

# **2018 Final Technical Report**

**on**

## **SULPHUR CREEK PLACER PROPERTY**

### **YMEP 18-010**

By  
William LeBarge  
and  
Selena Magel

Geoplacer Exploration Ltd.

For

Tusk Exploration Ltd.

Location of property: 63°42'11"N; 138°47'20"W  
NTS map sheet: 115O/10  
Mining District: Dawson  
Date: January 28, 2019

## Table of Contents

Executive Summary.....	1
Introduction .....	2
Location and Access .....	2
Placer Tenure .....	4
Permitting .....	4
History of Exploration and Mining – Sulphur Creek.....	6
Regional Bedrock Geology .....	8
Local Bedrock Geology and Mineral Occurrences .....	8
Quaternary History .....	10
Surficial Geology .....	10
Placer Geology .....	10
Rationale for 2018 Placer Exploration Program .....	12
2018 Placer Exploration Program .....	13
Overview .....	13
Auger Drilling .....	13
Resistivity Surveys.....	16
Introduction .....	16
Methodology.....	16
Limitations and Disclaimer.....	16
Results.....	17
2018 Test Mining Pit .....	29
Conclusions and Recommendations.....	32
Statements of Qualifications.....	34
William LeBarge .....	34
Selena Magel.....	34
References .....	35
Appendix A – Drill Logs .....	37

---

## List of Figures

Figure 1 - Location of Sulphur Creek Project, Yukon. ....	3
Figure 2 – Location of Sulphur Creek Placer Project and Dawson region placer tenures. The property lies 72 km by road from Dawson City.....	5
Figure 3 - Terrane map of Yukon, showing location of the Sulphur Creek placer property. After Yukon Geological Survey (2018). ....	7
Figure 4 - Bedrock Geology of Sulphur Creek Property, Sulphur Creek, after Yukon Geological Survey (2018).....	9
Figure 5 - Surficial Geology, Sulphur Creek Project Area, after Froese and Jackson (2005).....	11
Figure 6 – Sulphur Creek placer property showing areas of 2018 exploration along with surficial geology (after Froese and Jackson, 2005), YCGC drill holes, inferred and known paystreaks and modern values per cubic yard (after van Loon, 2017). A figure of \$1400 CDN per fine ounce was used to calculate the modern grade in \$/yard.....	15
Figure 7 - Detailed map of Area 1, showing 2018 resistivity surveys, auger drill holes with grades, nearby historic YCGC drill holes and drill targets. Auger drill hole grades of zero are not shown. ....	18
Figure 8 - RES18-48BD-02 was surveyed across 3 auger drill holes, GAT1A, GAT2B, and GAT3C. All of the drill holes encountered black muck, and a thin gravel layer that lies above bedrock. The bedrock has been interpreted with a gentle undulation near 79 metre mark that is a drill target at a depth of 20 m (65 ft.).....	19
Figure 9 - RES18-48BD-03 was surveyed across 2 drill holes, GAT5E and GAT4D. The drill hoes both encountered black muck and a thin gravel layer on bedrock. There is a gentle undulation around the 130m mark that is a drill target at 22 m (72 ft.) for exploration of placer gold. This target is in line with the target on RES18-48BD-02 and could be indicating a bench channel deposit. ....	20
Figure 10 - RES18-KAREN-01 was surveyed on the left limit across a YCGC drill hole which had a grade of \$74.8/yd <sup>3</sup> . The bedrock and gravel contacts are interpreted as gently undulating and following topography. One potential drill target at a depth of 14 m (46 ft.) is shown at the 70 metre mark.....	21
Figure 11- RES18-KAREN2-02 was surveyed in the flat valley bottom and crosses over a historic YCGC drill hole with a value of \$30/yd <sup>3</sup> . The bedrock is interpreted as relatively flat with small undulations. No obvious drill targets were identified.....	22
Figure 12 - Detailed map of Area 2, showing 2018 resistivity surveys with drill targets, auger drill holes with grades, the 2018 active mining pit and nearby historic YCGC drill holes. Auger drill hole grades of zero are not shown. ....	23
Figure 13 - RES18-CLAIM5-02 was surveyed across 3 drill holes, DH4, DH5, and DH6. The drill holes assisted in interpreting a bedrock contact, which appears slightly undulating on the left limit bench and relatively flat in the creek valley. The bench bedrock undulations may indicate a side channel with placer gold potential, shown by DH4 which had a gold grade of \$10.31/yd <sup>3</sup> . The bedrock undulations resemble the bedrock displayed in downstream profile RES18-CLAIM5-01. ....	24
Figure 14 - RES18-CLAIM5-01 was surveyed on the left limit bench across 3 historic YCGC drill holes, and across auger drill holes LL1, LL2, LL3 and LL4. The YCGC gold grades are displayed in the image. The bedrock is interpreted with some undulations on the left limit which could indicate a channel with placer gold potential, demonstrated by auger drill hole LL3 which had a gold grade of \$9.68/yd <sup>3</sup> . ....	25

---

Figure 15 - RES18-CLAIM5-03 was surveyed on the left limit bench across auger drill holes DH1, DH2 and DH3, which intersected a layer of gravel between 3 and 5 ft. thick. The 2018 auger drill holes had high values from \$33 to \$815.22/yd<sup>3</sup>. However, due in part to the presence of the active mining pit immediately downstream, part of the profile was thawed and part of it was frozen. This lateral variation in physical characteristics resulted in a large resistivity contrast which overprinted most of the vertical stratigraphic and lithological transitions which would usually be evident..... 26

Figure 16 - Detailed map of Area 3, showing 2018 resistivity surveys, auger drill holes with grades and nearby historic YCGC drill holes. Auger drill hole grades of zero are not shown. .... 27

Figure 17 - RES18-CLAIM5 (Lower)-01 was surveyed on the right limit bench across three auger drill holes, DH8, DH9 and DH10. The drill results show a layer of gravel under black muck and the bedrock is interpreted as slightly undulating and dipping with topography. Gold grades in the auger holes were as high as \$31.43/yd<sup>3</sup>. .... 28

Figure 18 - At the southern end of the left limit mining pit, a 6 ft. thick section of clast-supported, crudely-stratified, Mn-stained, cryoturbated cobble-pebble gravel was exposed on May 18, 2018. This unit was overlying a decomposed schist/gneiss bedrock at this location. .... 29

