried and subjected to a 4-inch-wide jaw crusher in order to achieve -6 mm sized material, and then split into sub-samples using a riffle splitter creating a 250 gm representative sample that is pulverized to 75 micron (0.075 mm) size material using a ring and puck style steel grinding mill. The pulverized sample is reduced to 0.500 grams used for multielement ICP and 20 grams used for Au geochemical analysis. The 0.500 gram sample is digested with 3ml of aqua regia diluted to 10ml with water. For Au analysis, the 20 gram sample is digested with aqua regia, MIBK extracted, and finished by AA to 1ppb detection.

7.2.2 Rock ICP Sampling Results

Sampling was completed to support the mapping program in the Lode Star West zones, and the newly acquired Gold Star claim, with two samples collected adjacent to the 2016 soil sample grid.

In the Lode Star West zone, most of the samples collected were outcrop samples of fine grained feldspar porphyry displaying quartz+chlorite+kaolinite+limonite±hematite±calcite alteration. All samples contained pyrite, but good Au results were only returned from rocks containing pyrite+arsenopyrite. Rock geochemistry results for the Lode Star West zone are displayed in Figure 9.

Rock chip sample 754 (repeat of sample 711 from 2015) consists of coarse grained arsenopyrite-pyrite in a gangue of fractured and brecciated quartz with minor muscovite and epidote. The following table compares geochemical analysis of the sample that was repeated:

Table 2: Comparison of Assay Results from Sample Repeat (754 -2016 & 711 - 2015)

Sample # (date)	Cu ppm	Pb ppm	Ag ppm	Au ppb	As ppm
711 (2015)	347	1,093	16.3	15,500	69,290
754 (2016)	19	948	12.2	6,010	53,781

A mineralized quartz vein identified during the 2016 program cuts intrusive rock along with 0.1-1 cm wide quartz stringer veins. A continuous 1.5 metre zone was sampled (# 753, 754, & 755) to include a 0.25 meter wide quartz-pyrite-arsenopyrite vein in the center. Weighted average of the three rock samples (# 753, 754, & 755) are listed in the following table:

Table 3: Quartz Vein Assay Result Weighted Average (Samples 753, 754, 755)

Sample #	Width (m)	Pb ppm	Ag ppm	Au ppb	As ppm
753, 754, & 755	1.5	175.2	3.34	1,098	9,296

Figure 8: Photograph of Sample Location for 753, 754 & 755

Samples 753, 754, and 756 were taken over a 1.5m area in order to sample a 0.25cm wide mineralized quartz vein. The quartz vein sample (754) returned a value of 6.01 g/t Au.

Additional significant results were returned from 2-10cm wide quartz veins containing pyrite+arsenopyrite, hosted in fine grained feldspar porphyry.

Table 4: Other Significant Assay Results from 2016 Rock Sampling Program

Sample #	Cu ppm	Pb ppm	Ag ppm	Au ppb	As ppm
20873	307	4	4.6	1,520	2065
20874	29	91	2.4	1,280	3481
20875	406	27	4.7	4,400	435
20876	269	71	9.8	1,500	1681

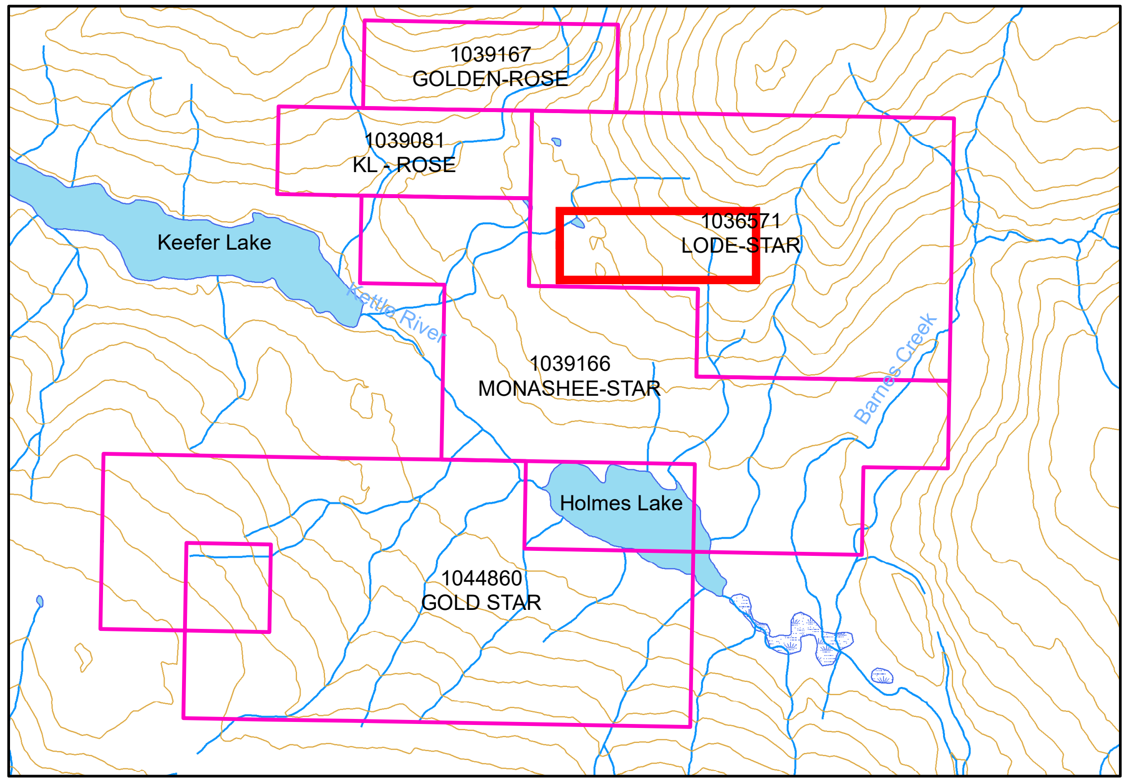
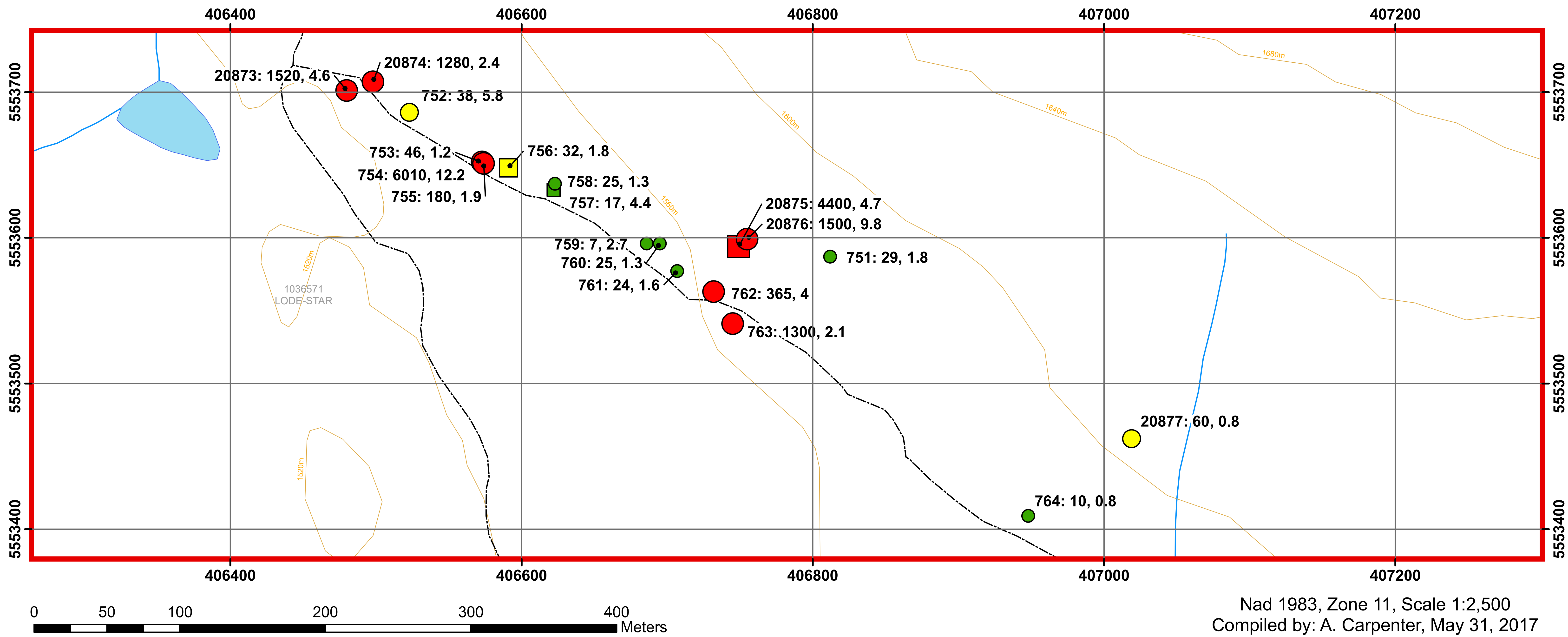


Figure 9
Cayenne Capital Corp - Lode Star Gold Project
Lode Star West
2016 Rock Geochemistry Assay Results

Legend

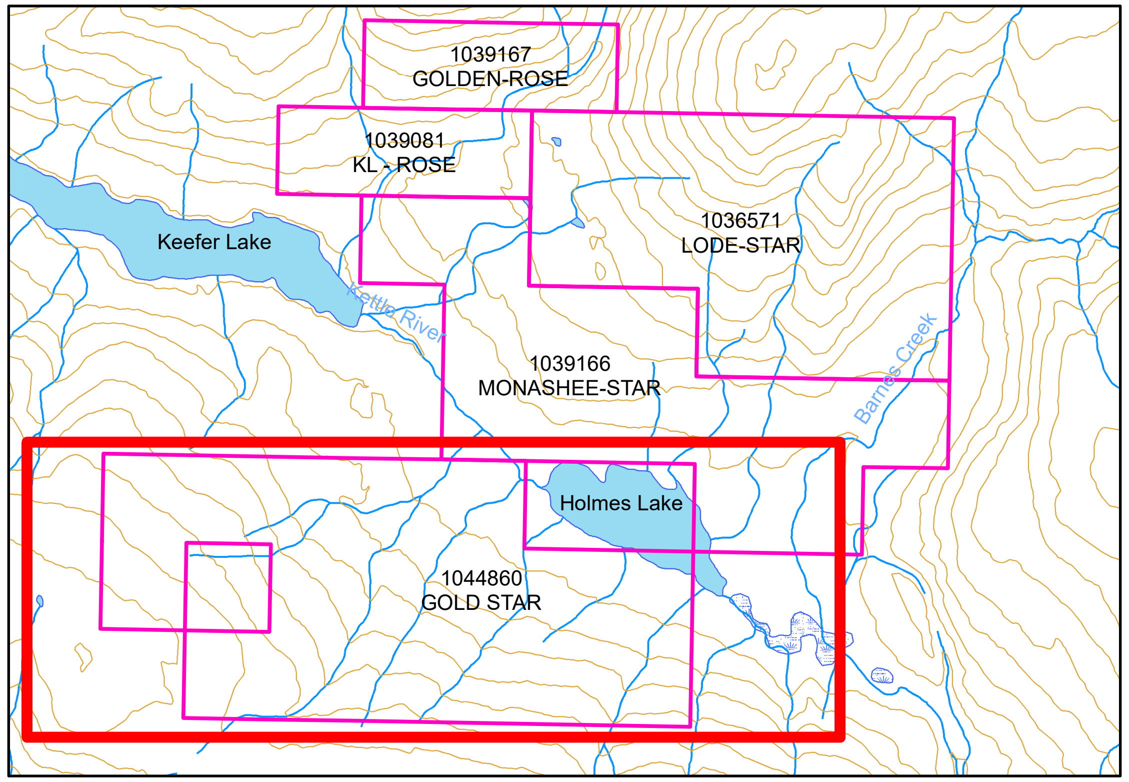
2016 Lode Star Rock Samples Au ppb, Ag ppm listed

Outcrop	Float (angular)		
2 - 30 ppb Au	2 - 30 ppb Au	Rivers	Load Star Claims
31 - 100 ppb Au	30 - 100 ppb Au	Swamp	Forest Service Roads
101 - 7000 ppb Au	100-7000 ppb Au	Lakes	



Nad 1983, Zone 11, Scale 1:2,500
Compiled by: A. Carpenter, May 31, 2017

Figure 10
Cayenne Capital Corp - Lode Star Gold Project
Gold Star and Lode Star SE
2016 Rock Geochemistry Assay Results



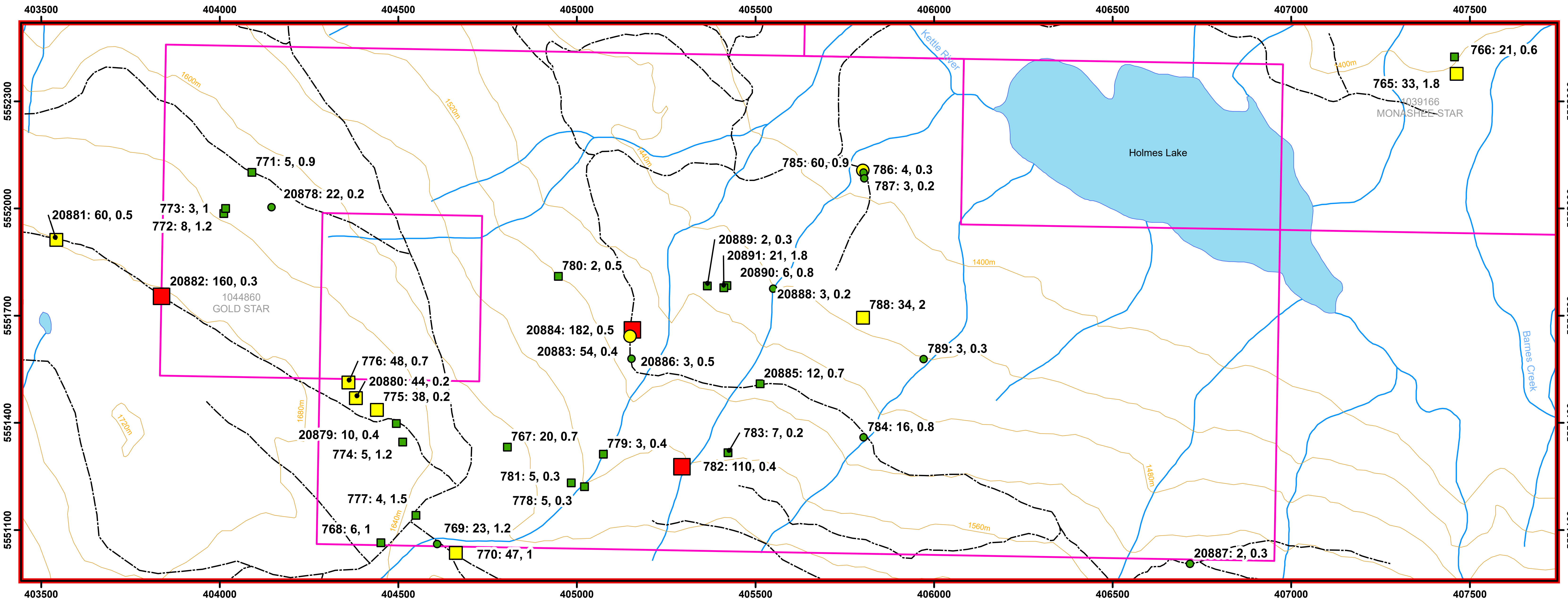
Legend

2016 Lode Star Rock Samples Au ppb, Ag ppm listed

Outcrop
- 2 - 30 ppb Au
- 31 - 100 ppb Au
- 101 - 7000 ppb Au

Float (angular)
- 2 - 30 ppb Au
- 30 - 100 ppb Au
- 100-7000 ppb Au

Rivers
Swamp
Lakes
Load Star Claims
Forest Service Roads



0 0.125 0.25 0.5 0.75 1 Kilometers

Nad 1983, Zone 11, Scale 1:10,000
Compiled by: A. Carpenter, May 31, 2017

The Gold Star Claim Block has poor outcrop exposure. Most of the samples collected in this claim block were angular float grab samples. The rock is dominantly quartz+chlorite+limonite altered phyllite and quartzite of the Devonian-Permian Harper Ranch Group.

A total of 36 rock chip samples were taken from the Gold Star Zone. 10 out of the 36 samples were taken from outcrop across widths of 5-15 cm (corresponding to width of quartz vein sampled). The rest of the samples were angular float since outcrop is only exposed in steep creek gullies. One float sample returned geochemical analysis values of 119 ppm Cu and 110 ppb Au, but generally base and precious metal values from the Gold Star Zone were low. The results of the sampling program are plotted in Figure 10. Au-As soil anomalies that were outlined in previous work by Columbia Yukon Exploration Inc, were not adequately explained, and the lack of outcrop makes prospecting difficult.

Two Samples, 765 and 766, were collected from the Monashee Star claim (Lode Star SE) did not return significant results (See Fig. 10).

7.3 **Soil Geochemical Sampling**

42 Soil samples were collected from the Monashee Star claim. The sampling lines form an extension on the historical Holmes Lake Grid completed by Columbia Yukon Exploration Inc. in 2005 (Augsten, 2005a). The 2005 survey identified two distinct west-northwest trending anomalies (Fig. 5), and these samples were taken to determine if the southern anomaly continued to the southeast. A Map of the sample locations and results can be viewed in Figure 11.

7.3.1 Soil Sample Collection and Preparation

A 200 x 700m area immediately west of Barnes Creek was sampled along east-west 100 meter spaced tie lines, with soil samples taken at 25 metre spacing along each tie line. ‘B’ horizon soil was taken from a depth of 10-30 cm with a grubhoe, and 500 grams soil placed into marked kraft envelopes. Samples were dried, securely stored, and then sent to Pioneer Laboratories in Richmond, B.C. for analysis.