Figure 19 - View looking north of the most upstream exposure of the active mining pit on Sept 28, 2018. The stratigraphy consisted of a variably-decomposed quartz-feldspar gneiss bedrock overlain by 2 to 5 ft. of grey-white cobble pebble gravel, overlain by 30 to 40 feet of silty frozen black muck. The basal gravel here is likely the 780,000 year old "Ross Gravel" described by Froese et. al. (2001). This gravel appears to be incised by and overlain in places by the younger Sulphur Creek gravel. Towards the centre of the valley (left side of the photo) dredge tailings and slickens abut against the virgin gravels of the pit. .... 30

Figure 20 – View of the pit wall looking east towards the left limit, Sept 28, 2018. The 5 ft. thick white-grey gravel at the base of the section is likely the "Ross Gravel", which at 780,000 years B.P. is older than the overlying Sulphur Creek gravel..... 31

**List of Tables**

Table 1 - Claim status, Sulphur Creek Placer Property. .... 4

Table 2 – 2018 Auger Drill Hole Locations, Depths and Gold Grade Results, Sulphur Creek. .... 13

Table 3 – 2018 resistivity survey lengths, grant number locations and endpoint geographic coordinates, Sulphur Creek..... 17

Table 4 - Drill Targets identified from resistivity surveys, Sulphur Creek..... 32

## Executive Summary

The following is the final technical report for Grant YMEP18-010 under the Yukon Mining Exploration Program, on the Sulphur Creek Property, owned by Tusk Exploration Ltd. The property is located in the main valley of Sulphur Creek, 8 km upstream of its confluence with the Indian River. Access to the property can be gained by summer road from Dawson City via Hunker Creek and Sulphur Creek, a total distance from Dawson City of approximately 72 kilometres.

Sulphur Creek has been mined since the beginning of the Klondike Gold Rush in 1898, first by hand methods, and then by dredging. Gold production from many documented sources and Yukon Government royalty records shows a total of over 352,000 ounces produced from Sulphur Creek between 1940 and 2015. YCGC conducted placer drilling programs on Sulphur Creek between 1935 and 1955. YCGC drilling results which overlap the project area show that there are several areas outside of the dredge limits where there may be potentially economic remnant placer gold deposits.

The 2018 placer exploration program consisted of 8 resistivity lines totalling 1601 m, and 59 auger drill holes totalling 1961 ft. (598 m), as well as a large test mining cut. Three areas were explored, including a left-limit bench on the upstream extent of the property (Area 1), a left limit bench in the central part of the claims (Area 2), and a right-limit bench in the downstream part of the property (Area 3).

In Area 1, auger drill hole results included grades from \$5.95/yd<sup>3</sup> to \$13.90/yd<sup>3</sup>. Geophysical surveys indicated that the bedrock rim on the left limit bench in this location rises moderately to the east, increasing the potential for placer paleochannels.

In Area 2, many of the high-grade 2018 auger drill holes and historic YCGC drill holes were coincident with economic mining values subsequently mined in the 2018 bulk test pit. Some of the auger drill holes upstream of the 2018 test mining pit had very high grades, including one hole (DH 3) which sampled at \$855.22/yd<sup>3</sup>. Interpreted contacts from geophysics correlated well with auger drill holes in the well-frozen areas upstream of the test mining pit, but not very well in the discontinuous permafrost near the test pit.

In Area 3, many of the auger drill holes showed promising grades, including highs of \$33.13/yd<sup>3</sup> and \$31.43/yd<sup>3</sup>. Bedrock was shallower on this right-limit bench than in all other areas tested in 2018.

Further exploration throughout the property should include resistivity geophysical surveys transecting the benches, followed by auger drill holes targeting potential paleochannels. Promising drill results should be followed-up by excavator test-pitting and bulk sampling.

The 2018 test mining pit (on the left limit bench in Area 2) should be extended upstream (north) in the direction of the high-grade drill targets. The recent mining pit on the downstream extent of the right-limit bench (Area 3) should also be extended upstream. The boundaries of the dredge limits and rising bedrock rims in both of these areas may be defined using resistivity geophysical surveys, in conjunction with auger drill holes for calibration of interpreted contacts and sampling of placer gold content.

## **Introduction**

The following is the final technical report in support of Grant #YMEP18-010 under the Yukon Mining Exploration Program (YMEP), Placer Module, on the Sulphur Creek (formerly Kruger) placer property, for Tusk Exploration Ltd.

## **Location and Access**

Sulphur Creek is a right limit tributary of the Indian River, located in central Yukon approximately 60 km by air south of Dawson City, Yukon (Figure 1). The Sulphur Creek Placer Property is located in the main valley of Sulphur Creek, approximately 8 km upstream of its confluence with the Indian River.

The centre of the property is 63°42'11"N and 138°47'20"W, on NTS map sheet 1150/10, in the Dawson Mining District (Figure 2).

Access to the property can be gained by summer road from Dawson City. The usual route runs from Dawson City along the Klondike Highway, then along Hunker Creek to King Solomon Dome, and down Sulphur Creek to near its confluence with Indian River (approximately 72 kilometres).