Pioneer Laboratories screened the samples through -80 mesh and analyzed the fines, discarding the coarse fraction. The sample is reduced to 0.500 grams used for multielement ICP and 20 grams used for Au geochemical analysis. The 0.500 gram sample is digested with 3ml of aqua regia diluted to 10ml with water. For Au analysis, the 20 gram sample is digested with aqua regia, MIBK extracted, and finished by AA to 1ppb detection. The certificate can be viewed in Appendix VI.

7.3.2 Soil Geochemical Survey Results

Logging roads through the east portion of the Monashee Star claim (MTO tenure number 1039166) have exposed Upper Triassic Nicola and Slocan Group meta-sedimentary/volcanic rocks that contain 1-5% disseminated and fracture filling pyrite ± pyrrhotite. Near surface, a 1-3 mere wide zones of sulphide mineralization has oxidized resulting in rust coloured limonite and minor reddish hematite forming a prominent gossan (iron oxide). Geochemical analysis results indicate that the anomaly identified by Columbia Yukon does continue to the south, and is still open in that direction. Five sample locations that contain elevated base and precious metal content that require follow up exploration were identified:

Table 5: Significant Soil Sample Geochemistry Results – Monashee Star Claim

Line	Station	Cu ppm	Zn ppm	Ag ppm	Au ppb
5,552,250 N	407,225 E	53	48	0.8	115
5,552,250 N	407,425 E	111	113	1.0	140
5,552,300 N	407,450 E	82	236	0.7	22
5,552,600 N	407,600 E	38	59	1.1	110
5,552,600 N	407,675 E	297	362	2.6	50

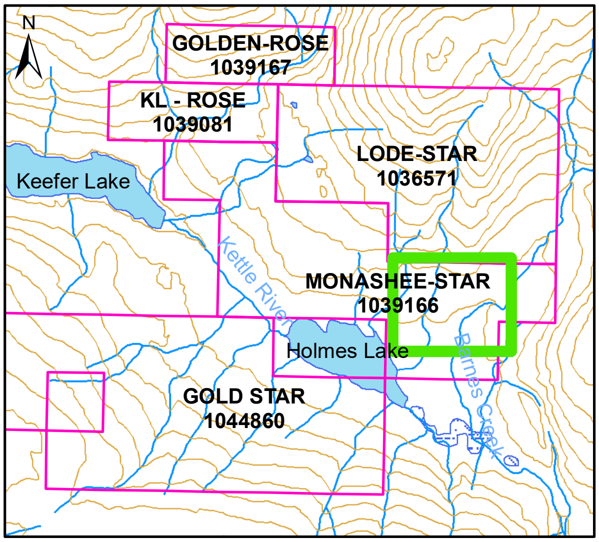
7.4 Pan Concentrate Sampling

One Pan-Concentrate sample was collected from a creek in the centre of the Gold Star claim. The results were positive and returned anomalous Au results. The concentrate was collected into a poly-ore bag and sent to Pioneer Laboratories in Richmond for ICP and Au Analysis by the same method described in section 7.2.1 of this report. The sample is plotted below in Figure 12.

Table 6: Pan-Concentrate Sample Results – Gold Star Claim

Sample Number	Easting UTM NAD 83	Northing UTM NAD 83	Au ppb	Ag ppm	As ppm
Pan-1	405185	5551529	3610	10.2	36

Figure 11
Cayenne Capital Corp-Lode Star Gold Project
2016 Geochemical Assay Results
Soil Samples



2016 Lode Star Soil Sampling Legend

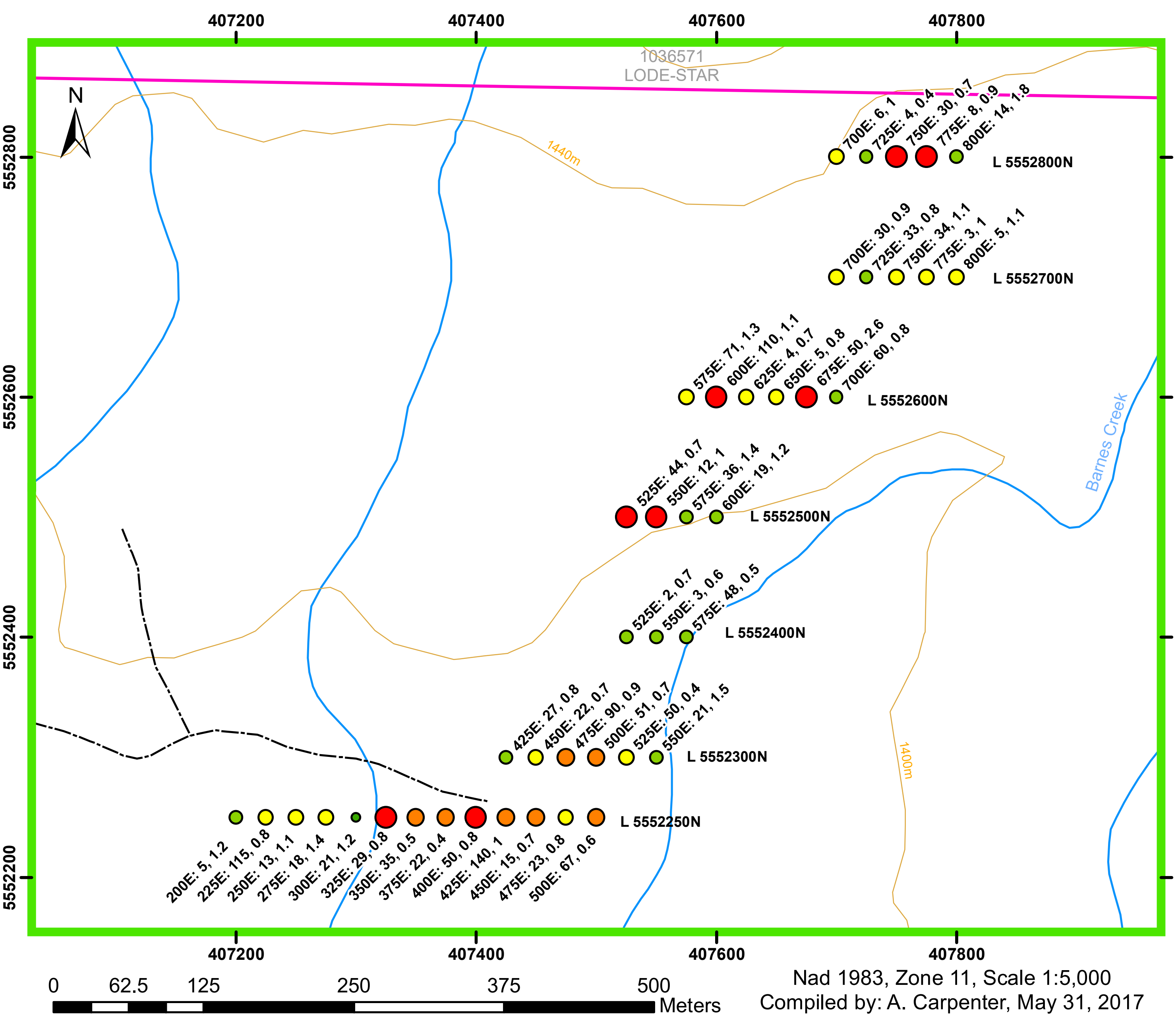
As ppm
- 0-5
- 5-34
- 34-57
- 57-96
- 96-127

(407)xxx E: Au ppb, Ag ppm

(407)xxx E: 40, 1.3

Sample # = L - UTM N (407)xxx E:

- Load Star Claims
- Forest Service Roads
- Rivers
- Swamp
- Lakes



Nad 1983, Zone 11, Scale 1:5,000

Compiled by: A. Carpenter, May 31, 2017

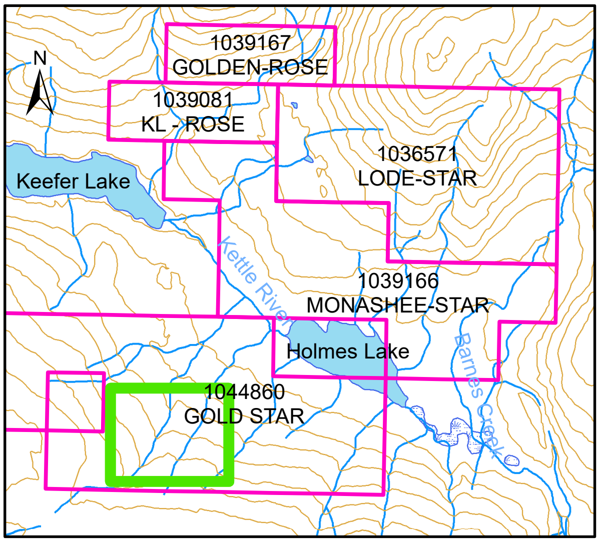
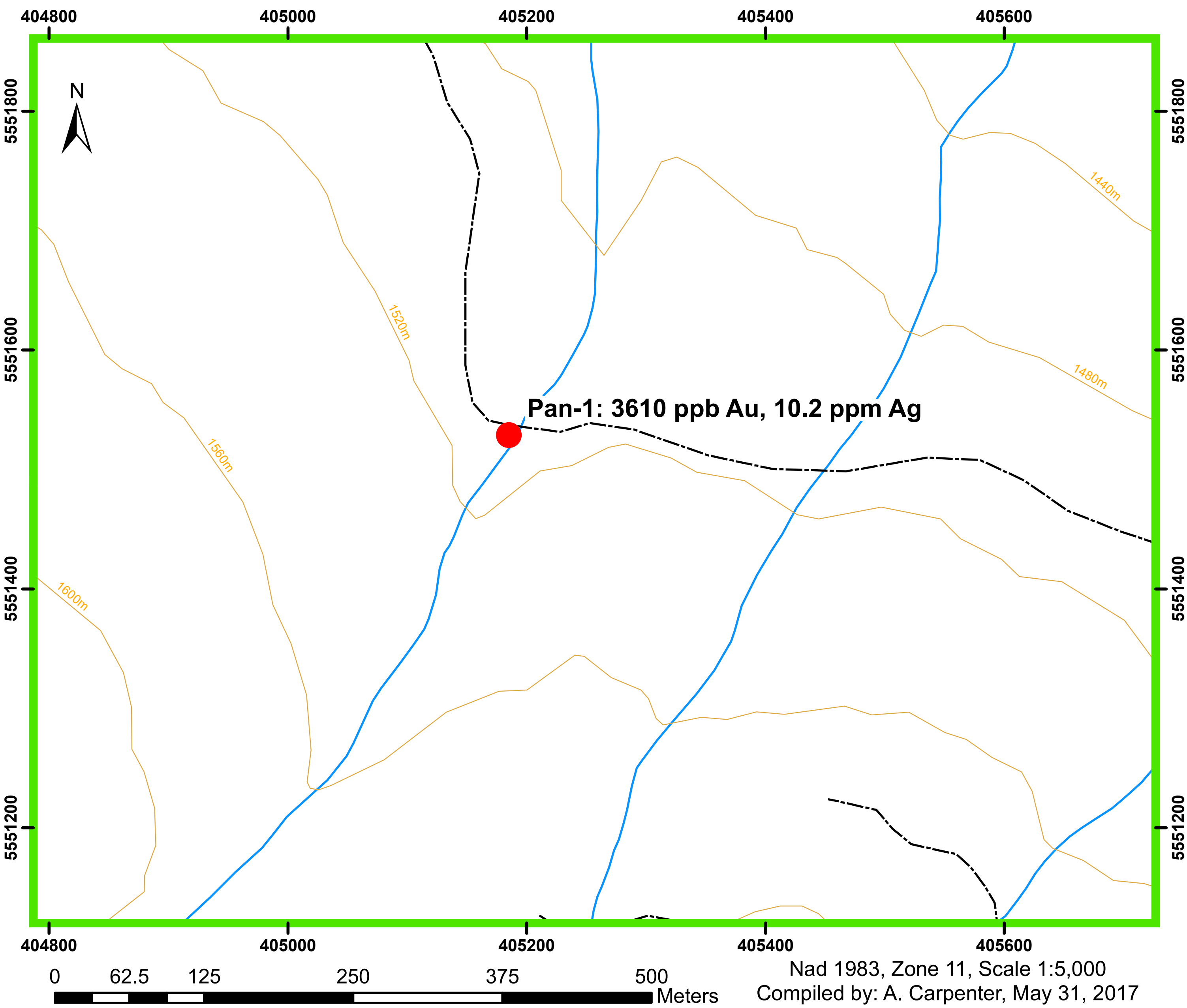


Figure 6
Cayenne Capital Corp-Lode Star Gold Project
2016 Geochemical Assay Results
Pan-Concentrate Sample

Legend

- Pan Concentrate Sample
- Rivers
- Swamp
- Lakes
- Load Star Claims
- Forest Service Roads



Nad 1983, Zone 11, Scale 1:5,000
Compiled by: A. Carpenter, May 31, 2017

7.5 Petrographic Work

Nine samples were collected for petrographic analysis during the 2016 sampling program conducted on the Lode Star Claims. These samples were collected to characterize rock types and alteration encountered during mapping and sampling. Hand samples of representative rock types were shipped to Vancouver Petrographics in Langley, B.C., where thin sections were prepared and analyzed. A Summary of the samples taken from the petrographic report are below:

Three of the samples (705, 706, 711) were samples of Au bearing quartz vein from the Lode Star West Zone. This vein was initially sampled during the 2015 program. A Summary of the samples can be found below (Kikauka, 2016, Colombo, 2016):

Table 7: Summary of 2016 Petrographic Samples

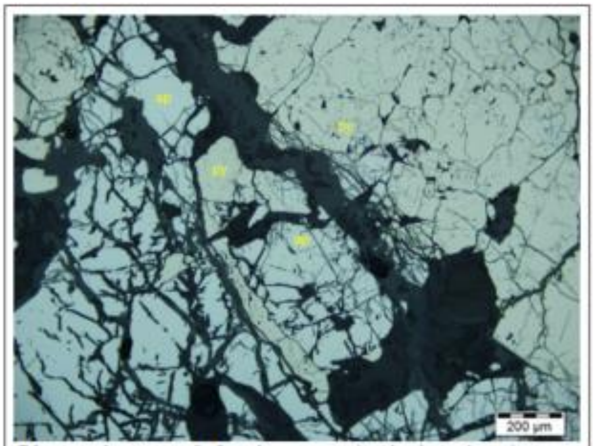
Sample ID	Easting UTM NAD 83	Northing UTM NAD 83	Sample Type	Rock type (From Petro Report)	Alteration (From Petro Report)	Au ppb	Cu ppm
705	407618	5553201	float (angular)	Silver-bearing(?) quartz vein		18840	703
706	407604	5553104	outcrop	Brecciated quartz vein		8200	266
711	406569	5553656	outcrop	Brecciated quartz-arsenopyrite-pyrite vein		15500	347
767	404805	5551332	float (angular)	Microdiorite(?); Quartz vein; Calcite vein and veinlets	calcite: weak to moderate within the microdiorite; clay(?): weak to moderate within the groundmass of the microdiorite	20	42
768	404451	5551064	float (angular)	Quartz-calcite vein		6	30
769	404609	5551060	outcrop	Meta-microdiorite(?); Quartz-calcite-albite-white mica-pyrrhotite-pyrite veins and infill	carbonate (calcite?): moderate to strong; pyrrhotite-iron oxides: weak; pyrite-chalcopyrite: subtle	23	61
770	404661	5551036	float (angular)	Microdiorite(?); Quartz-calcite-albite- pyrrhotite infill		47	24

Sample ID	Easting UTM NAD 83	Northing UTM NAD 83	Sample Type	Rock type (From Petro Report)	Alteration (From Petro Report)	Au ppb	Cu ppm
776	404360	5551513	float (angular)	Schist; Carbonate-clay alteration zone	carbonate-clay: moderate to strong: chlorite-quartz-K-feldspar: weak	48	100
20889	405365	5551783	float (angular)	Quartz vein		2	9

Samples 705, 706, and 711 were of deformed polygonal quartz. These samples contained irregular shear zones of recrystallized quartz. Arsenopyrite, silver, and pyrite after chalcopyrite were observed in the samples (Colombo, 2016).

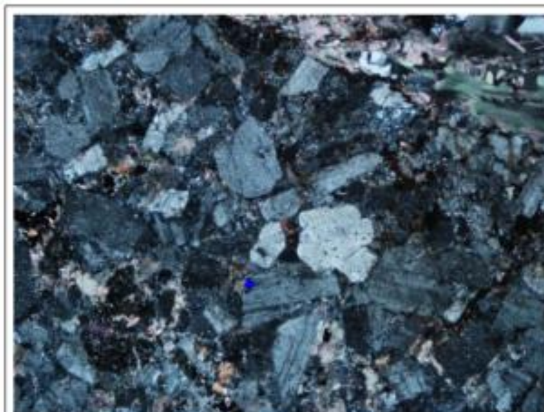
The remainder of the samples were collected from the Gold Star claim, and assay results show them to be unmineralized. Petrographic work identified a number of these samples as a meta-microdiorite. These samples were mapped during the 2016 program as phyllite/quartzite, and the results of the petrographic report may indicate that intrusive host rock may be more common in the southern portion of the property than previously thought.

Figure 13: Sample 711 Quartz vein with 15.5 g/t Au



***Photomicrograph 3c**: Arsenopyrite (ap) and pyrite (py) are intergrown and fractured within the sulphide-rich domain. Plane polarized reflected light.*

Figure 14: Sample 767- microdiorite



***Photomicrograph 4a**: Microdiorite—subhedral crystals of plagioclase are densely packed and define a medium-grained granular microstructure. Crossed Nicols transmitted light.*

The full petrographic report can be viewed in Appendix VI of this report.