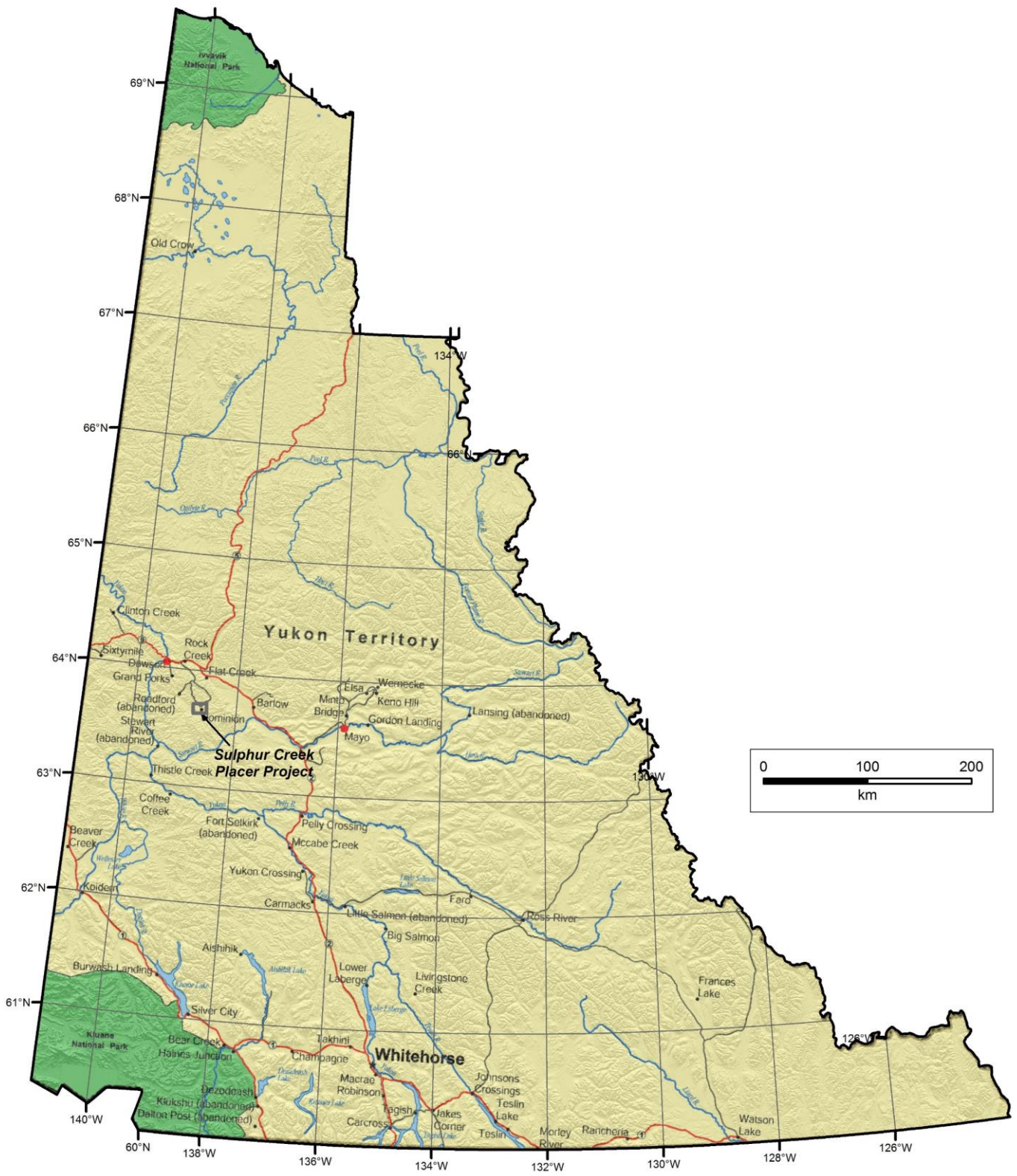


Figure 1 - Location of Sulphur Creek Project, Yukon.

## Placer Tenure

Table 1 shows a summary of the current status for claims on Sulphur Creek held by Tusk Exploration or subject to exploration agreements by the company.

Table 1 - Claim status, Sulphur Creek Placer Property.

GRANT NUMBER	STATUS	CLAIM NAME	OWNER NAME	STAKING DATE	RECORDED DATE	EXPIRY DATE
P 01338	Active	Lil 5	Gatenby Enterprises Ltd. - 100%	5/25/1976	5/25/1976	5/25/2019
P 01340	Active	Lil 6	Gatenby Enterprises Ltd. - 100%	5/25/1976	5/25/1976	5/25/2019
P 01339	Active	Lil 7	Gatenby Enterprises Ltd. - 100%	5/25/1976	5/25/1976	5/25/2019
P 04170	Active	Lil 8	Gatenby Enterprises Ltd. - 100%	5/14/1977	5/25/1977	5/25/2019
0655	Active	48 BD	Lance Gibson - 50%, Kris Kana - 50%	8/25/1897	8/28/1897	1/1/2020
P 45077	Active	Tamie 2	Lance Gibson - 50%, Kris Kana - 50%	9/8/2001	9/10/2001	1/1/2020
P 00499	Active	Claim 1	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08202	Active	Claim 1	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00500	Active	Claim 2	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08203	Active	Claim 2	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00501	Active	Claim 3	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08204	Active	Claim 3	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00502	Active	Claim 4	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08205	Active	Claim 4	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00503	Active	Claim 5	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08206	Active	Claim 5	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00504	Active	Claim 6	Tusk Exploration Ltd - 100%	8/21/1975	8/22/1975	10/1/2031
P 08207	Active	Claim 6	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 08208	Active	Claim 7	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 08209	Active	Claim 8	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 08210	Active	Claim 9	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 08211	Active	Claim 10	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 08212	Active	Claim 11	Tusk Exploration Ltd - 100%	10/1/1979	10/4/1979	10/1/2031
P 00416	Active	Discovery	Tusk Exploration Ltd - 100%	8/1/1975	8/4/1975	10/1/2031
P 09234	Active	Fractional	Tusk Exploration Ltd - 100%	6/12/1980	6/13/1980	10/1/2031
P 49364	Active	Karen	Yukon Alpine Heliski Ltd - 100%	5/28/2009	5/29/2009	5/29/2022
P 49365	Active	Mary	Yukon Alpine Heliski Ltd - 100%	5/28/2009	5/29/2009	5/29/2022

## Permitting

Water license PM14-027 and Class 4 Placer land use permit AP14027 are held by Tusk Exploration Ltd. on the property. The permits were issued on September 15, 2014 and are valid until September 3, 2024.