8.0 DISCUSSION AND CONCLUSIONS

During the 2016 exploration program on the Lode Star property, geological mapping, and geochemical sampling was conducted within mineral claims 1036571, 1039166 and 1044860. Geological mapping was completed over 8 hectares at 1:2,500 scale, and over 200 hectares at 1:10,000 scale. A total of 110 samples were collected throughout the program: 58 rock samples, consisting of 27 outcrop samples and 31 angular float samples , were collected for ICP; 9 rock samples collected for petrographic analysis, 42 soil samples for ICP analysis, and one pan-concentrate sample for ICP analysis.

The main objectives of the geological mapping and geochemical sampling were to follow up historical Au-As soil anomalies identified by Columbia Yukon (Augsten, 2005a), to explore outcrop exposed by a new forestry roadcut, and to complete additional mapping and sampling around areas of Au bearing quartz veins identified during 2015 and historical exploration.

Three distinct areas within the Lode Star property were worked on during the 2016 exploration program. Lode Star west, an 8 hectare area covering newly exposed outcrop in a roadcut, and the location of a significant Au-As soil anomaly identified by Columbia Yukon; the Gold Star claim, a 200 hectare area in a newly acquired claim block covering another historically identified Au-As soil anomaly; and Monashee Star – Lode star southeast zone, located to the southeast of historically identified Au-As soil anomalies.

1:2,500 scale geological mapping was completed in the Lode Star west zone over 8 hectares. The west portion of the new road is underlain mainly by porphyritic phases of the Cretaceous Whatshan batholith. There are several 1-10m scale inclusions of hornfels and schists that are part of Upper Triassic Nicola & Slocan Group (metamorphosed sandstone, and siltstone. The east portion of the new road has limited exposure of outcrop that consists of metamorphosed andesitic volcanic rock. Geochemical sampling of steeply south-east dipping pyrite+arsenopyrite quartz veins hosted in fine grained feldspar porphyry returned significant Au results. Samples 753, 754, & 755 represent a 1.5m wide sampling zone which includes a 0.25m mineralize quartz vein. The weighted average of the assay results is 1.1g/t Au, and 3.34 g/t Ag. 2016 Petrographic work on similar veins shows deformed polygonal quartz intergrown with arsenopyrite crystals.

1:10,000 scale geological mapping was undertaken in the Gold Star claims over a 200 hectare area. The area is underlain by Devonian-Permian Cache Creek Group Harper Ranch Formation &

Triassic Nicola Group siltstone and limestone metamorphosed to phyllite and marble. The area is weakly mineralized, and quartz veining contains sparse sulphides consisting of pyrite and minor pyrrhotite. Outcrop exposure in this area is poor and limited to gullies. Historic trenching had uncovered quartz vein samples in faulted argillaceous siltstone with up to 254.92 g/t Au (Augsten, 2003b). The highest Au value from the 2016 program was sample 20884 with a value of 182ppb Au returned from a piece of Angular quartz float with box work textures; the bedrock source for the anomalies was not found during the 2016 program. 2016 Petrographic work identified several the samples from the Gold Star claim as Meta-microdiorite. This was not identified in mapping, and may indicate that phases of the Cretaceous Whatshan batholith are present in the southern portions of the claim block. One pan-concentrate sample was collected from this claim and returned a value of 3610 ppb Au, confirming anomalous gold on the property.

42 Soil samples were collected from the Monashee Star Claim, forming a south-east extension to the Holmes Lake Grid completed by Columbia Yukon in 2005 (Augsten, 2005a). The results of this survey indicate that the southern east-southeast trending anomaly identified by the historical survey continues to the south east, and is still open in that direction. Au values of up to 140ppb Au in soil were returned.

The results of the 2016 exploration program are encouraging. The indicate the presence of high grade gold bearing quartz veins coincident with historic Au-As soil anomalies, and that the anomalies are still open, and more extensive than originally identified. Further work to determine the extent and structural controls on this mineralization are recommended. Outcrop exposure in the southern Gold Star claim is extremely limited, and mostly of the geochemical samples were angular float. The results were lower than expected, when compared to the historic trench results. To properly explore this claim further trenching and drilling would be required.

APPENDIX I

REFERENCES

REFERENCES

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MINFILE: British Columbia Mineral Occurrence database.
RGS: British Columbia geochemical database
MAPPLACE: interactive site for geoscience data for British Columbia.

APPENDIX II

STATEMENT OF EXPENDITURES

Statement of Expenditures

Personnel / Position	Field Days	# Days	Rate	Sub Total	Total
Craig Lynes / Prospector	June 20-July 10	21 days	$550.00	$10,500.00	$10,500.00
Teresa Lynes / Field Tech	June 20-Jul 10	21 days	$450.00	$9,450.00	$9,450.00
Andris Kikauka /Geologist	June 20-Jul 5	17 days	$650.00	$11,050.00	$11,050.00
Craig Lynes / Prospector	Oct 06-09	4 days	$550.00	$2,200.00	$2,200.00
	Oct 14-16	3 days	$550.00	$1,650.00	$1,650.00
Teresa Lynes / Field Tech	Oct 06-09	4 days	$450.00	$1,800.00	$1,800.00
	Oct 14-16	3 days	$450.00	$1,350.00	$1,350.00
LABOUR					$38,000.00
EXPENCES					
Meals /Accommodation Travel- 69 person days	June 20- July 10 Oct 06-09 Oct 14-16	69 days 08 days 06 days	83 X $120.00		$9,960.00
Truck Rental 2 4x4 vehicles		42 Days	$150.00		$6,300.00
Fuel/oil/vehicle					$622.63
Assay Costs Pioneer Labs					$356.27
Petrographic charge					$2,021.00
Equipment rental- Radio's Chainsaws, Sat Phone etc.		28 days	$100.00		$2,800.00
Consumables Bags, Tags Batteries etc.					$52.80
Data Compilation and Reporting					$3,400.00
PROGRAM TOTAL					**$63,512.70**

APPENDIX III

STATEMENT OF QUALIFICATION

I, Alicia N. Carpenter, do hereby certify that:

1. I am a self-employed consulting geologist in the minerals exploration industry with offices at 818 Second St. West Revelstoke, B.C. V0E 2S0.

2. I graduated from the University of British Columbia, Vancouver, British Columbia, with a Honours Bachelor of Science degree in Earth and Ocean Science in 2007.

3. I am a member in good standing of the Association of Professional Engineers and Geologists of British Columbia.

4. I have practiced my profession with exploration companies in British Columbia and Nunavut, Canada for ten years.

5. I am the author of the '2016 Geological and Geochemical Assessment Report on the Lode Star Property', dated June, 2017.

6. The Assessment Report is based on mapping and sampling conducted by Craig A. Lynes of Rich River Resources, and Consulting Geologist Andris Kikauka, historical reports, and from information available from public files.

7. I have no interest in the property herein.

Dated at Revelstoke, British Columbia, Canada this 13th day of June, 2016.

____

Alicia N. Carpenter

I Craig A. Lynes am the co-author of this report and I have completed college courses in mineral exploration, mineralogy and earth sciences at Selkirk College in Castlegar BC.
I have worked in the mineral exploration industry as an independent prospector and exploration contractor since 1975.
I retain an excellent working relationship with many professional mining engineers, geologists, geophysicists, geochemists, geological technicians, prospectors, drillers and miners.

I have gained a great deal of my exploration knowledge from working very closely with many professional geologists over the years.

I also continually study the geology and deposition of numerous mineral deposit types.
I have conducted exploration programs and prospected in California, Nevada, Arizona and Utah USA, as well as in British Columbia, Alberta, Manitoba, Ontario and Yukon Territories Canada.

I'm the president and head prospector for Rich River Exploration Ltd., a contract mineral exploration service company that has been in continual successful operation since 1999...

Web-site: www.richriver.bc.ca

Respectfully Submitted by

Prospector

RICH RIVER EXPLORATION LTD.

SELKIRK COLLEGE

CASTLEGAR, B. C., CANADA

DEPARTMENT OF CONTINUING EDUCATION

THIS IS TO CERTIFY THAT

CRAIG LYNES

HAS PARTICIPATED IN

"MINERAL EXPLORATION FOR PROSPECTORS"

120 Hour Course

Sponsored by: Ministry of Mines & Petroleum Resources & Ministry of Education

May 2 - May 13, 1977

INSTRUCTOR/PROGRAM COORDINATOR

CHAIRMAN OF CONTINUING EDUCATION

APPENDIX IV

SAMPLE DETAILS TABLES

Sample ID	MTO tenure	Easting UTM NAD 83	Northing UTM NAD 83	Elev (m)	Sample Type	Zone Name	Lithology	Alteration	Mineralization	Comments	Strike	Dip	Width (cm)	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm	Sb ppm
751	1036571	406812	5553587	1598	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, pyrolusite, calcite	pyrite, chalcopyrite, arsenopyrite	old trench, poor outcrop exposure	145	83 NE	10	207	10	44	1.8	29	44	<2
752	1036571	406523	5553686	1534	outcrop	Lode Star West	phyllite, quartzite	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure	29	46 NW	10	358	1	19	5.8	38	81	<2
753	1036571	406572	5553652	1548	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure	28	73 SE	60	32	16	49	1.2	46	546	13
754	1036571	406573	5553652	1548	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite, arsenopyrite, galena, trace tetrahedrite	roadcut, good outcrop exposure	28	73 SE	25	19	948	7	12.2	6010	53781	337
755	1036571	406574	5553651	1548	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite, trace arsenopyrite	roadcut, good outcrop exposure	28	73 SE	65	39	25	51	1.9	180	229	15
756	1036571	406591	5553648	1550	float (angular)	Lode Star West	phyllite, quartzite	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, sub-crop				267	7	32	1.8	32	36	10
757	1036571	406622	5553633	1551	float (angular)	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure			15	710	6	25	4.4	17	83	<2
758	1036571	406623	5553637	1554	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite, calcite	pyrite	roadcut, good outcrop exposure	44	73 SE	16	23	19	35	1.3	25	40	15
759	1036571	406686	5553596	1566	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure	160	77 NE	30	252	16	48	2.7	7	21	19
760	1036571	406695	5553596	1566	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure	48	75 NW	100	138	10	25	1.3	25	15	18
761	1036571	406707	5553577	1571	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite	roadcut, good outcrop exposure	20	83 SE	20	113	14	54	1.6	24	76	13
762	1036571	406732	5553563	1575	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite, calcite	pyrite	roadcut, good outcrop exposure	0	74 E	15	79	24	251	4.0	365	149	19
763	1036571	406745	5553541	1575	outcrop	Lode Star West	f gr feldspar porphyry	quartz, chlorite, kaolinite, limonite, hematite	pyrite, arsenopyrite	roadcut, good outcrop exposure	42	80 SE	42	152	21	92	2.1	1300	718	21
764	1036571	406948	5553409	1599	outcrop	Lode Star West	andesitic greenstone	quartz, chlorite, limonite, hematite	pyrite	roadcut, good outcrop exposure	33	76 SE	9	40	12	44	.8	10	15	12
765	1039166	407463	5552377	1419	float (angular)	Lode Star SE	andesitic greenstone	quartz, chlorite, limonite	pyrite, pyrrhotite	no outcrop				135	9	46	1.8	33	19	16
766	1039166	407457	5552424	1406	float (angular)	Lode Star SE	andesitic greenstone	quartz, chlorite, limonite	pyrite, pyrrhotite	no outcrop				12	2	11	.6	21	4	11
767	1044860	404805	5551332	1619	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, sericite, limonite	pyrite	old trench, no outcrop exposure				42	1	45	.7	20	11	<2
768	1044860	404451	5551064	1653	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	old borrow pit, some outcrop				30	9	45	1.0	6	46	4
769	1044860	404609	5551060	1631	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	creek outcrop	160	63 W	8	61	17	147	1.2	23	36	13
770	1044860	404661	5551036	1633	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite, trace arsenopyrite	no outcrop				24	20	85	1.0	47	216	18
771	1044860	404090	5552101	1592	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				8	6	19	.9	5	9	11
772	1044860	404011	5551986	1640	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				10	15	69	1.2	8	16	8
773	1044860	404016	5552000	1635	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				11	7	10	1.0	3	8	15
774	1044860	404512	5551346	1653	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				14	20	56	1.2	5	18	4
775	1044860	404440	5551436	1662	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				8	9	17	.2	38	5	8
776	1044860	404360	5551513	1662	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, sericite limonite	pyrite	no outcrop				100	2	42	.7	48	94	9
777	1044860	404549	5551141	1637	float (angular)	Gold Star	hyllite, quartzite, greenstor	quartz, chlorite, limonite, hematite	pyrite	no outcrop				110	9	47	1.5	4	29	26
778	1044860	405021	5551221	1564	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				22	11	36	.3	5	31	15
779	1044860	405074	5551312	1562	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				11	18	14	.4	3	5	5
780	1044860	404948	5551810	1521	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				7	35	32	.5	2	16	13
781	1044860	404984	5551232	1609	float (angular)	Gold Star	andesitic greenstone	quartz, chlorite, limonite	pyrite	no outcrop				58	9	65	.3	5	35	16
782	1044860	405294	5551277	1589	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				119	1	21	.4	110	11	12
783	1044860	405423	5551316	1574	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop				22	2	57	.2	7	13	10
784	1044860	405803	5551359	1512	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite, siderite	pyrite	no outcrop				16	9	37	.8	16	19	17
785	1044860	405801	5552106	1397	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite, graphite	pyrite	no outcrop	12	71 E	5	40	6	52	.9	60	24	14
786	1044860	405803	5552100	1396	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop	28	80 NW	8	12	1	14	.3	4	16	9
787	1044860	405805	5552084	1395	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	no outcrop	45	85 NW	12	13	6	27	.2	3	18	8
788	1044860	405801	5551694	1437	float (angular)	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite, trace chalcopyrite	no outcrop				175	4	50	2.0	34	19	9
789	1044860	405971	5551578	1444	outcrop	Gold Star	phyllite, quartzite	quartz, chlorite, limonite	pyrite	creek outcrop	20	80 E	15	39	3	39	.3	3	31	20
20873	1036571	406480	5553701		outcrop	Lode Star West	f gr feldspar porphyry							307	4	28	4.6	1520	2065	27
20874	1036571	406498	5553707		outcrop	Lode Star West	f gr feldspar porphyry	artz, chlorite, kaolinite, limonite, hemat	pyrite, chalcopyrite, arsenopyrite	outcrop			10	29	91	23	2.4	1280	3481	16
20875	1036571	406749	5553594		float (angular)	Lode Star West	f gr feldspar porphyry		massive sulphide	old excavator trench				406	27	49	4.7	4400	435	28
20876	1036571	406755	5553599		outcrop	Lode Star West	f gr feldspar porphyry	artz, chlorite, kaolinite, limonite, hemat	pyrite	small 1-3 cm qtz veins in feld porph			2	269	71	37	9.8	1500	1681	34

Sample ID	MTO tenure	Easting UTM NAD 83	Northing UTM NAD 83	Elev (m)	Sample Type	Zone Name	Lithology	Alteration	Mineralization	Comments	Strike	Dip	Width (cm)	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm	Sb ppm
20877	1036571	407019	5553462		outcrop	Lode Star West	andesitic greenstone	quartz, chlorite, limonite	pyrite	minor rusty zone with 4 cm Qtz Vein in altered Volc Rx.			3	216	10	30	0.8	60	76	25
20878	1044860	404145	5552003		outcrop	Gold Star	qtz vein		pyrite	30cm Qtz Vein cutting Feld Porph in otcp.			30	12	4	8	0.2	22	5	13
20879	1044860	404494	5551398		float (angular)	Gold Star	qtz vein		pyrite	Ang. Qtz Float				8	9	11	0.4	10	7	9
20880	1044860	404381	5551469		float (angular)	Gold Star	qtz vein		pyrite	Qtz-Carb Vein Subcrop in skid trail				9	2	23	0.2	44	5	11
20881		403542	5551912		float (angular)	Gold Star	qtz vein		pyrite	Subcrop in old skid trail.				6	7	18	0.5	60	118	10
20882	1044860	403837	5551754		float (angular)	Gold Star	qtz vein		pyrite	Subcrop in skid trail.				10	12	36	0.3	160	14	9
20883	1044860	405149	5551642		outcrop	Gold Star	qtz vein	quartz, chlorite, limonite	pyrite, chalcopyrite, arsenopyrite	White Qtz Vein in road ditch				14	11	20	0.4	54	6	12
20884	1044860	405155	5551660		float (angular)	Gold Star	qtz vein	quartz, chlorite, limonite	pyrite	Angular boulder, boxwork textures.				2	3	3	0.5	182	10	7
20885	1044860	405513	5551509		float (angular)	Gold Star	qtz vein	quartz, chlorite, limonite	pyrite, chalcopyrite	30-40 cm white Qtz Vein rusty leached pockets			35	129	8	133	0.7	12	33	146
20886	1044860	405153	5551579		outcrop	Gold Star	limestone	calcite	pyrrhotite, arsenopyrite, pyrite	outcrop black carbonaceous seds				104	1	249	0.5	3	11	<2
20887	1044860	406717	5551005		outcrop	Gold Star	limestone	quartz, limonite	pyrrhotite, pyrite	Limestone Breccia				39	9	70	0.3	2	22	9
20888	1044860	405550	5551775		outcrop	Gold Star	qtz vein	quartz	pyrite, pyrrhotite, chalcopyrite	Ang Qtz Subcrop in creek				34	3	34	0.2	3	52	11
20889	1044860	405365	5551783		float (angular)	Gold Star	qtz vein	limonite	pyrite	Angular float, vuggy rusty boxwork textures.				9	9	15	0.3	2	30	9
20890	1044860	405420	5551784		float (angular)	Gold Star	argillite		pyrite	hydrothermally Altered bleached Argillite with stringers, blebs semi massive Pyrite.				60	7	42	0.8	6	38	30
20891	1044860	405411	5551778		float (angular)	Gold Star	argillite		pyrite	bleached hydrothermally altered Argillite/ siltstone with stringers, pods fine grnd pyrite				83	8	78	1.8	21	23	29

Lode Star Zone	Northing UTM NAD 83	Easting UTM NAD 83	Depth	Colour	Texture	Organics	Horizon	Comments	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	As ppm
SE extension	5552250	407200	25	RB	silt, sand	low	B		28	22	59	1.2	5	29
SE extension	5552250	407225	30	RB	silt, sand	low	B		53	13	48	.8	115	50
SE extension	5552250	407250	20	RB	silt, sand	low	B		52	22	168	1.1	13	44
SE extension	5552250	407275	20	RB	silt, sand	low	B		46	20	151	1.4	18	37
SE extension	5552250	407300	25	RB	silt, sand	low	B		32	19	101	1.2	21	5
SE extension	5552250	407325	25	RB	silt, sand	low	B		53	20	97	.8	29	96
SE extension	5552250	407350	30	RB	silt, sand	low	B		46	16	72	.5	35	86
SE extension	5552250	407375	20	RB	silt, sand	low	B		37	15	68	.4	22	74
SE extension	5552250	407400	30	RB	silt, sand	low	B		51	17	81	.8	50	119
SE extension	5552250	407425	20	RB	silt, sand	low	B		111	23	113	1.0	140	92
SE extension	5552250	407450	20	RB	silt, sand	low	B		53	25	85	.7	15	72
SE extension	5552250	407475	20	RB	silt, sand	low	B		56	18	63	.8	23	53
SE extension	5552250	407500	20	RB	silt, sand	low	B	Barnes Ck	62	19	52	.6	67	88
SE extension	5552300	407425	20	RB	silt, sand	low	B		31	29	77	.8	27	23
SE extension	5552300	407450	20	RB	silt, sand	low	B		82	30	236	.7	22	57
SE extension	5552300	407475	20	RB	silt, sand	low	B		47	21	67	.9	90	74
SE extension	5552300	407500	20	RB	silt, sand	low	B		46	17	84	.7	51	87
SE extension	5552300	407525	30	RB	silt, sand	low	B		61	9	70	.4	50	50
SE extension	5552300	407550	20	RB	silt, sand	low	B	Barnes Ck	262	20	63	1.5	21	25
SE extension	5552400	407525	15	RB	silt, sand	low	B		64	21	96	.7	2	23
SE extension	5552400	407550	20	RB	silt, sand	low	B		29	14	77	.6	3	25
SE extension	5552400	407575	20	RB	silt, sand	low	B	Barnes Ck	30	13	101	.5	48	24
SE extension	5552500	407525	20	RB	silt, sand	low	B		72	39	94	.7	44	113
SE extension	5552500	407550	25	RB	silt, sand	low	B		45	26	150	1.0	12	114
SE extension	5552500	407575	25	RB	silt, sand	low	B		65	39	149	1.4	36	34
SE extension	5552500	407600	30	RB	silt, sand	low	B		34	31	112	1.2	19	24
SE extension	5552600	407575	20	RB	silt, sand	low	B		29	45	74	1.3	71	41
SE extension	5552600	407600	25	RB	silt, sand	low	B		38	21	59	1.1	110	122
SE extension	5552600	407625	25	RB	silt, sand	low	B		45	26	77	.7	4	41
SE extension	5552600	407650	30	RB	silt, sand	low	B		38	20	76	.8	5	47
SE extension	5552600	407675	20	RB	silt, sand	low	B		297	31	362	2.6	50	127
SE extension	5552600	407700	30	RB	silt, sand	low	B		30	20	123	.8	60	33
SE extension	5552700	407700	20	RB	silt, sand	low	B		59	25	214	.9	30	45
SE extension	5552700	407725	15	RB	silt, sand	low	B		39	20	177	.8	33	21
SE extension	5552700	407750	20	RB	silt, sand	low	B		34	29	153	1.1	34	50
SE extension	5552700	407775	20	RB	silt, sand	low	B		48	35	187	1.0	3	41
SE extension	5552700	407800	25	RB	silt, sand	low	B		45	38	137	1.1	5	51
SE extension	5552800	407700	20	RB	silt, sand	low	B		36	27	85	1.0	6	36
SE extension	5552800	407725	25	RB	silt, sand	low	B		24	26	71	.4	4	18
SE extension	5552800	407750	20	RB	silt, sand	low	B		79	35	162	.7	30	115
SE extension	5552800	407775	20	RB	silt, sand	low	B		88	27	182	.9	8	102
SE extension	5552800	407800	25	RB	silt, sand	low	B		18	24	67	1.8	14	18

Sample Number	Easting UTM NAD 83	Northing UTM NAD 83	Au ppb	Ag ppm	As ppm
Pan-1	405185	5551529	3610	10.2	36

APPENDIX V

ASSAY CERTIFICATES

PIONEER LABORATORIES INC. **#103-2691 VISCOUNT WAY RICHMOND, BC CANADA V6V 2R5** **TELEPHONE (604) 231-8165**

G E O C H E M I C A L A N A L Y S I S C E R T I F I C A T E

RICH RIVER EXPLORATION LTD.

Multi-element ICP Analysis - 0.500 gram sample is digested with 3 ml of aqua regia, diluted to 10 ml with water. This leach is partial for Al, B, Ba, Cr, Fe, Mg, Mn, Na, P, S, Sn, Ti and limited for Na and K. *Au Analysis- 20 gram sample is digested with aqua regia, MIBK extracted, and is finished by AA or graphite furnace AA to 1 ppb detection.

Project: Lode Star
Sample Type: Soils/Silt/Rocks

Analyst ______________
Report No. 2161577
Date: August 11, 2016

ELEMENT SAMPLE	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sn ppm	Sr ppm	Te ppm	Ti %	Tl ppm	V ppm	Zn ppm	*Au ppb
LS L-5552250N 407200E	1.2	2.97	29	<5	77	<10	.20	1	7	22	28	2.94	.02	.25	204	2	.03	12	.02	22	.04	6	<2	18	<5	.23	<5	59	59	5
LS L-5552250N 407225E	.8	3.88	50	<5	50	<10	.70	2	13	14	53	2.66	.05	.24	292	2	.04	21	.15	13	.03	<2	<2	59	<5	.15	<5	37	48	115
LS L-5552250N 407250E	1.1	3.56	44	<5	174	<10	.14	4	14	31	52	4.34	.04	.62	293	3	.04	28	.18	22	.02	<2	<2	14	<5	.21	<5	64	168	13
LS L-5552250N 407275E	1.4	3.89	37	<5	183	<10	.09	5	16	27	46	3.80	.03	.51	638	4	.04	26	.19	20	.03	<2	<2	9	<5	.19	<5	51	151	18
LS L-5552250N 407300E	1.2	3.00	5	<5	195	<10	.10	3	12	20	32	3.43	.04	.40	406	2	.05	15	.18	19	.01	<2	<2	11	<5	.21	<5	56	101	21
LS L-5552250N 407325E	.8	4.46	96	<5	119	<10	.34	2	16	23	53	3.80	.05	.94	275	3	.04	23	.11	20	.05	19	<2	32	<5	.27	<5	75	97	29
LS L-5552250N 407350E	.5	3.85	86	<5	74	<10	.56	1	12	26	46	3.04	.04	.43	358	2	.04	24	.10	16	.01	26	<2	47	<5	.19	<5	53	72	35
LS L-5552250N 407375E	.4	3.46	74	<5	94	<10	.40	3	15	52	37	3.37	.04	.39	376	5	.04	45	.12	15	.04	100	<2	30	<5	.23	<5	65	68	22
LS L-5552250N 407400E	.8	3.35	119	<5	115	<10	.42	2	16	28	51	3.42	.05	.37	417	3	.04	31	.11	17	.04	40	<2	36	<5	.25	<5	72	81	50
LS L-5552250N 407425E	1.0	4.61	92	<5	67	<10	.60	3	18	40	111	4.28	.06	.86	328	4	.04	46	.14	23	.03	<2	<2	52	<5	.29	<5	102	113	140
LS L-5552250N 407450E	.7	3.22	72	<5	186	<10	.82	2	11	21	53	2.69	.07	.42	1041	2	.04	22	.17	25	.13	15	<2	64	<5	.16	<5	48	85	15
LS L-5552250N 407475E	.8	3.61	53	<5	56	<10	.21	3	12	24	56	3.42	.03	.29	337	5	.04	19	.16	18	.06	6	<2	18	<5	.25	<5	59	63	23
LS L-5552250N 407500E	.6	4.50	88	<5	42	<10	1.63	1	17	21	62	3.25	.10	.43	308	4	.03	18	.22	19	.05	<2	<2	127	<5	.08	<5	45	52	67
LS L-5552300N 407425E	.8	4.40	23	<5	70	<10	.10	3	9	18	31	2.68	.03	.26	410	3	.04	10	.15	29	.04	9	<2	9	<5	.20	<5	43	77	27
LS L-5552300N 407450E	.7	3.28	57	<5	150	<10	.19	2	19	31	82	4.10	.06	.77	719	3	.04	35	.17	30	.01	7	<2	16	<5	.18	<5	59	236	22
LS L-5552300N 407475E	.9	3.57	74	<5	80	<10	.44	4	13	28	47	3.67	.05	.36	294	4	.04	29	.14	21	.02	18	<2	34	<5	.20	<5	71	67	90
LS L-5552300N 407500E	.7	4.34	87	<5	117	<10	.31	3	12	22	46	3.22	.04	.37	307	3	.04	19	.15	17	.04	<2	<2	27	<5	.25	<5	62	84	51
LS L-5552300N 407550E	.4	2.69	50	<5	68	<10	1.09	1	14	26	61	2.96	.08	.75	343	2	.04	24	.11	9	.01	7	<2	93	<5	.16	<5	61	70	50
LS L-5552300N 407525E	1.5	4.27	25	<5	47	<10	1.78	2	27	8	262	6.76	.12	.52	321	3	.01	19	.03	20	.24	33	<2	175	<5	.11	<5	71	63	21
LS L-5552400N 407525E	.7	4.24	23	<5	89	<10	.62	3	20	30	64	4.02	.05	.52	483	2	.04	28	.13	21	.05	<2	<2	49	<5	.25	<5	89	96	2
LS L-5552400N 407550E	.6	3.56	25	<5	111	<10	.61	2	8	16	29	3.37	.04	.36	253	3	.04	9	.17	14	.07	<2	<2	44	<5	.21	<5	59	77	3
LS L-5552400N 407575E	.5	1.52	24	<5	158	<10	.57	1	10	30	30	2.29	.15	.80	536	2	.06	27	.10	13	.02	<2	<2	35	<5	.16	<5	36	101	48
LS L-5552500N 407525E	.7	4.77	113	<5	84	<10	.40	3	19	29	72	3.62	.04	.51	386	3	.04	23	.16	39	.06	<2	<2	36	<5	.22	<5	88	94	44
LS L-5552500N 407550E	1.0	4.54	114	<5	133	<10	.92	4	14	27	45	3.33	.06	.70	1596	3	.05	22	.12	26	.05	<2	<2	47	<5	.29	<5	71	150	12
LS L-5552500N 407575E	1.4	3.78	34	<5	151	<10	.14	5	18	29	65	3.91	.04	.52	614	5	.04	23	.24	39	.05	<2	<2	11	<5	.17	<5	56	149	36
LS L-5552500N 407600E	1.2	3.87	24	<5	116	<10	.07	4	12	23	34	3.17	.03	.37	476	3	.04	13	.32	31	.02	<2	<2	7	<5	.18	<5	45	112	19
LS L-5552600N 407575E	1.3	4.10	41	<5	69	<10	.32	3	11	22	29	3.14	.04	.38	247	2	.04	14	.18	45	.05	<2	<2	28	<5	.33	<5	58	74	71
LS L-5552600N 407600E	1.1	4.24	122	<5	99	<10	.28	2	15	24	38	3.38	.04	.44	348	3	.04	13	.14	21	.04	<2	<2	26	<5	.32	<5	72	59	110
LS L-5552600N 407625E	.7	4.10	41	<5	98	<10	.40	1	18	23	45	3.05	.05	.45	1217	2	.04	12	.27	26	.04	14	<2	36	<5	.28	<5	73	77	4
LS L-5552600N 407650E	.8	4.56	47	<5	128	<10	.26	2	14	24	38	3.30	.06	.51	595	3	.04	14	.18	20	.04	<2	<2	29	<5	.36	<5	70	76	5
LS L-5552600N 407675E	2.6	3.27	127	<5	318	<10	1.27	3	27	60	297	4.62	.22	1.18	1873	4	.04	102	.13	31	.09	31	<2	61	<5	.19	<5	76	362	50
LS L-5552600N 407700E	.8	2.43	33	<5	218	<10	.22	2	9	19	30	2.79	.04	.39	578	3	.04	15	.10	20	.05	<2	<2	14	<5	.18	<5	44	123	60
LS L-5552700N 407700E	.9	2.61	45	<5	245	<10	.12	3	19	29	59	4.11	.05	.63	697	5	.04	30	.16	25	.04	<2	<2	13	<5	.16	<5	59	214	30
LS L-5552700N 407725E	.8	2.98	21	<5	243	<10	.28	2	13	25	39	3.38	.06	.48	509	4	.04	20	.14	20	.04	<2	<2	21	<5	.23	<5	51	177	33
LS L-5552700N 407750E	1.1	2.70	50	<5	160	<10	.09	4	14	24	34	3.62	.03	.44	361	3	.04	18	.18	29	.05	<2	<2	8	<5	.14	<5	55	153	34
LS L-5552700N 407775E	1.0	3.04	41	<5	180	<10	.12	3	11	22	48	2.86	.04	.42	417	4	.04	21	.20	35	.05	7	<2	9	<5	.12	<5	41	187	3
LS L-5552700N 407800E	1.1	3.21	51	<5	138	<10	.08	2	9	20	45	3.17	.03	.38	406	2	.04	12	.16	38	.06	<2	<2	7	<5	.15	<5	47	137	5
LS L-5552800N 407700E	1.0	4.08	36	<5	145	<10	.24	3	14	19	36	3.30	.04	.42	1166	3	.04	9	.17	27	.07	<2	<2	27	<5	.22	<5	61	85	6
LS L-5552800N 407725E	.4	4.57	18	<5	99	<10	.06	1	8	8	24	1.74	.02	.12	580	2	.04	8	.23	26	.04	<2	<2	6	<5	.23	<5	25	71	4
LS L-5552800N 407750E	.7	3.46	115	<5	116	<10	.24	2	21	25	79	3.73	.06	.63	837	4	.04	30	.14	35	.05	4	<2	17	<5	.21	<5	57	162	30