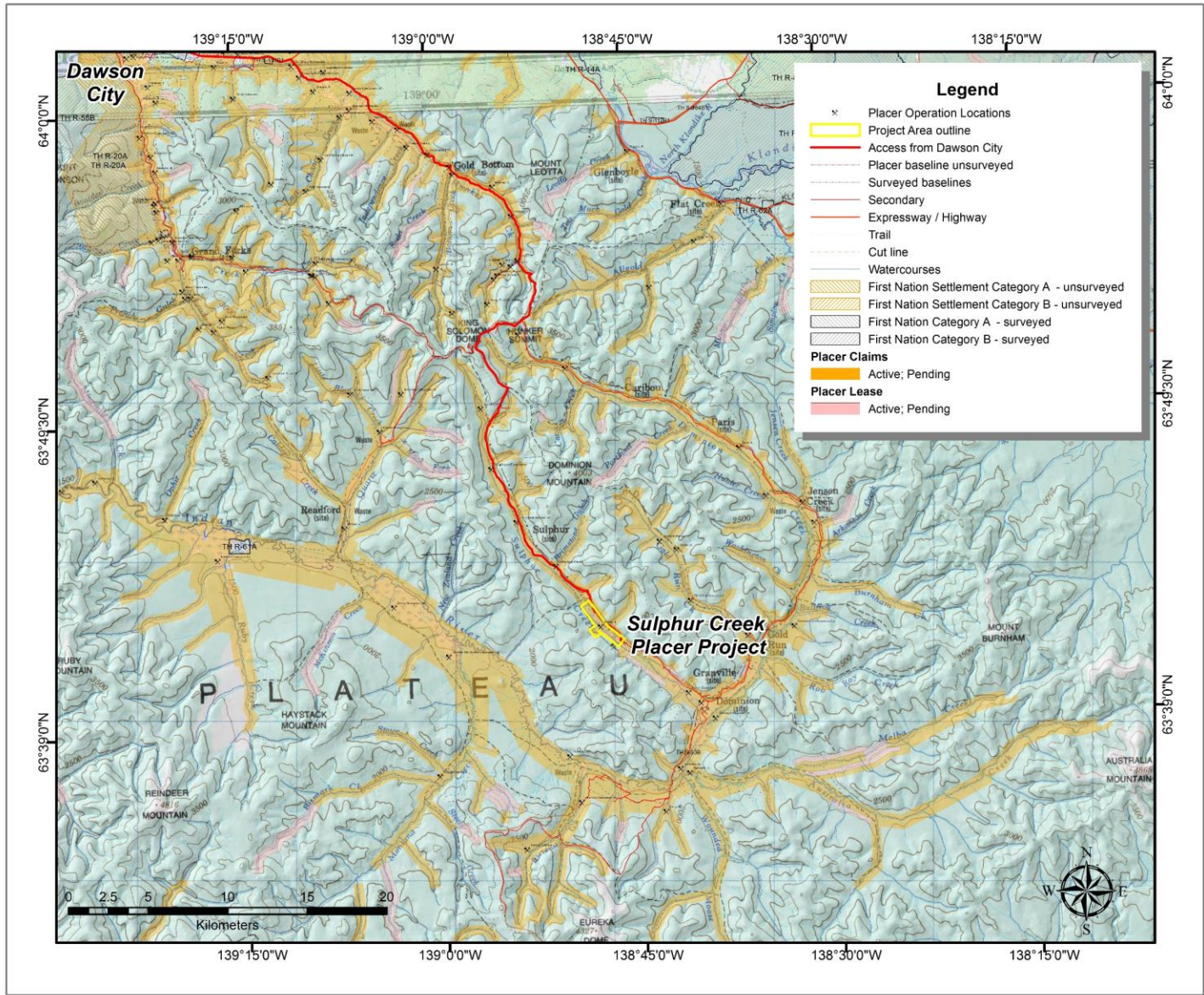


Figure 2 – Location of Sulphur Creek Placer Project and Dawson region placer tenures. The property lies 72 km by road from Dawson City.

## History of Exploration and Mining – Sulphur Creek

Sulphur Creek has been mined since the beginning of the Klondike Gold Rush in 1898, first by hand methods, and then by dredging. Green (1977) notes that three dredges mined on Sulphur Creek beginning in 1936. YCGC (Yukon Consolidated Gold Corporation) Dredge #6 mined 148,000 ounces between 1936 and 1966; YCGC Dredge #8 mined 212,000 ounces between 1937 and 1966 and YCGC Dredge #9 mined 113,000 ounces between 1938 and 1966.

Mechanical mining replaced the dredges after 1966 and dozens of operations have mined on Sulphur Creek from then up to the present day. Much of the activity is documented in LeBarge (2007) with more recent mining documented in LeBarge and Welsh (2007), LeBarge and Nordling (2011), and van Loon and Bond (2014). Gold production from these sources and Yukon Government royalty records shows a total of over 352,000 ounces produced from Sulphur Creek between 1940 and 2015. This does not include the hand mining from the 40+ years previous.

The centre of the 2018 Tusk Exploration project is comprised of the claims formerly owned by Mr. Henry Kruger. The Kruger placer mining operation has been active since the mid 1970's. Mr. Kruger's equipment over the years has included a Caterpillar 225 excavator, Caterpillar D7 bulldozer, Caterpillar D9 bulldozer, Caterpillar 955K loader, two Hough 120C loaders, and a Koehring 605 dragline. Water was supplied at 1500 to 2000 igpm with an 8 by 8" Murphy pump powered by a 671 Detroit engine, allowing the wash plant to process 50 loose cubic yards (38 m<sup>3</sup>) of gravel per hour. In 2010, Coulee Resources leased some of the property and mined a cut on the left limit.

In 2014, Tusk Exploration Ltd. under the management of Gary Crawford, established an agreement with Mr. Kruger (Bond and van Loon, 2018). Heavy equipment located onsite in 2017 included a John Deere 330 excavator, a Caterpillar 245 excavator, a Caterpillar 980 wheel loader and a Caterpillar D10N bulldozer. A custom-built trommel processed material at a rate of 80 loose yd<sup>3</sup> (61 m<sup>3</sup>)/hr.