ELEMENT SAMPLE	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sn ppm	Sr ppm	Te ppm	Ti %	Tl ppm	V ppm	Zn ppm	*Au ppb
LS L-5552800N 407775E	.9	3.49	102	<5	168	<10	.42	2	24	36	88	3.80	.09	.82	1303	2	.04	42	.13	27	.05	<2	<2	28	<5	.22	<5	67	182	8
LS L-5552800N 407800E	1.8	2.47	18	<5	145	<10	.13	1	4	12	18	2.41	.04	.16	290	2	.03	6	.03	24	.04	4	<2	10	<5	.19	<5	35	67	14
Pan-1 (Silt)	10.2	.77	36	<5	61	<10	.34	6	8	25	37	2.56	.04	.57	369	4	.03	24	.11	13	.08	12	<2	23	<5	.06	<5	31	94	3610
751 (Rock)	1.8	1.00	44	<5	66	<10	.73	3	53	47	207	4.62	.07	.40	289	11	.07	14	.03	10	2.09	<2	<2	60	<5	.17	<5	53	44	29
752 (Rock)	5.8	.46	81	<5	13	<10	.47	2	376	15	358	19.62	.01	.23	135	16	.03	144	.02	1	12.35	<2	<2	11	<5	.06	<5	10	19	38
753 (Rock)	1.2	1.45	546	<5	240	<10	.83	1	16	57	32	3.05	.22	.98	346	1	.05	8	.06	16	.16	13	<2	69	<5	.26	<5	84	49	46
754 (Rock)	12.2	.28	53781	<5	38	<10	.10	3	24	35	19	11.00	.05	.01	38	3	.01	2	.08	948	4.55	337	<2	15	<5	.03	<5	1	7	6010
755 (Rock)	1.9	1.61	229	<5	79	<10	.81	2	15	39	39	3.29	.09	1.31	479	1	.02	10	.07	25	.09	15	<2	52	<5	.20	<5	82	51	180
756 (Rock)	1.8	1.18	36	<5	67	<10	1.16	1	43	28	267	4.69	.04	.37	224	20	.12	25	.06	7	2.11	10	<2	63	<5	.15	<5	33	32	32
757 (Rock)	4.4	.39	83	<5	10	<10	.70	3	208	27	710	12.30	.01	.17	81	10	.02	35	.08	6	9.93	<2	<2	24	<5	.06	<5	19	25	17
758 (Rock)	1.3	1.02	40	<5	104	<10	.40	1	9	74	23	2.09	.10	.88	310	2	.03	12	.02	19	.13	15	<2	24	<5	.22	<5	58	35	25
759 (Rock)	2.7	1.74	21	<5	48	<10	1.62	2	33	38	252	6.96	.05	.43	357	5	.03	19	.07	16	1.39	19	<2	109	<5	.15	<5	44	48	7
760 (Rock)	1.3	.75	15	<5	25	<10	1.19	1	23	33	138	2.57	.04	.33	191	4	.04	27	.08	10	1.26	18	<2	44	<5	.15	<5	22	25	25
761 (Rock)	1.6	1.51	76	<5	214	<10	.86	2	16	41	113	5.29	.18	1.25	629	1	.04	8	.15	14	.28	13	<2	56	<5	.22	<5	102	54	24
762 (Rock)	4.0	1.48	149	<5	232	<10	.70	3	21	61	79	5.05	.21	1.34	513	3	.03	11	.14	24	.13	19	<2	39	<5	.22	<5	101	251	365
763 (Rock)	2.1	2.22	718	<5	158	<10	1.48	4	57	51	152	8.00	.23	2.24	957	4	.02	79	.41	21	1.80	21	<2	56	<5	.21	<5	165	92	1300
764 (Rock)	.8	1.14	15	<5	9	<10	1.47	1	6	52	40	1.22	.02	.41	208	3	.02	4	.05	12	.08	12	<2	33	<5	.24	<5	22	44	10
765 (Rock)	1.8	1.69	19	<5	48	<10	1.85	2	14	46	135	4.08	.09	.54	320	3	.09	13	.07	9	1.35	16	<2	42	<5	.29	<5	70	46	33
766 (Rock)	.6	.03	4	<5	7	<10	.11	1	3	1	12	.05	.00	.02	19	1	.01	3	.02	2	.12	11	<2	4	<5	.02	<5	2	11	21
767 (Rock)	.7	.29	11	<5	206	<10	4.56	2	5	24	42	1.36	.07	.31	643	1	.04	2	.08	1	.25	<2	<2	192	<5	.02	<5	6	45	20
768 (Rock)	1.0	.55	46	<5	92	<10	.44	3	4	102	30	1.34	.06	.51	292	1	.02	7	.04	9	.16	4	<2	54	<5	.01	<5	18	45	6
769 (Rock)	1.2	.29	36	<5	156	<10	4.04	4	9	47	61	3.08	.10	1.20	981	1	.04	13	.14	17	.49	13	<2	397	<5	.01	<5	12	147	23
770 (Rock)	1.0	.67	216	<5	136	<10	6.85	3	5	48	24	2.45	.05	1.02	1059	1	.02	4	.05	20	.16	18	<2	541	<5	.02	<5	35	85	47
771 (Rock)	.9	.24	9	<5	52	<10	.27	2	2	91	8	.38	.10	.14	139	2	.01	3	.02	6	.02	11	<2	18	<5	.04	<5	12	19	5
772 (Rock)	1.2	.13	16	<5	82	<10	.09	3	4	102	10	1.80	.02	.03	700	1	.04	12	.06	15	.03	8	<2	9	<5	.01	<5	6	69	8
773 (Rock)	1.0	.03	8	<5	6	<10	.03	4	2	165	11	.25	.02	.03	28	1	.01	4	.03	7	.02	15	<2	2	<5	.02	<5	8	10	3
774 (Rock)	1.2	.07	18	<5	55	<10	.22	3	3	130	14	1.54	.02	.04	287	1	.02	6	.04	20	.05	4	<2	16	<5	.03	<5	7	56	5
775 (Rock)	.2	.05	5	<5	23	<10	.08	1	2	151	8	.63	.01	.04	230	2	.01	5	.02	9	.04	8	<2	7	<5	.03	<5	5	17	38
776 (Rock)	.7	.46	94	<5	285	<10	.75	2	12	47	100	4.44	.15	.39	313	3	.05	18	.09	2	.96	9	<2	51	<5	.12	<5	38	42	48
777 (Rock)	1.5	1.07	29	<5	311	<10	.15	3	6	50	110	2.76	.25	.81	246	4	.04	13	.08	9	.16	26	<2	18	<5	.02	<5	32	47	4
778 (Rock)	.3	1.27	31	<5	314	<10	1.78	1	5	109	22	1.30	.32	.65	462	3	.14	14	.04	11	.19	15	<2	91	<5	.18	<5	34	36	5
779 (Rock)	.4	.10	5	<5	43	<10	1.34	2	3	108	11	.41	.02	.02	632	2	.03	4	.02	18	.01	5	<2	140	<5	.03	<5	2	14	3
780 (Rock)	.5	.05	16	<5	24	<10	.05	1	2	129	7	.81	.01	.04	342	3	.01	5	.01	35	.03	13	<2	5	<5	.02	<5	3	32	2
781 (Rock)	.3	1.04	35	<5	200	<10	2.09	2	11	52	58	2.49	.11	.90	472	2	.03	22	.06	9	.51	16	<2	162	<5	.03	<5	26	65	5
782 (Rock)	.4	.27	11	<5	27	<10	.46	3	2	141	119	.55	.03	.11	189	3	.04	5	.02	1	.02	12	<2	24	<5	.02	<5	7	21	110
783 (Rock)	.2	.14	13	<5	54	<10	.13	1	3	174	22	.74	.04	.02	319	2	.02	10	.03	2	.02	10	<2	11	<5	.04	<5	8	57	7
784 (Rock)	.8	.20	19	<5	125	<10	5.01	3	2	89	16	1.18	.05	.55	453	1	.01	10	.02	9	.10	17	<2	220	<5	.01	<5	8	37	16
785 (Rock)	.9	1.60	24	<5	121	<10	.94	2	11	44	40	2.66	.12	.86	588	2	.06	11	.09	6	.11	14	<2	91	<5	.20	<5	58	52	60
786 (Rock)	.3	.43	16	<5	15	<10	.44	1	3	93	12	.40	.03	.07	418	3	.02	2	.02	1	.01	9	<2	19	<5	.03	<5	10	14	4
787 (Rock)	.2	.79	18	<5	14	<10	1.03	2	2	83	13	.56	.02	.09	948	1	.01	6	.01	6	.02	8	<2	22	<5	.02	<5	13	27	3
788 (Rock)	2.0	1.43	19	<5	53	<10	.37	3	26	39	175	10.42	.11	1.17	471	3	.04	13	.12	4	5.41	9	<2	39	<5	.22	<5	64	50	34
789 (Rock)	.3	.26	31	<5	102	<10	7.40	1	2	61	39	1.63	.05	1.20	926	2	.02	15	.06	3	.37	20	<2	659	<5	.01	<5	11	39	3
20873 (Rock)	4.6	.45	2065	<5	106	<10	.24	4	18	27	307	20.13	.11	.33	382	12	.05	18	.19	4	2.26	27	<2	30	<5	.16	<5	71	28	1520
20874 (Rock)	2.4	.33	3481	<5	69	<10	.30	3	11	103	29	2.87	.08	.16	654	2	.01	7	.03	91	.05	16	<2	17	<5	.02	<5	18	23	1280
20875 (Rock)	4.7	1.00	435	<5	67	<10	.49	4	64	106	406	9.03	.09	.73	318	14	.03	27	.18	27	2.99	28	<2	34	<5	.18	<5	87	49	4400
20876 (Rock)	9.8	.81	1681	<5	109	<10	.50	5	37	86	269	7.18	.10	.60	258	9	.04	17	.21	71	1.90	34	<2	45	<5	.15	<5	77	37	1500
20877 (Rock)	.8	1.43	76	<5	23	<10	1.46	2	18	35	216	5.18	.06	.41	225	8	.02	15	.10	10	2.28	25	<2	61	<5	.16	<5	42	30	60
20878 (Rock)	.2	.08	5	<5	21	<10	.21	1	2	356	12	.54	.01	.02	72	2	.03	9	.01	4	.05	13	<2	6	<5	.01	<5	3	8	22
20879 (Rock)	.4	.05	7	<5	14	<10	.04	3	3	118	8	.47	.02	.04	169	3	.02	4	.02	9	.04	9	<2	3	<5	.02	<5	4	11	10
20880 (Rock)	.2	.12	5	<5	34	<10	.05	1	4	139	9	.62	.01	.05	234	2	.01	20	.01	2	.03	11	<2	2	<5	.04	<5	3	23	44

ELEMENT SAMPLE	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P %	Pb ppm	S %	Sb ppm	Sn ppm	Sr ppm	Te ppm	Ti %	Tl ppm	V ppm	Zn ppm	*Au ppb
20881 (Rock)	.5	.05	118	<5	14	<10	.23	3	2	109	6	.31	.01	.04	91	3	.03	5	.05	7	.01	10	<2	24	<5	.03	<5	2	18	60
20882 (Rock)	.3	.04	14	<5	98	<10	1.30	2	3	108	10	2.41	.02	.25	3630	2	.02	8	.06	12	.06	9	<2	143	<5	.02	<5	4	36	160
20883 (Rock)	.4	.07	6	<5	52	<10	.51	3	2	139	14	1.27	.03	.14	793	4	.03	9	.07	11	.01	12	<2	48	<5	.04	<5	4	20	54
20884 (Rock)	.5	.05	10	<5	8	<10	.11	4	3	72	2	1.02	.01	.03	6	2	.02	3	.01	3	.02	7	<2	5	<5	.02	<5	2	3	182
20885 (Rock)	.7	.04	33	<5	6	<10	.72	5	4	92	129	.66	.02	.26	274	3	.03	12	.02	8	.17	146	<2	60	<5	.02	<5	3	133	12
20886 (Rock)	.5	.29	11	<5	111	<10	.55	4	19	67	104	3.59	.08	.09	80	12	.06	48	.12	1	3.07	<2	<2	24	<5	.36	<5	38	249	3
20887 (Rock)	.3	1.50	22	<5	233	<10	8.66	2	11	66	39	2.31	.37	.79	1059	3	.17	28	.15	9	.66	9	<2	124	<5	.22	<5	62	70	2
20888 (Rock)	.2	.58	52	<5	157	<10	1.79	1	4	53	34	1.55	.06	.58	603	2	.04	9	.12	3	.60	11	<2	74	<5	.06	<5	32	34	3
20889 (Rock)	.3	.05	30	<5	12	<10	.29	2	2	141	9	.43	.01	.03	190	3	.01	4	.01	9	.02	9	<2	21	<5	.02	<5	3	15	2
20890 (Rock)	.8	1.49	38	<5	116	<10	.92	3	7	15	60	3.98	.12	.91	297	6	.05	5	.26	7	2.75	30	<2	183	<5	.30	<5	59	42	6
20891 (Rock)	1.8	1.90	23	<5	94	<10	.89	4	12	22	83	5.45	.11	1.50	445	8	.06	8	.20	8	3.01	29	<2	208	<5	.35	<5	71	78	21

APPENDIX VI

PETROGRAPHIC REPORT

Report for: Mr. Andris Kikauka
Rich River Exploration Ltd.

Sent to: Mr. Andris Kikauka

Report 160433

August 4, 2016

Petrographic Report on 9 Rock Samples from Lode Star Project for Rich River Exploration Ltd.

Fabrizio Colombo, Ph.D., P.Geo.
fab.petrologic@gmail.com

Table of Contents

1. Executive Summary

Mr. Andris Kikauka of Rich River Exploration Ltd. submitted 9 rock samples to Vancouver Petrographics for petrographic analysis. The client indicated that the samples were collected from Boomerang Project (Samples 1–7) and Lode Star Project (Samples 8–16).

The attached “Petrographic Descriptions” section provides the following for each sample: (i) the petrographic rock classification; (ii) a brief microstructural description; (iii) a table with the modal percentage and average grain size for each mineral; and (iv) a detailed description of the minerals in decreasing order of abundance.

Samples 1–9 (see Table 1) were cut and prepared as ~20 × 40 mm polished thin sections (see the image of the billet on the first page of each description).

The petrographic classification follows the recommendations of Gillespie et al. (2011), Gillespie and Styles (1999), and Robertson (1999).

The microstructural terminology used in this report follows the recommendations and definitions of Vernon (2004), Passchier and Trouw (2005), and Ramdohr (1980). Capitalized words are defined in the Glossary.

The samples can be subdivided into **three** suites.

The **first** suite (Samples **1–3, 5**, and **9**) consists of quartz dominated veins. In most cases the vein walls were not observed on the sample, and the samples were classified as vein based on the verbal communication with Mr. Kinkauka. Sample 7 shows a brecciated microstructure, in which fragments of rock are replaced by white mica and are immersed within quartz- and calcite-rich infill. A probable **silver** particle was distinguished in Sample 1 (Photomicrograph 1c).

The **second** suite (Samples **4**, **6**, and **7**) is a **microdiorite**. Sample 6 shows a probable metamorphic layering, therefore the suffix 'meta-' is used in the classification of this sample.

The **third** suite (Sample **8**) is a **schist** associated with a carbonate-clay alteration zone.

Table 1: List of samples with their magnetic susceptibility and petrographic classification[1].

Sample No.	Sample ID	Rock Type	Alteration
1	705	Silver-bearing(?) quartz vein	
2	706	Brecciated quartz vein	
3	711	Brecciated quartz-arsenopyrite-pyrite vein	
4	767	Microdiorite(?); Quartz vein; Calcite vein and veinlets	calcite: weak to moderate within the microdiorite; clay(?): weak to moderate within the groundmass of the microdiorite
5	768	Quartz-calcite vein	
6	769	Meta-microdiorite(?); Quartz-calcite-albite-white mica-pyrrhotite-pyrite veins and infill	carbonate (calcite?): moderate to strong; pyrrhotite-iron oxides: weak; pyrite-chalcopyrite: subtle
7	770	Microdiorite(?); Quartz-calcite-albite-pyrrhotite infill	
8	776	Schist; Carbonate-clay alteration zone	carbonate-clay: moderate to strong: chlorite-quartz-K-feldspar: weak
9	20889	Quartz vein	

1 Rock classification after Gillespie et al. (2011), Gillespie and Styles (1999), and Robertson (1999).

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This report consists of 28 pages and is signed by

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3. Petrographic Descriptions

Sample 1: 705

Silver-bearing(?) quartz vein

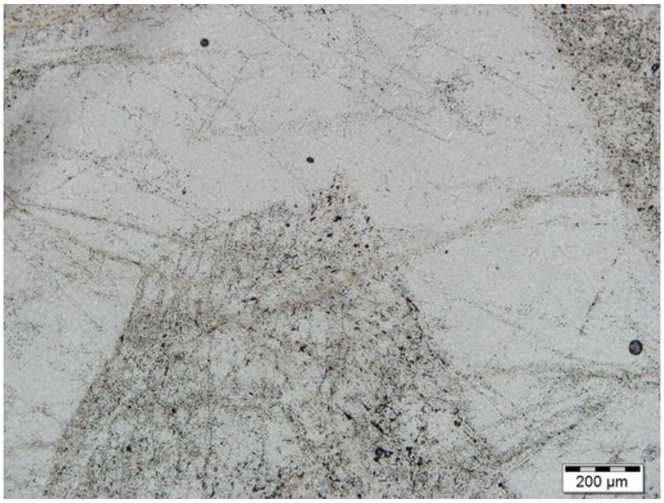
This vein consists of an inequigranular polygonal aggregate of quartz. Very rare iron oxides occupy the interstices between the quartz and host rare relicts of pyrite and probable silver.

Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
quartz	99 – 100	up to 5	low relief, birefringence up to first order white
iron oxides	0.1 – 0.2	<0.01	
pyrite	0.05	up to 0.2	high reflectance, creamy white, isotropic
silver(?)	tr	up to 0.05	very high reflectance, creamy white, isotropic

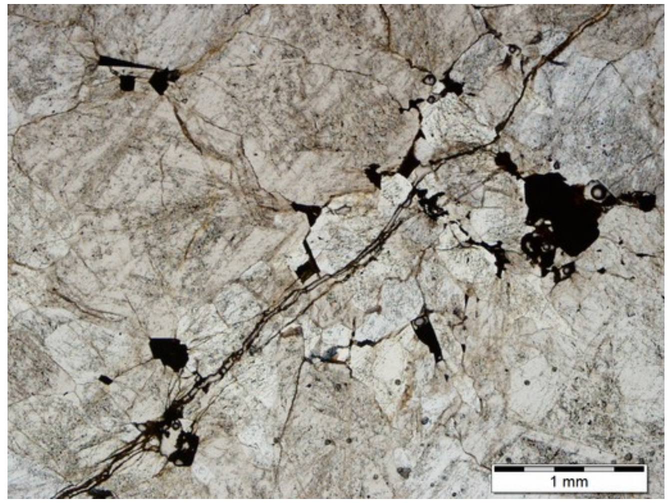
Quartz dominates the composition of this vein as inequigranular (up to 5 mm) polygonal aggregates. The quartz hosts abundant fluid inclusions, which in some of the crystals define euhedral growth zoning. These fluid inclusions are the ideal target in a fluid inclusion study aimed to understand the temperature and the fluid condition of the vein crystallization.

Irregular fractures crosscut the polygonal aggregate of quartz. The quartz is deformed and shows a moderate to strong undulose extinction. In some cases the quartz crystals show sub-grain boundaries near some of the fractures.