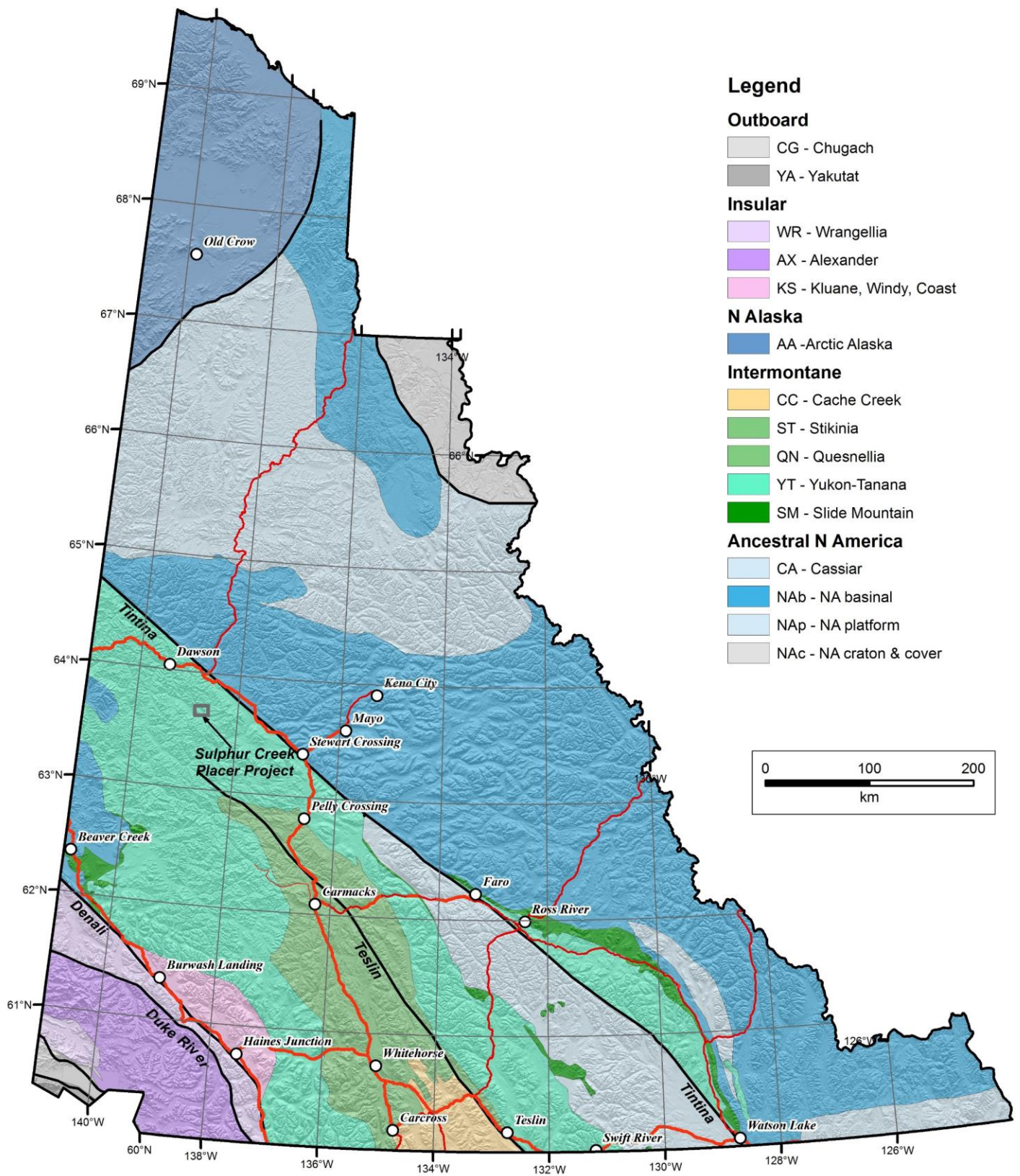


Figure 3 - Terrane map of Yukon, showing location of the Sulphur Creek placer property. After Yukon Geological Survey (2018).

## Regional Bedrock Geology

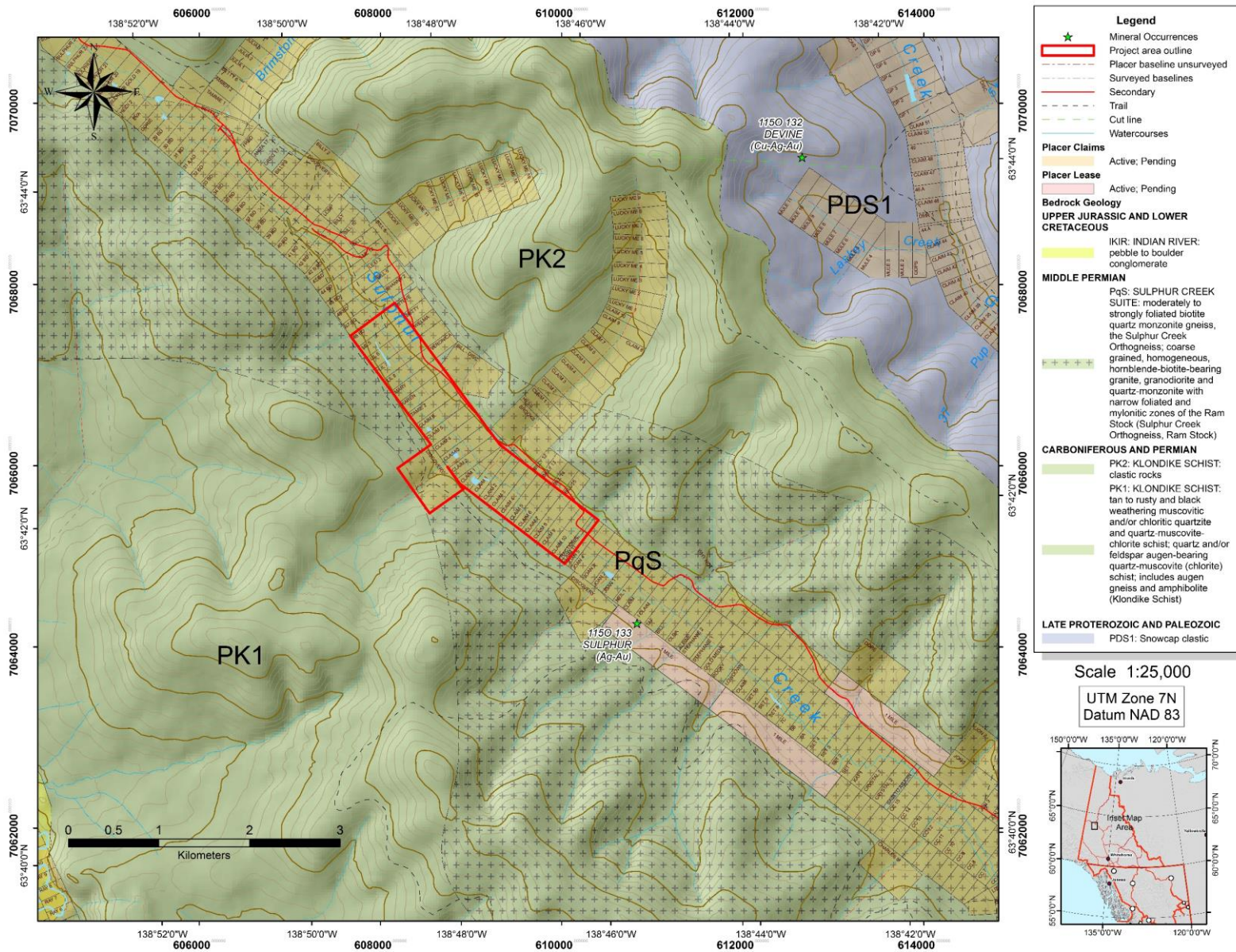
The project area is situated within the Yukon-Tanana terrane (Figure 3), an accreted pericratonic sequence that covers a large part of the northern Cordillera from northern British Columbia to east-central Alaska (Gordey and Ryan, 2005; Colpron and Nelson, 2006). The Yukon Tanana Terrane consists of Paleozoic schist and gneiss that were deformed and metamorphosed in the late Paleozoic, and intruded by several suites of Mesozoic intrusions that range in age from Jurassic to Eocene (Colpron and Nelson, 2006). The Paleozoic rocks are pervasively foliated with at least two overprinting fabrics (MacKenzie and Craw, 2010; MacKenzie et al, 2008). During Late Permian to Early Jurassic time these rocks were tectonically-stacked along thrust faults which were parallel to regional foliation. Later tensional-extensional tectonics occurred during the mid-Cretaceous, and this resulted in brittle fracture of the Paleozoic rocks, which is likely responsible for structurally-controlled gold mineralization in the south Klondike area including the White Gold exploration camp (MacKenzie et al, 2008; MacKenzie and Craw, 2010; MacKenzie and Craw, 2012).