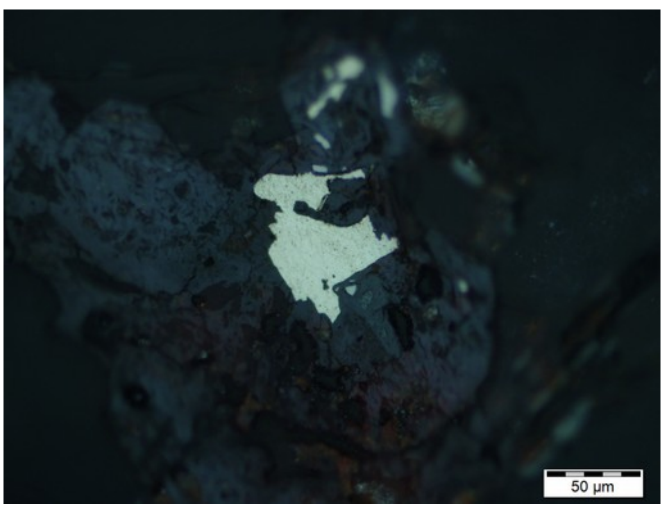
Iron oxides are irregularly dispersed within some of the fractures. Very rare xenomorphic relicts of pyrite are spatially associated with the fractures. Very rare and fine grained crystals of pyrite are subtly altered by iron oxides and are dispersed along the interstices of the quartz. One relict of a highly reflectant mineral occur within an irregularly shaped alteromorph of iron oxides (Photomicrograph 1c). The nature of this mineral would need to be confirmed by electron optic analysis; however I tentatively interpret it as a **silver** grain.



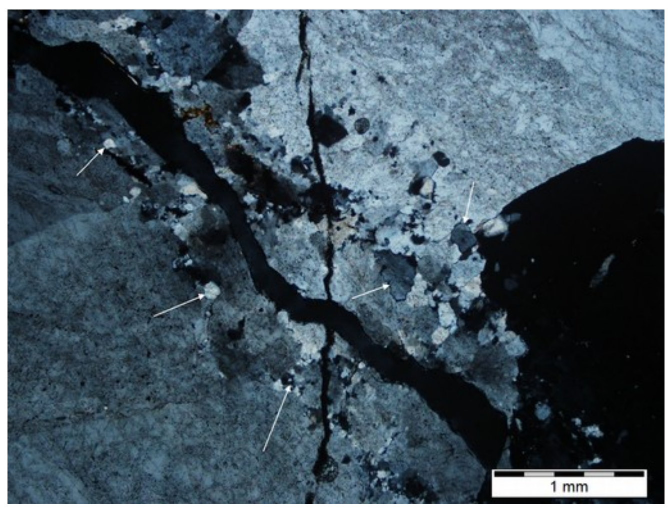
Photomicrograph 1a*: Within some of the quartz crystals, the fluid inclusions define euhedral growth zoning. Plane-polarized transmitted light.*



Photomicrograph 1b*: The quartz aggregate (white) is irregularly fractured and filled in by iron oxides (opaque) and very rare relict of pyrite. Plane-polarized transmitted light.*



Photomicrograph 1c*: One relict of probable silver(?) is highly reflectant and is hosted within an irregular alteromorphs of iron oxides (dark grey). Plane-polarized reflected light.*



Photomicrograph 1d*: Near the irregular fractures, the quartz shows moderate to strong undulose extinction, and hosts sub-grain boundaries (white arrows). Crossed Nicols transmitted light.*

Sample 2: 706

Brecciated quartz vein

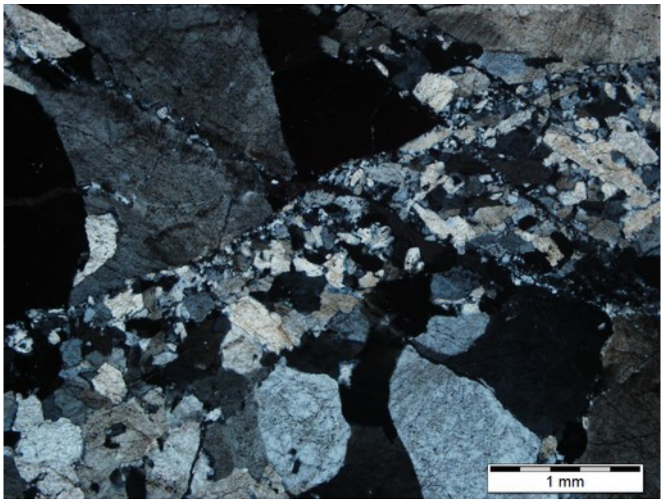
This vein is made up of inequigranular polygonal aggregates quartz and very rare pyrite and iron oxides. The polygonal aggregate of quartz is fractured and crosscut by irregular shear zones, along which the medium-to coarse-grained crystals of quartz are recrystallized into fine-grained crystals. Conjugated systems of veinlets are filled in by calcite.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
quartz	99 – 100	up to 6×12	low relief, birefringence up to first order white
calcite	0.5 – 1	up to 0.1	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
pyrite	tr	up to 0.1, very rare up to 0.2	high reflectance, creamy white, isotropic
iron oxides	tr	<0.01	
chalcopyrite	tr	up to 0.03	high reflectance, yellow

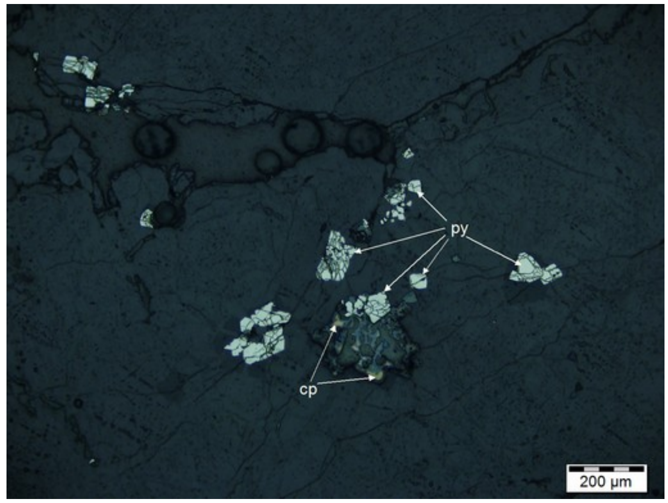
Quartz forms an inequigranular polygonal aggregate, which dominates the composition of this vein. The polygonal crystals (up to 6×12 mm) are fractured and crosscut by irregular and anastomosing shear zones, along which the quartz shows a moderate to strong undulose extinction and recrystallized into fine-grained interlobate crystals (Photomicrograph 2a).

Calcite filled in conjugated veinlets produced during the brittle deformation (Photomicrograph 9c). In some cases the veinlets reactivate the recrystallized domains of quartz.

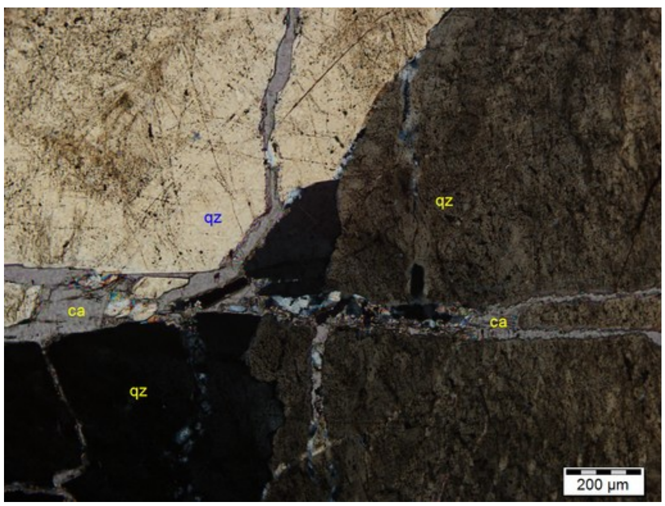
Pyrite is fine-grained (up to 0.1 mm, and in one case 0.2 mm) and forms idiomorphic crystals, which are dispersed near the fractures. The pyrite is fractured and partially replaced by iron oxides. In one case, the irregularly shaped alteromorph of iron oxides hosts very fine-grained relicts of chalcopyrite (Photomicrograph 2b).



***Photomicrograph 2a**: The quartz recrystallized along irregular shear zones crosscutting coarser crystals of quartz. Crossed Nicols transmitted light.*



***Photomicrograph 2b**: Fractured crystals of pyrite (py) and iron oxides replacement after chalcopyrite are dispersed near and along the fractures crosscutting the quartz. Plane-polarized reflected light.*



***Photomicrograph 2c**: Irregular veinlets of calcite (ca) filled in the conjugated fracture system crosscutting the quartz (qz). Crossed Nicols transmitted light.*

Sample 3: 711

Brecciated quartz-arsenopyrite-pyrite vein

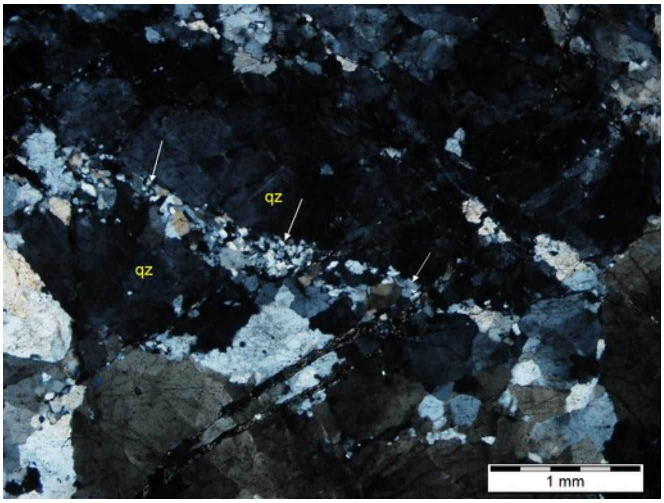
This sample is made up of fractured and brecciated quartz and a sulphide-rich domain of arsenopyrite and pyrite. The quartz probably represents a quartz-rich infill or vein similar to Sample 2. The quartz and the sulphides are crosscut by irregular infills of epidote or white mica.

Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
quartz	70 – 72	up to 5×10	low relief, birefringence up to first order white
arsenopyrite	17 – 19	up to 10	high reflectance, white, anisotropic
pyrite	7 – 9	up to 1×3	high reflectance, creamy white, isotropic
iron oxides	2 – 2.5	<0.01	
epidote(?)	1.5 – 2	up to 0.05	high relief, high birefringence, heterogeneous distribution of the birefringence colours
clay(?)	1 – 2	~0.01	low relief, birefringence up to first order white

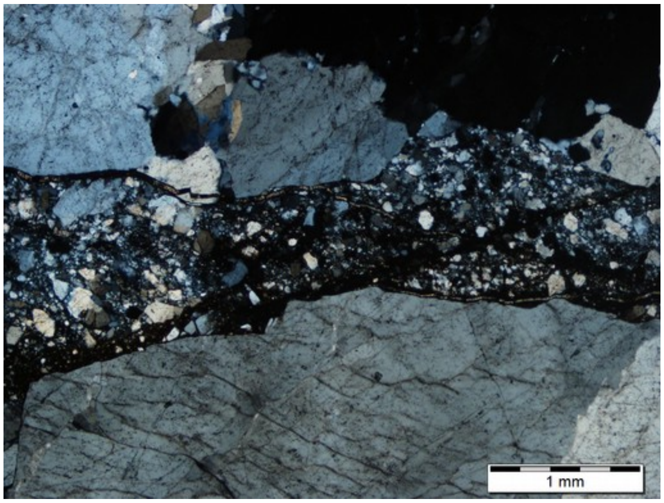
Quartz prevails over the sulphides and form an inequigranular (up to 5×10 mm) interlobate to polygonal crystal aggregate, which I interpret as a vein/infill domain similar to Sample 9. In this sample, the medium- to coarse-grained crystals of quartz show a moderate to strong undulose extinction. Similarly to Sample 2, the deformed quartz hosts strongly deformed shear zones, in which sub-grain boundaries recrystallize the coarser quartz (Photomicrograph 3a); however, this sample is further deformed and these recrystallized shear zones are crosscut by the brecciated domains. The contact between the less deformed quartz and the brecciated domains is sharp (Photomicrograph 3b). Within the brecciated domains, fine-grained angular to rounded clasts of quartz are immersed within a very fine-grained matrix of probable clay and /or quartz flour.

Arsenopyrite is concentrated within an irregular domain (see lower left part of the billet and lower right part of the polished thin section). The arsenopyrite forms fractured crystals up to 10 mm and is intergrown with subordinate **pyrite** (Photomicrograph 3c).

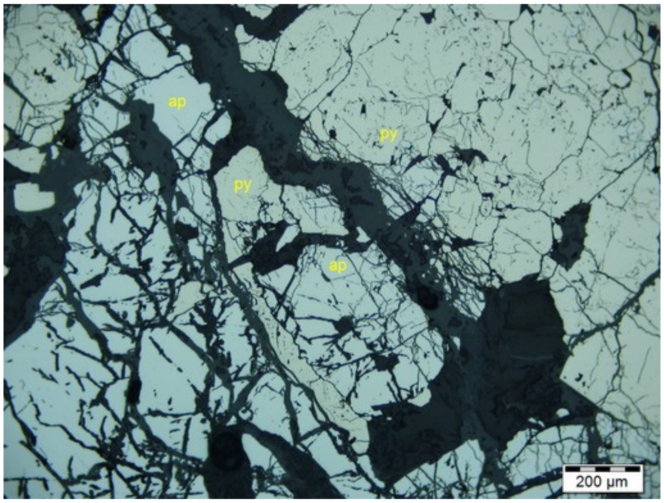
Irregular veinlets are partially filled by crustiform and in some cases layered aggregates of probable **epidote(?)** (Photomicrograph 3d), and crosscut the deformed and brecciated quartz and the fractured sulphides.



Photomicrograph 3a*: Medium- to coarse-grained quartz (qz)shows a strong undulose extinction and is recrystallized along irregular shear domains (white arrows). Crossed Nicols transmitted light.*



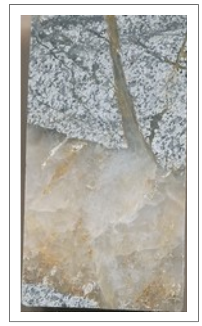
Photomicrograph 3b*: A sharply defined brecciated zone crosscut the quartz and is made up of angular to rounded clasts of quartz immersed within a very fine-grained matrix of quartz and/or clay. Crossed Nicols transmitted light.*



Photomicrograph 3c*: Arsenopyrite (ap) and pyrite (py) are intergrown and fractured within the sulphide-rich domain. Plane polarized reflected light.*

Photomicrograph 3d*: Irregular veinlets are partially filled in by crustiform aggregates of probable epidote (ep?) and crosscut the quartz (qz). Plane polarized transmitted light.*

Sample 4: 767



Microdiorite(?)

Quartz vein

Calcite vein and veinlets

A medium-grained microdiorite(?) shows a densely packed granular microstructure defined by subhedral crystals of plagioclase. The granular microstructure is crosscut by a 20 mm thick quartz vein. The vein and the microdiorite are crosscut by pyrrhotite-pyrite-chalcopyrite-bearing calcite±quartz vein and veinlets and veinlets.

Alteration: calcite: weak to moderate within the microdiorite; **clay**(?): weak to moderate within the groundmass of the microdiorite.

Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
microdiorite(?) (~40% of PTS)			
plagioclase	28 – 30	up to 0.5×0.6	low relief, first order grey birefringence, albite twinnings
calcite	5 – 6	up to 0.05	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
clay(?)	4 – 6	~0.01	low to moderate relief, low birefringence (up to first order)
rutile	tr	up to 0.1	high relief, brown under plane polarized light, anisotropic
pyrrhotite	tr	up to 0.1	high reflectance, light brown, anisotropic
pyrite	tr	up to 0.1	high reflectance, creamy white, isotropic
iron oxides	tr	<0.01	
quartz vein (54%of PTS)			
quartz	54	0.05–2	low relief, birefringence up to first order white
calcite±quartz vein and veinlets (~6% of PTS)			

Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
calcite	4.8	up to 0.5	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
quartz	1	up to 0.5	low relief, birefringence up to first order white
pyrrhotite	0.1	up to 0.1	high reflectance, light brown, anisotropic
pyrite	0.1	up to 0.1	high reflectance, creamy white, isotropic
iron oxides	tr	<0.01	
chalcopyrite	tr	up to 0.02	high reflectance, yellow

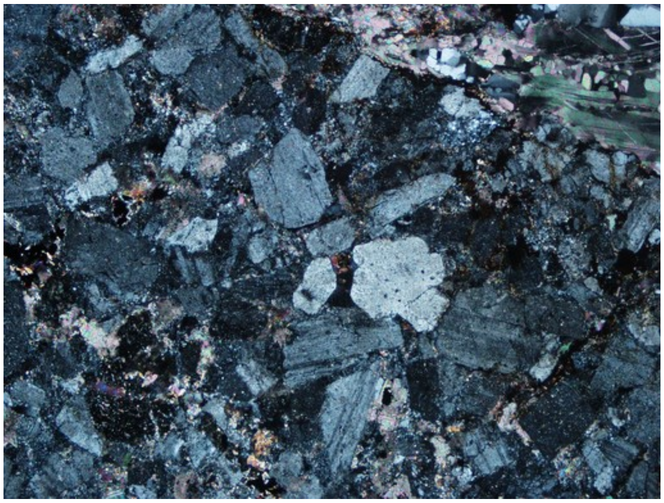
Quartz forms an up to 20 mm thick sub-tabular vein. Within the vein the quartz is inequigranular and forms fine-grained (0.05–0.2 mm) polygonal aggregates and interlobate crystals (up to 2.5 mm). The grain size heterogeneity was probably generated by a brittle deformation event and by the partial recrystallization, which probably ended with the calcite-rich infill episode. The quartz is subordinate within the microdiorite, in which probably permeated after the crystallization of the magma.

Plagioclase dominates the composition of the microdiorite as subhedral to anhedral crystals of up to 0.5×0.6 mm. The plagioclase crystals are randomly oriented and define a densely packed granular microstructure. The medium-grained crystals of plagioclase are immersed within subordinate groundmass, which is very fine-grained and it is mostly recrystallized and replaced by alteration minerals (clay and calcite?). The plagioclase is weakly to moderately altered by a very fine-grained dispersions of calcite, and in most cases the plagioclase crystals show albite twinnings.