Major units in the Klondike area include: the Snowcap (Nasina) Assemblage, the Klondike Series, the Slide Mountain (Moosehide) Assemblage, upper Cretaceous Carmacks Group volcanics/volcanoclastics, and Eocene intrusives (Figure 3). The basement unit is the Snowcap (Nasina) Series, consisting of metamorphosed schist and quartzite. It is overlain by the Klondike Series, a dominantly quartzofeldspathic schist of Early Permian (280 m.y.) age. Mid-Permian Sulphur Creek orthogneiss cuts the Klondike Schist extensively along Sulphur Creek. In the south and west Klondike, the Klondike Series is in contact with Late Devonian to Mississippian Simpson Range orthogneiss. Structurally overlying the Klondike and Nasina Series are greenstone and altered ultramafic of the Slide Mountain (Moosehide) Assemblage. In the east and south Klondike, upper Cretaceous andesitic volcanics and clastic sediments occur. These units are intruded by Eocene age rhyolite and diorite dykes and sills. Significant lode gold has been found throughout the Klondike and south Dawson areas (Chapman et. al., 2011 and others). The precise relationship between lode gold sources and local placer gold deposits is enigmatic and has been the subject of many scientific studies.

## Local Bedrock Geology and Mineral Occurrences

Figure 4 shows the bedrock underlying the property and throughout most of lower Sulphur Creek as Sulphur Creek orthogneiss (map unit PqS). Immediately to the east and west of this central unit, the bedrock consists of Klondike Schist (map units PK1 and PK2). Farther to the east lies Snowcap (Nasina) assemblage quartzite and schist (map unit PDS1).

There are two known mineral occurrences near the Sulphur Creek property. The first is Minfile #1150 132 (DEVINE), which is a 2.4 m wide quartz vein (also known as the Kentucky Lode) which was first discovered in 1901 (YGS, 2018). It is hosted in Snowcap (Nasina) assemblage quartzite and schist. Historical values of 7.9 g/t gold with traces of silver and copper have been reported. Minfile #1150 133 (SULPHUR) lies downstream and is hosted in the same bedrock. Little is known about this occurrence although the area was drilled extensively in the mid 1980's.



## Quaternary History

Most of the Klondike region has not been glaciated (Duk-Rodkin, 1999; Jackson et al., 2001). However, the marginal effects of a pre-Reid glaciation deposited glaciofluvial gravel along Australia Creek and Indian River. These were sourced from meltwater channels which breached the divide in the headwaters to the east. There is no evidence that glacial ice advanced into the drainage, although the pre-Reid glaciofluvial terraces covered pre-existing Tertiary White Channel gravels. These are especially evident in downstream reaches above Indian River (Froese and Jackson, 2005). The Sulphur Creek drainage, upstream of Indian River, escaped glaciation altogether. However, climatic influences and base level changes brought on by regional glaciations would have had significant effects on the weathering and erosion of local bedrock, as well as the deposition of the alluvial and colluvial materials into the local valleys.

## Surficial Geology

The surficial geology of the project area was mapped by Froese and Jackson (2005). Along Sulphur Creek lie surficial units of several ages and types, shown in Figure 5. These include: CEaP/AtT (Pleistocene colluvial-aeolian sediments overlying Tertiary alluvial terrace sediments), CEaP (Pleistocene colluvial-aeolian sediments), AtP (Pleistocene alluvial terrace), ACxP (Pleistocene alluvial/colluvial complex), Ax (alluvial complex), Cx (colluvial complex), Cl (landslide) and Cb-v (colluvial blanket-veneer). In general, the AtT (Tertiary alluvial terrace) units are more prevalent downstream, whereas upstream reaches are dominated by ACxP (Pleistocene alluvial/colluvial complex) and Cx (colluvial complex). The Kruger Property is mapped as M (made land - mined) and Ax (Alluvial Complex) in the valley centre, flanked by Cx (colluvial complex).

## Placer Geology

Placer gravels in Dominion Creek and its tributaries (Gold Run and Sulphur) can be characterized by 5 types of deposits: Pliocene White Channel gravel; Pleistocene terraces; early Pleistocene incised-valley gravel (Ross gravel); Pleistocene Dominion Creek gravel; and creek and gulch deposits (Froese et al., 2001). LeBarge (2007) describes the gravel section mined in 2006 as 5 m (16.4 ft.) of frozen black muck overlying 5 to 6 m (15 to 20 ft.) of various gravel layers. These gravel units had 'White Channel' rocks, oxidized rounded rocks and flat slide rocks, and were comprised of a 4-foot (1 m) rusty layer, a 4-foot (1 m) yellow layer and a 4-foot (1 m) grey layer on bedrock. From 5 to 6 m (15 to 20 feet) of gravel were sluiced along with 1/2 to 1 foot (0.2 to 0.3 m) of bedrock. The stratigraphy of a right limit section on the Kruger property is described by van Loon and Bond (2014) as 5 to 6 m (16.4 to 19.7 ft.) of gravel overlain by 5 m (16.4 ft.) of frozen black muck. All of the gravel was sluiced as well as 0.1 to 0.3 m (0.5 to 1.0 ft.) of bedrock. Placer gold was described as fine-grained and bright yellow, with a bulk fineness ranging from 790 to 820. The bedrock beneath the gravel was described as a decomposed schist. Bond and van Loon (2018) describe the stratigraphy on a right limit cut in 2017 as consisting of four units. Unit 1 is a decomposed quartz-feldspar gneiss, which becomes more competent after a depth of 1.0 m (3.3 ft). Unit 2 is a continuous mixing zone between the weathered gneiss bedrock and the upper gravel unit. The mixing zone undulates and has a thickness ranging between 0.3 and 0.6 m (1.0 & 2.0 ft). The unit consists of medium sand that contains subrounded to rounded pebble and cobble-sized clasts. Overlying the mixing zone is unit 3, a pebble-cobble gravel from 0.6 to 2.4 m (2.0-7.9 ft) thick that contains 60% pebbles and 40% cobbles. It is a light grey gravel known as "Ross gravel" and is matrix-supported with medium sand and minor silt, is fairly loose, and has rare boulders up to 0.3 m (1.0 ft) in length. Ross gravel is an incised-valley gravel and despite its similarity to White Channel gravel, is significantly younger (Froese et al., 2001). Unit 4, from 2.4 to 8.0 m (7.9-26.2 ft), consists of interbedded fine-grained sand and silt, and loess. Up to 1.5 m (5 ft) of gravel and 0.6 m (2 ft) of bedrock was sluiced.

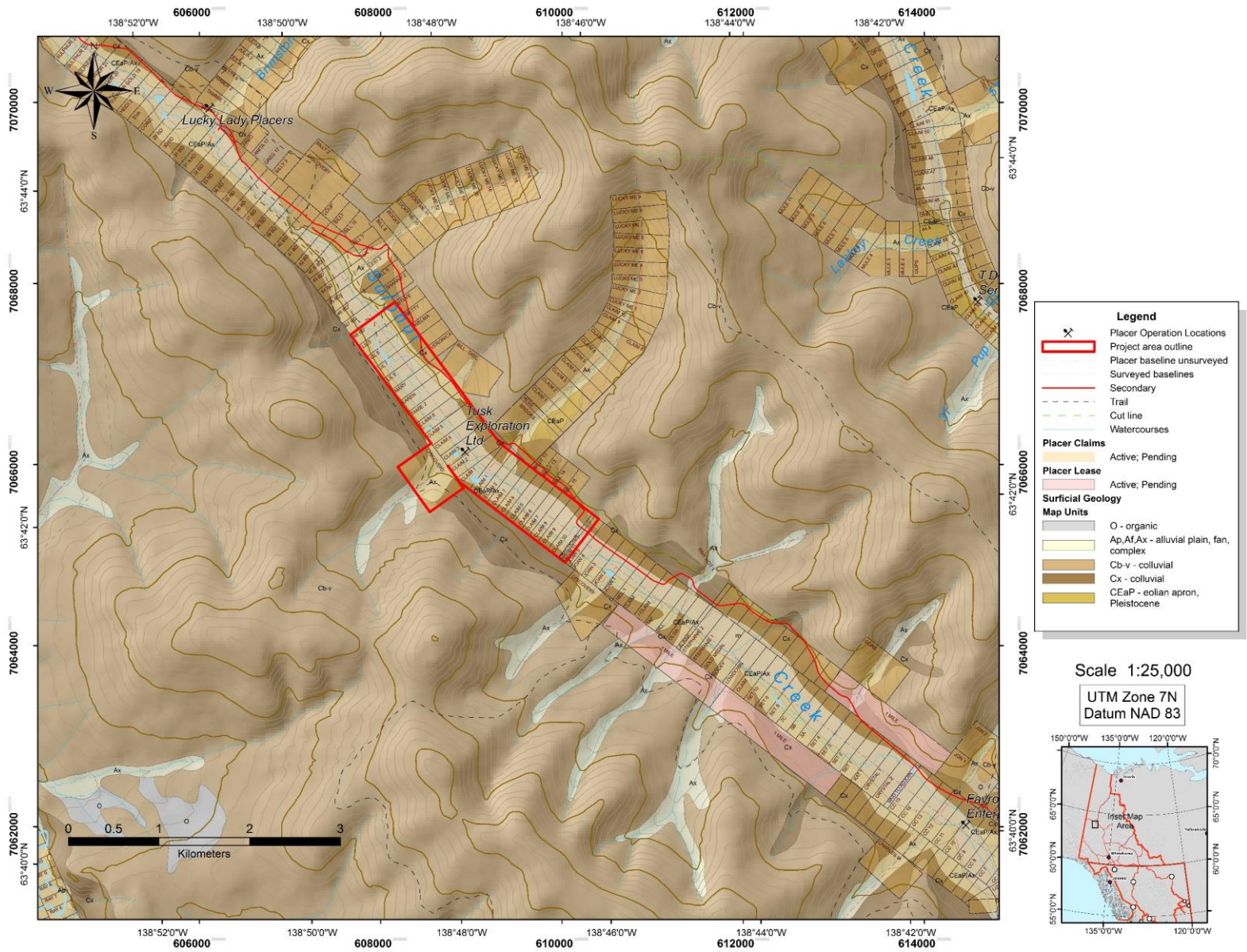


Figure 5 - Surficial Geology, Sulphur Creek Project Area, after Froese and Jackson (2005).

## Rationale for 2018 Placer Exploration Program

Sulphur Creek has consistently been one of the top ten producing creeks annually in the Yukon since placer mining began early in Klondike history. Green (1977) notes that three dredges mined on Sulphur Creek beginning in 1936. YCGC (Yukon Consolidated Gold Corporation) Dredge #6 mined 148,000 ounces between 1936 and 1966; YCGC Dredge #8 mined 212,000 ounces between 1937 and 1966, and YCGC Dredge #9 mined 113,000 ounces between 1938 and 1966.

Mechanical mining replaced the dredges after 1966, and dozens of operations have mined on Sulphur Creek from then up to the present day. Gold production from numerous sources and Yukon Government royalty records shows a total of over 352,000 ounces produced from Sulphur Creek between 1940 and 2015. This does not include the hand mining from the 40+ years previous. Since 1980, Sulphur Creek has produced approximately 122,000 oz. of placer gold (van Loon, 2017). Although recent production has diminished, in 2016 Sulphur Creek continued to be a significant producer of placer gold with over 500 crude ounces recorded in royalties (Bond and van Loon, 2016).

YCGC conducted placer drilling programs throughout the Klondike, including on Sulphur Creek between 1935 and 1955. The results of these drilling programs were well-documented in map and text files, however it was not easily available, as most of the files were held in Ottawa at the National Archives. Although it was known for many years that several placer miners had visited Ottawa to acquire this data on their own claims, efforts to send a Government representative to Ottawa to gather this information were not successful until 2013.

Presently however, much of this data has now been compiled, digitized and georeferenced by the Yukon Geological Survey, and is available publically (van Loon, 2017). This georeferenced data can be used, among other things, to compare dredged and mined areas to the locations and values acquired during the drill programs. Certain trends and highlights may be found, including areas with economic placer gold values which were never dredged or mined in the present day.

Figure 6 shows the prospective YCGC drill holes in the Sulphur Creek project area, along with an interpretation of potential paystreaks which transect the property (van Loon, 2017). This data is key to the 2018 placer exploration program on Sulphur Creek.



## 2018 Placer Exploration Program

### Overview

The 2018 placer exploration program consisted of 8 resistivity lines totalling 1601 m, and 59 auger drill holes totalling 1961 ft. (598 m), as well as a large test mining cut. The areas where placer exploration was concentrated in 2018 are shown on Figure 6, which is a compilation map of the Sulphur Creek property including surficial geology, YCGC drill results, and known or inferred paystreaks (after van Loon, 2017). Areas 1 to 3 are shown in detailed maps following.