Calcite is concentrated within up to 3 mm thick veins and veinlets, which crosscut the quartz vein and the microdiorite. Very fine-grained crystals of calcite altered the plagioclase and probably altered the ferromagnesian minerals of the microdiorite.

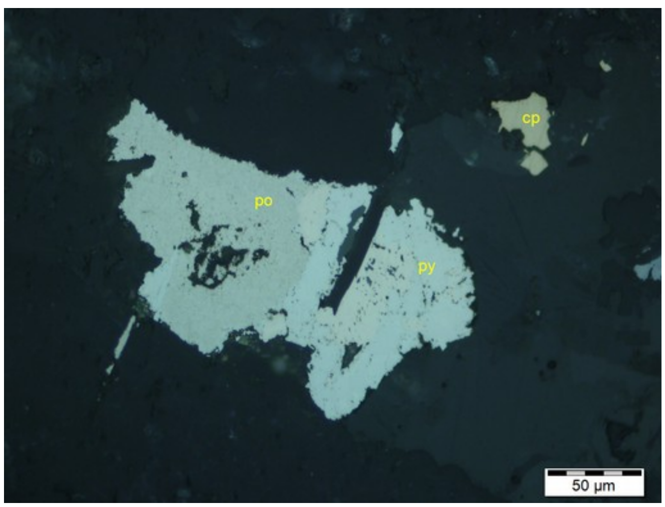
Rare **pyrrhotite** is intergrown and probably partially replaced by **pyrite** (Photomicrograph 4c) and filled in irregular calcite veinlets within the microdiorite and the quartz vein.

Very rare **chalcopyrite** is spatially associated with the pyrrhotite and the pyrite. Because of the spatial association of the sulphides with the calcite veinlets. I interpret the sulphides precipitation as coheval with the calcite-rich infill episode.



Photomicrograph 4a*: Microdiorite—subhedral crystals of plagioclase are densely packed and define a medium-grained granular microstructure. Crossed Nicols transmitted light.*

Photomicrograph 4b*: Quartz vein—The quartz forms fine-grained polygonal (on the left of this photomicrograph) to medium-grained (on the right) crystal aggregates. The quartz shows moderate to strong undulose extinction and is filled in by calcite (ca) Crossed Nicols transmitted light.*



Photomicrograph 4c*: Microdiorite—Pyrrhotite (po) is intergrown with pyrite (py) and is preferentially dispersed within calcite veinlets. Plane-polarized reflected light.*

Sample 5: 768

Quartz-calcite vein

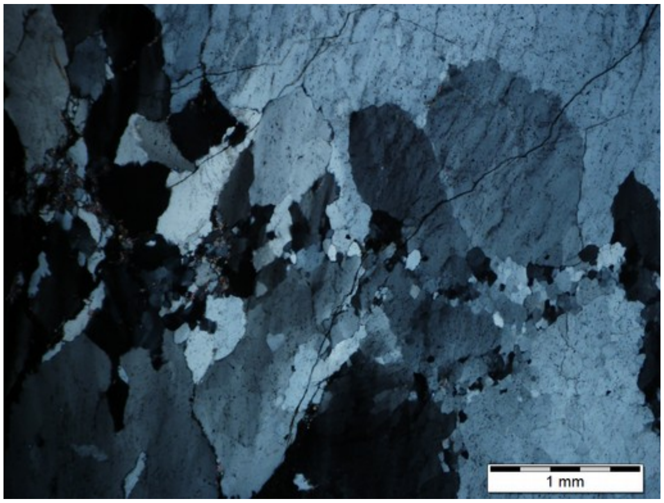
Iso-oriented elongate crystals of quartz are intergrown with an irregular domain of coarse-grained calcite and rare crystals of pyrrhotite. The quartz crystals are probably oriented at high angles with respect to the vein walls (not observed in the polished thin section) and the calcite domain may be interpreted as the median zone of the vein.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
quartz	82 – 84	up to 4×16	low relief, birefringence up to first order white
calcite	14 – 16	up to 4	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
pyrrhotite	tr	up to 0.15 long	high reflectance, light brown, anisotropic

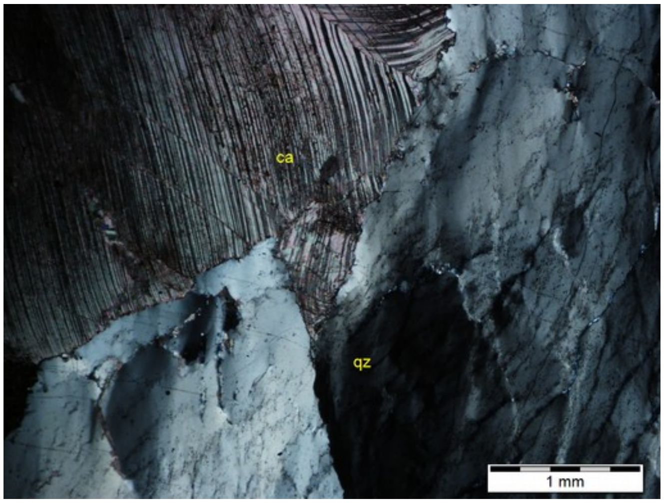
Quartz dominates the composition of this vein as elongate crystals (up to 4×16 mm). The crystals are iso-oriented and show a moderate undulose extinction. In the lower part of the polished thin section, an irregular zone is fine-grained, and iso-oriented at high angles with respect to the elongation of the quartz crystals. I interpret this zone as a deformed and recrystallized zone of the vein (Photomicrograph 5a).

Calcite is coarse-grained and forms an irregular domain, which probably filled in the termination of the quartz crystals growing in opposite directions—the median zone of the vein. Both the calcite and the quartz show a moderate to strong undulose extinction. This type of internal strain may be caused by the growth of coarse-grained crystals.

Fine-grained tabular crystals of **pyrrhotite** are randomly oriented and dispersed within the calcite.

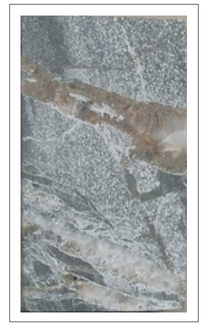


Photomicrograph 5a: *An irregular zone of fine-grained recrystallized quartz is oriented at high angles with respect to the elongation of the coarse-grained crystals of quartz. Crossed Nicols transmitted light.*



Photomicrograph 5b: *Coarse-grained calcite (ca) filled in the interstices of the anhedral terminations of the coarse-grained crystals of quartz (qz). Both calcite and quartz show moderate to strong undulose extinction. Crossed Nicols transmitted light.*

Sample 6: 769



Meta-microdiorite(?)

Quartz-calcite-albite-white mica-pyrrhotite-pyrite veins and infill

This polished thin section is made up of a probable magmatic rock, in which medium-grained subhedral crystals of plagioclase are immersed within a very fine-grained replacement aggregate of carbonate and plagioclase. The medium-grained rock show different degrees of deformation and it is crosscut by quartz-rich veins and infills.

Alteration: carbonate (calcite?): moderate to strong; **pyrrhotite-iron oxides**: weak; **pyrite-chalcopyrite**: subtle.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
meta-microdiorite(?) (~75% of PTS)			
plagioclase	37 – 39	up to 0.4×0.7	low relief, first order grey birefringence, albite twinnings
calcite(?)	30 – 32	up to 0.1	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
quartz	2 – 2.2	up to 0.05	low relief, birefringence up to first order white
pyrrhotite	1 – 2	up to 0.3	high reflectance, light brown, anisotropic
iron oxides	1	<0.01	
chalcopyrite	tr	up to 0.1	high reflectance, yellow
quartz-rich veins and infill (~25% of PTS)			
quartz	21	up to 0.8	low relief, birefringence up to first order white
albite	2	up to 0.3	low relief, first order grey birefringence, albite twinnings
calcite(?)	1	up to 0.2, rare 1 long	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
white mica	1	up to 2 long	moderate relief, birefringence up to third order blue, straight extinction
pyrrhotite	tr	up to 2 long	high reflectance, light brown, anisotropic

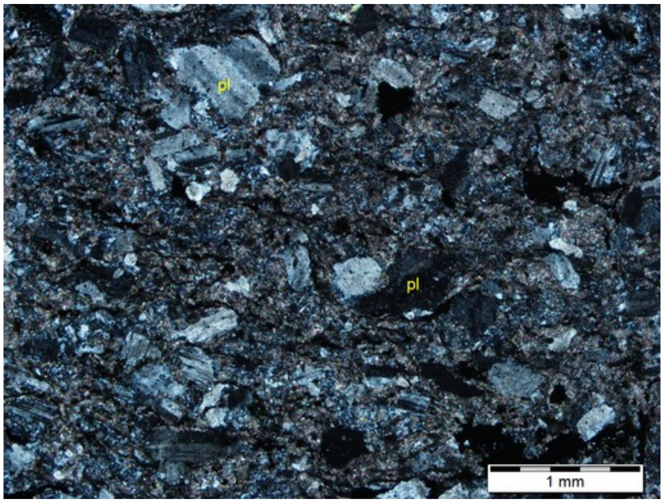
Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
pyrite	tr	up to 0.6	high reflectance, creamy white, isotropic

Plagioclase forms medium-grained (up to 0.4×0.7 mm) subhedral crystals, which are randomly oriented within the less deformed parts of the host rock (Photomicrograph 6a) and are preferentially iso-oriented within the moderately deformed parts (Photomicrograph 6b). Angular and elongate rock fragments immersed within the quartz-rich infills are made up of foliated calcite, and subordinate porphyroblasts of plagioclase. I interpret these foliated domains (Photomicrograph 6c) as the strongly deformed microdiorite, which were fragmented and filled in by the quartz-rich infill domain. Fine-grained subidioblastic crystals of **albite** filled some of the infill domains (Photomicrograph 6e and 6f). Because of their microstructural position, I interpret the albite as having crystallized during the earliest stages of the infill episode in association with the quartz, which then prevailed in the following infill stage.

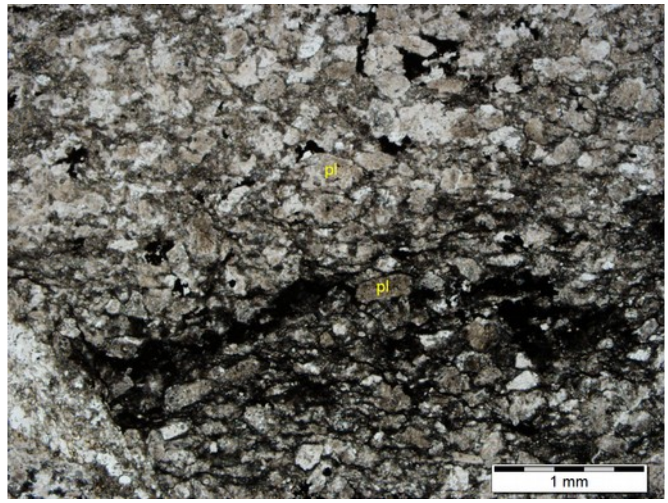
Quartz is concentrated within anastomosing veins and infill domains, in which the inequigranular crystals (up to 8 mm) are intergrown with lesser calcite, white mica and pyrrhotite (Photomicrograph 6d).

Calcite (and dolomite?) weakly to strongly altered the plagioclase within the host rock. The intensity of the alteration is proportional to the amount of deformation. In the less deformed part of the rock, the calcite prevails over subordinate plagioclase and probable quartz within the groundmass. In the most deformed parts, the calcite almost completely replaced the plagioclase, which only occurs as fine-grained and moderately altered porphyroblasts. The calcite forms elongate blades intergrown with the elongate lamellae of white mica (up to 2 mm) and elongate sub-tabular crystals of pyrrhotite (up to 2 mm) oriented at high angle with respect to the vein wall and protruding into the quartz (Photomicrograph 6d).

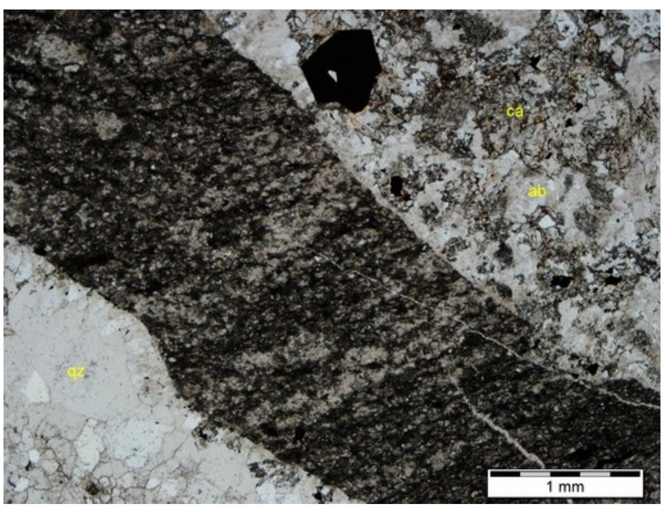
Pyrrhotite is dispersed within the meta-microdiorite as fine-grained xenomorphic crystals (up to 0.3 mm), which in rare cases are intergrown with finer-grained crystals of chalcopyrite. One crystal of idiomorphic pyrite (up to 0.6 mm) is immersed within the infill aggregate of subidioblastic albite, calcite and white mica, which surrounds one of the angular fragments of highly deformed meta-microdiorite (Photomicrograph 6e).



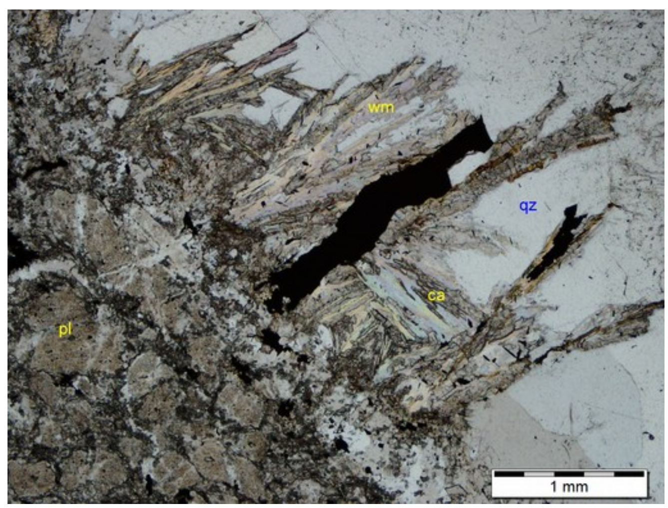
***Photomicrograph 6a**: Subhedral crystals of plagioclase (pl) are randomly oriented within the groundmass, which is moderately to strongly altered by calcite. Crossed Nicols transmitted light.*



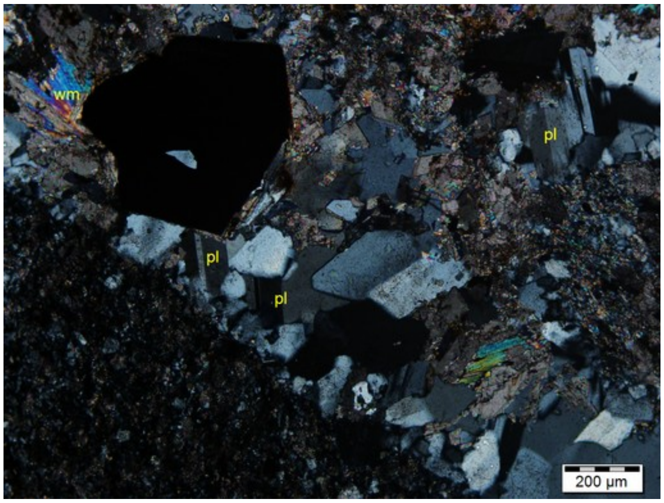
***Photomicrograph 6b**: The plagioclase shows increasing degree of iso-orientation within the more deformed part of the host rock (in the lower part of this photomicrograph). Higher deformation is accompanied by more abundant calcite, pyrrhotite and iron oxides (opaque). Plane-polarized transmitted light.*



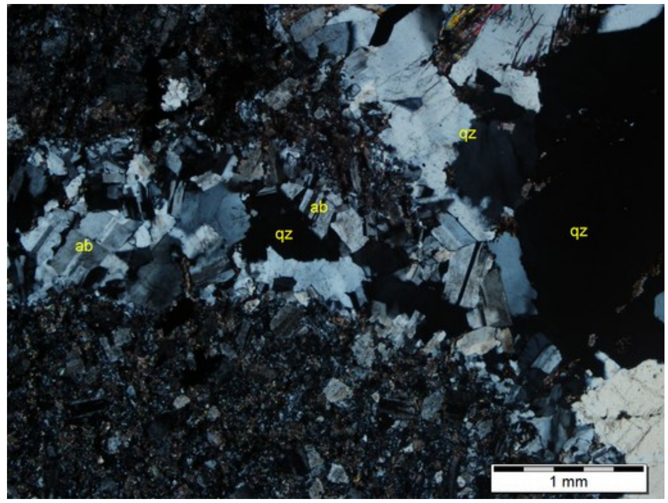
***Photomicrograph 6c**: A fragment of highly deformed meta-microdiorite (darker and earthy) is made up of calcite and an earthy and unresolved aggregate and porphyroblasts of plagioclase and is immersed within an infill domain of quartz (qz), albite (ab), calcite (ca), and pyrite (opaque). Plane polarized transmitted light.*



***Photomicrograph 6d**: Most of the infills and veins are made up of quartz (qz) and elongate crystals of white mica (wm), calcite (ca) and rare pyrrhotite (opaque). Plane-polarized transmitted light.*



***Photomicrograph 6e**: Some infills are made up of fine-grained crystals of albite (pl), calcite (ca), white mica (wm) and pyrite (opaque). Crossed Nicols transmitted light.*



***Photomicrograph 6f**: Within some of the earliest infill (in the center left of this photomicrograph), the albite (ab) prevails over the quartz (qz). The albite-bearing infill is crosscut by quartz-dominated infill domain (qz in the right). Crossed Nicols transmitted light.*

Sample 7: 770

Microdiorite(?)

Quartz-calcite-albite-pyrrhotite infill

This polished thin section is made up of two domains. In the upper part, mostly anhedral crystals of plagioclase define a medium-grained densely packed granular microstructure (Photomicrograph 7a), in which the calcite, iron oxides and pyrrhotite filled in the interstices between the plagioclase. The plagioclase-rich rock shows a sharp boundary with a heterogeneous and inequigranular infill domain of quartz, calcite, albite and pyrrhotite (Photomicrograph 7b).

Alteration: calcite: weak to moderate; **pyrrhotite-rutile**: subtle to weak.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
microdiorite(?) (28% of PTS)			
plagioclase	22 – 24	up to 0.4×0.7	low relief, first order grey birefringence, albite twinnings
calcite	4 – 5	up to 0.05	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
rutile	tr	up to 0.04	high relief, brown under plane polarized light, anisotropic
pyrrhotite	tr	up to 0.3×0.3	high reflectance, light brown, anisotropic
quartz-calcite-albite-pyrrhotite infill (72% of PTS)			
quartz	59 – 61	up to 4	low relief, birefringence up to first order white
calcite	10 – 12	up to 0.1, rare blades up to 8 long	high relief, extreme birefringence, brisk reaction to cold dilute (10%) HCl
albite	1 – 1.5	up to 0.1, rare up to 0.3	low relief, first order grey birefringence, albite twinnings
pyrrhotite	tr	up to 0.3×0.5	high reflectance, light brown, anisotropic

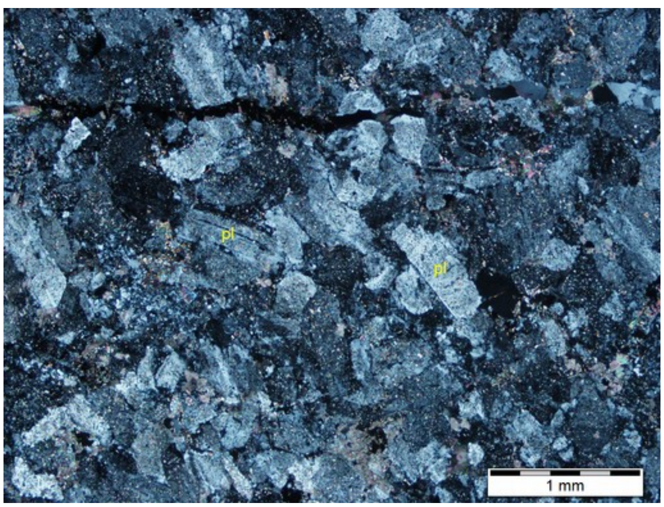
Plagioclase dominates the composition of the microdiorite as anhedral to subhedral crystals (up to 0.4×0.7 mm), which are randomly oriented and are probably derived from the slight deformation and alteration of a medium-grained dioritic rock. The plagioclase crystals are weakly to moderately altered by very fine-grained dispersions of calcite.

Quartz forms inequigranular crystals (up to 4 mm) within the infill domain. Some of the quartz crystals show a strong undulose extinction and are intergrown with up to 8 mm long blades of calcite (Photomicrograph 7b).

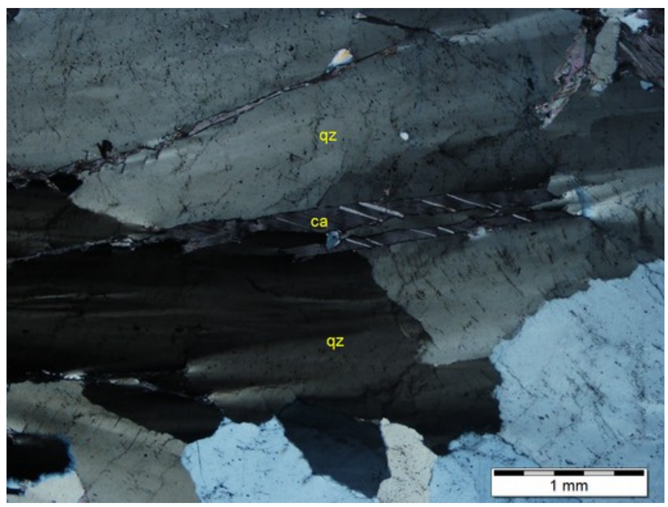
Calcite is very fine- to fine-grained within the microdiorite, in which weakly to moderately alters the plagioclase and forms interstitial replacement patches in association with lesser **rutile** and **pyrrhotite**. The calcite filled in the interstices between the densely packed granular microstructure, and probably replaced the ferromagnesian minerals. Within the infill, the calcite forms very fine- to fine-grained aggregates subordinate to the quartz, and forms blades up to 8 mm long within the strongly deformed part of the infill (Photomicrograph 7b).

Pyrrhotite is fine-grained xenomorphic and is spatially associated with the calcite within the infill and the microdiorite. The pyrrhotite and the altered rutile form a thin and discontinuous veinlet within the microdiorite.

Fine-grained blocky aggregates of **albite** are concentrated within the infill near the contact with the microdiorite.



Photomicrograph 7a*: Anhedral to subhedral crystals of plagioclase (pl) define a densely packed granular microstructure within the microdiorite. Crossed Nicols transmitted light.*



Photomicrograph 7b*: Coarse-grained quartz (qz) shows a strong undulose extinction and is intergrown with blades of calcite (ca). Plane-polarized reflected light.*

Sample 8: 776

Schist

Carbonate-clay alteration zone

This polished thin section is made up of two domains. In the upper part, cleavage domains of probable clay define a sub-parallel foliation and wrap microlithons, in which the alteromorphs after probable plagioclase are strongly altered by carbonate and clay. In the lower part, the sample is strongly altered by a very fine-grained felt-like aggregate of carbonate, clay and/or white mica, chlorite and quartz. Irregular veinlets of K-feldspar crosscut this isotropic alteration zone (see yellow stained veinlets in the lower part of the billet above).

Alteration: carbonate-clay: moderate to strong: **chlorite-quartz-K-feldspar**: weak.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
schist (~50% of PTS)			
clay	28 – 30	up to 0.01	low to moderate relief, low birefringence (up to first order)
carbonate (dolomite?)	19 – 20	up to 0.02	high relief, extreme birefringence, slow reaction to cold dilute (10%) HCl
pyrrhotite	1 – 1.5	up to 0.3	high reflectance, light brown, anisotropic
iron oxides	0.1	<0.01	
chalcopyrite	tr	up to 0.1	high reflectance, yellow
carbonate-clay alteration zone (~50% of PTS)			
carbonate (dolomite?)	27 – 29	up to 0.02	high relief, extreme birefringence, slow reaction to cold dilute (10%) HCl
clay	13 – 14	up to 0.01	low to moderate relief, moderate birefringence (up to second order?)
chlorite	3 – 4	up to 0.1	moderate relief, weak pleochroism with green tints, straight extinction, low birefringence
quartz (and plagioclase?)	2 – 3	up to 0.1	low relief, birefringence up to first order white
pyrrhotite	1.5 – 1.7	up to 0.3	high reflectance, light brown, anisotropic

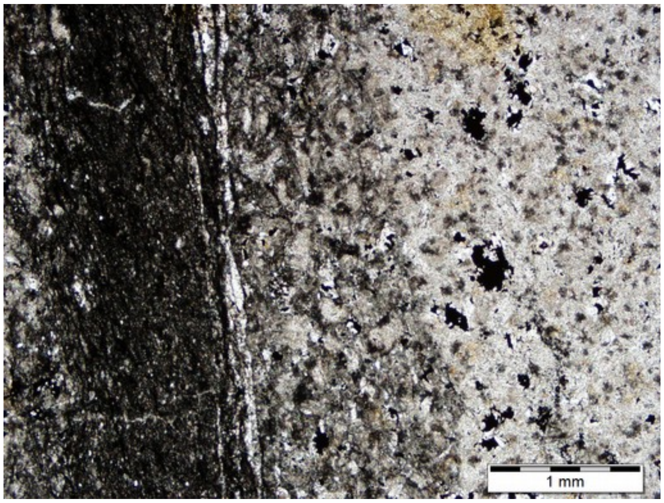
Mineral	***Modal %***	***Size Range (mm)***	***Distinguishing Features***
K-feldspar	1 – 1.5	up to 0.05	low relief, low birefringence (up to first order grey)
iron oxides	0.1	<0.01	
white mica	tr	up to 0.05	moderate relief, birefringence up to third order blue, straight extinction
chalcopyrite	tr	up to 0.1	high reflectance, yellow

Clay occurs as a earthy and very fine-grained aggregates in the cleavage domains, in which it probably replaced an unknown phyllosilicate. The clay and the carbonate replaced the microlithons, which I interpret as lenticular fragments with a composition similar to the second domain. In some cases, fine-grained alteromorphs of probable feldspar are made up of a very fine-grained aggregate of carbonate and clay. The microlithons are wrapped by the foliation defined by the clay. Very fine-grained clay, in association with very fine-grained carbonate partially replaced the second domain, which I interpret as the strongly altered but relatively undeformed parent rock of the microlithons.

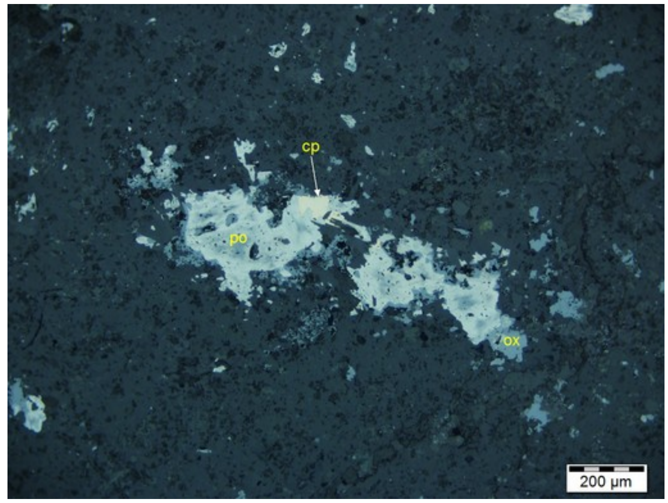
Carbonate is very fine-grained and overprinted the clay-rich aggregate in the schist and the isotropic domain in the lower part of the polished thin section. The slow reaction to cold dilute (10%) HCl suggest that the carbonate is dolomite; however, the slow reaction observed on the billet may be a consequence of the very fine grain size of the carbonate.

Subordinate amounts of fine-grained **quartz** and probable relicts of **plagioclase** are intergrown with the carbonate-clay replacement aggregates.

The isotropic domain is crosscut by thin (up to 0.4 mm thick) veinlets of **chlorite**, **white mica** and in some cases **K-feldspar**. The chlorite also occurs as irregular replacement patches dispersed within the very fine-grained aggregate of carbonate-clay.



***Photomicrograph 8a**: The contact between the schist (on the left of this photomicrograph) and the isotropic alteration zone (on the right). Plane-polarized transmitted light.*



***Photomicrograph 8b**: Irregular replacement patches of pyrrhotite (po) are partially replaced by iron oxides (ox). Rare chalcopyrite (cp) is intergrown with the pyrrhotite. Plane-polarized reflected light.*

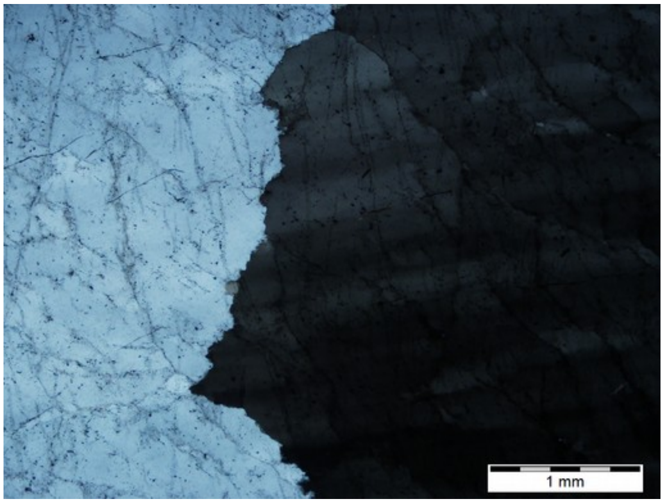
Sample 9: 20889

Quartz vein

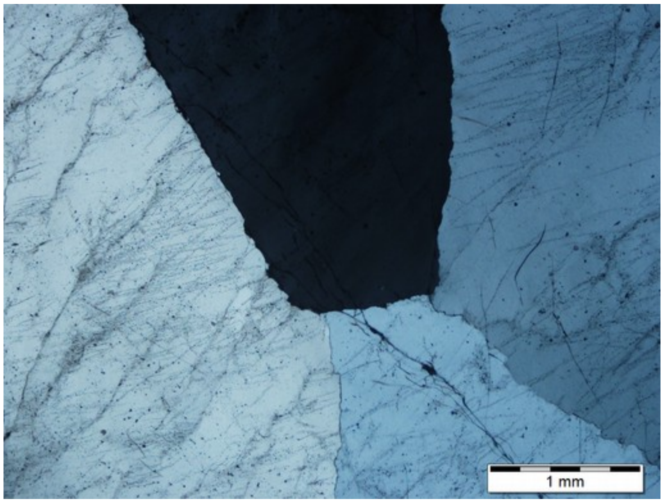
This polished thin section is made up of coarse-grained equant to elongate crystals of quartz.

Mineral	*Modal %*	*Size Range (mm)*	*Distinguishing Features*
quartz	100	up to 9×12	low relief, birefringence up to first order white

Quartz forms inequigranular (up to 9×12 mm) crystals containing abundant very fine-grained fluid inclusions. The contact between the crystals is interlobate (Photomicrograph 9a) and in some cases tend to form polygonal boundaries (Photomicrograph 9b). Some of the crystals show a strong undulose extinction.



Photomicrograph 9a*: Coarse-grained quartz crystals show interlobate crystal boundaries. The crystal on the right of this photomicrograph shows a strong undulose extinction and deformation bands. Crossed Nicols transmitted light.*



Photomicrograph 9b*: In some cases the quartz crystals tend to form polygonal grain boundaries. Crossed Nicols transmitted light.*

4. Glossary of Microstructural and Petrologic Terms Used in the Text

a, b, c: Symbols used to describe the crystallographic axes of the crystals.

alteromorph: Mineral or group of minerals developed by partial to complete alteration or weathering of a primary mineral. An alteromorph does not always preserve the shape, size, and volume of the mineral that it has replaced.

amoeboid: With strongly curved and lobate interlocking grain boundaries; like an amoeba.

anhedral: Describes irregular grains showing no crystal-face boundaries.

cleavage domain*:* Layer or lens with a relatively high content of elongate grains (such as micas or amphiboles) and low content of equidimensional grains (such as quartz, feldspar, or carbonate). Together with microlithons they make up a spaced foliation. Micas in cleavage domains commonly have a preferred orientation parallel to or at a small angle to the domain.

conjugated: Describes systems of fractures or veins generated during the same deformation event.

deformation band: Describes a more deformed volume within a crystal.

euhedral: Describes a mineral with crystal faces.

foliation: Planar microstructural element that occurs penetratively on a mesoscopic scale in a rock. Primary foliation includes bedding and igneous layering; secondary foliations are formed by deformation-induced processes.

groundmass: Aggregate that is distinctly finer-grained than the phenocrysts in an igneous rock.

idiomorphic: Describes a mineral with crystal faces in an igneous rock. Synonym of euhedral and autoinorphic.

interlobate: With irregular lobate grain boundaries.

interstitial: Describes a mineral occupying angular cavities or interspace fillings between other minerals.

matrix: Aggregate that is distinctly finer-grained than the crystals, clasts, and lithic fragments in a metamorphic and volcaniclastic rock. The usage is similar to that of “groundmass” in an igneous rock.

microlithon: Layer or lens with a relatively small degree of preferred orientation compared to cleavage domains. A crenulated older foliation may be present in microlithons. Together with cleavage domains, microlithons make up a spaced foliation.

phenocryst: Crystal (commonly euhedral) that is distinctly larger than the other minerals around it.

pleochroism: A property of certain crystals of absorbing light to an extent that depends on the orientation of the vector of the light with respect to the optic axes of the crystal.

poikilitic: Describes a crystal with numerous, randomly oriented inclusions of other minerals.

pseudomorph: Mineral or group of minerals developed by partial to complete alteration or weathering of a primary mineral. The pseudomorph preserves the shape, size, and volume of the mineral that it has replaced.

relict (residual structure): Structure remaining after a deformation or metamorphic event, such as a porphyroclast in a mylonite, a phenocryst in a metamorphosed volcanic rock, or a partially replaced porphyroblast in a retrograde metamorphic rock. “Relict” is sometimes used as a synonym for “residual.”

strain shadow: Region adjacent to a clast or porphyroblast that is protected from deformation, such that it may preserve earlier microstructures that have been obliterated from the rest of the matrix.

subhedral: Term describing a mineral with some crystal faces and some irregular boundaries in an igneous rock.

subidiomorpbic: Term describing a mineral with some crystal faces and some irregular boundaries in an igneous rock.

xenomorphic: Irregular grains showing no crystal-face boundaries.

undulose (undulatory) **extinction**: Wavy, nonuniform extinction in a single grain, owing to slight bending of the crystal. Patchy, irregular undulose extinction can be due to submicroscopic fractures, kinks, and dislocation angles.

X, Y, Z: symbols used to describe the optical indicatrix of the crystals.