### Auger Drilling

Between May and October 2018, 59 six-inch diameter auger drill holes were drilled for a total of 1961 ft. (598 metres). The driller was Jeff Dubois, and the drill unit was mounted on a Nodwell tracked vehicle. Table 2 lists the coordinates and claim details of the 2018 drill holes.

Table 2 – 2018 Auger Drill Hole Locations, Depths and Gold Grade Results, Sulphur Creek.

Drill Hole Name	Claim Name Location	Grant Number	Depth_ft	Depth_m	Grade \$ /yd <sup>3</sup>	Latitude	Longitude
1	Claim 5	P 00503	37	11.2776	\$0.00	63.709517	-138.795272
2	Claim 5	P 00503	48	14.6304	\$33.00	63.709563	-138.795094
3	Claim 5	P 00503	48	14.6304	\$815.22	63.709592	-138.794862
4	Claim 5	P 00503	58	17.6784	\$10.31	63.710399	-138.795984
5	Claim 5	P 00503	57	17.3736	\$0.00	63.71043	-138.795881
6	Claim 5	P 00503	32	9.7536	\$0.00	63.710511	-138.795571
7	Claim 6	P 00504	58	17.6784	\$9.63	63.710897	-138.79713
8	Claim 6	P 00504	54	16.4592	\$0.00	63.710971	-138.796867
9	Claim 6	P 00504	37	11.2776	\$0.00	63.711141	-138.795929
A	Claim 4	P 00502	39	11.8872	\$0.00	63.709256	-138.794723
B	Claim 4	P 00502	43	13.1064	\$33.59	63.70921	-138.794883
C	Claim 4	P 00502	43	13.1064	\$0.00	63.709179	-138.795032
D	Claim 4	P 00502	42	12.8016	\$0.00	63.709084	-138.794636
E	Claim 4	P 00502	34	10.3632	\$0.00	63.709066	-138.794793
F	Claim 4	P 00502	38	11.5824	\$22.00	63.709055	-138.794922
G	Claim 4	P 00502	28	8.5344	\$4.66	63.708864	-138.794396
H	Claim 4	P 00502	28	8.5344	\$15.29	63.708831	-138.794637
I	Claim 4	P 00502	26	7.9248	\$94.30	63.708749	-138.794882
LL 1	Claim 5	P 00503	47	14.3256	\$0.00	63.710031	-138.79539
LL 2	Claim 5	P 00503	46	14.0208	\$0.00	63.70997	-138.795536
LL 3	Claim 5	P 00503	48	14.6304	\$9.68	63.710031	-138.79539
LL 4	Claim 5	P 00503	53	16.1544	\$0.00	63.710083	-138.795325
RL 1	KAREN	P 49364	17	5.1816	\$0.00	63.711363	-138.808568
RL 2	KAREN	P 49364	27	8.2296	\$0.00	63.711354	-138.80931

Drill Hole Name	Claim Name Location	Grant Number	Depth_ft	Depth_m	Grade \$ /yd <sup>3</sup>	Latitude	Longitude
RL 3	MARY	P 49365	25	7.62	\$0.00	63.711967	-138.809606
RL 4	TAMIE 2	P 45077	24	7.3152	\$0.00	63.709603	-138.805845
Gat1a	48 BD	655	58	17.6784	\$0.00	63.720073	-138.812646
Gat2b	48 BD	655	41	12.4968	\$0.00	63.720134	-138.812412
Gat3c	48 BD	655	42	12.8016	\$0.00	63.720181	-138.812252
Gat4d	48 BD	655	43	13.1064	\$0.00	63.719774	-138.812284
Gat5e	48 BD	655	45	13.716	\$0.00	63.71989	-138.81188
Gat6f	LIL 7	P 01339	38	11.5824	\$11.89	63.716683	-138.808057
Gat7g	LIL 7	P 01339	42	12.8016	\$5.95	63.716745	-138.807824
Gat8H	LIL 7	P 01339	32	9.7536	\$10.19	63.716012	-138.806733
Gat9I	LIL 7	P 01339	32	9.7536	\$13.90	63.716153	-138.807123
Gat10J	LIL 8	P 04170	42	12.8016	\$11.33	63.715226	-138.806972
BRL 1	Claim 8	P 08209	12	3.6576	\$30.58	63.698202	-138.779064
BRL 2	Claim 8	P 08209	15	4.572	\$14.02	63.698195	-138.779344
BRL 3	Claim 8	P 08209	18	5.4864	\$24.21	63.69814	-138.779742
BRL 4	Claim 8	P 08209	22	6.7056	\$0.00	63.697891	-138.780216
BRL 5	Claim 7	P 08208	25	7.62	\$7.65	63.699249	-138.78161
BRL 6	Claim 7	P 08208	25	7.62	\$10.19	63.699141	-138.781908
BRL 7	Claim 6	P 08207	26	7.9248	\$0.00	63.699035	-138.782277
BRL 8	Claim 5	P 08206	22	6.7056	\$7.65	63.700189	-138.783637
BRL 9	Claim 5	P 08206	24	7.3152	\$8.50	63.700041	-138.783982
BRL 10	Claim 5	P 08206	28	8.5344	\$31.43	63.699984	-138.784157
BRL 11	Claim 4	P 08205	16	4.8768	\$33.13	63.701018	-138.785864
BRL 12	Claim 4	P 08205	23	7.0104	\$2.04	63.700899	-138.78611
BRL 13	Claim 4	P 08205	27	8.2296	\$2.55	63.700788	-138.786506
BRL 14	Claim 2	P 08203	23	7.0104	\$9.56	63.702179	-138.789592
BRL 15	Claim 2	P 08203	24	7.3152	\$11.89	63.702038	-138.789998
BRL 16	Claim 2	P 08203	22	6.7056	\$8.66	63.701913	-138.790376
BRL 17	Claim 3	P 08204	22	6.7056	\$9.56	63.701511	-138.787777
BRL 18	Claim 3	P 08204	20	6.096	\$17.84	63.701404	-138.787983
BRL 19	Claim 2	P 08203	23	7.0104	\$7.65	63.702186	-138.789865
BRL 23	Claim 8	P 08209	20	6.096	\$1.91	63.698419	-138.780063
BRL 24	Claim 8	P 08209	27	8.2296	\$2.55	63.698282	-138.780459
BRL 25	Claim 7	P 08208	22	6.7056	\$2.55	63.698661	-138.780571
BRL 26	Claim 7	P 08209	23	7.0104	\$2.55	63.69854	-138.780904

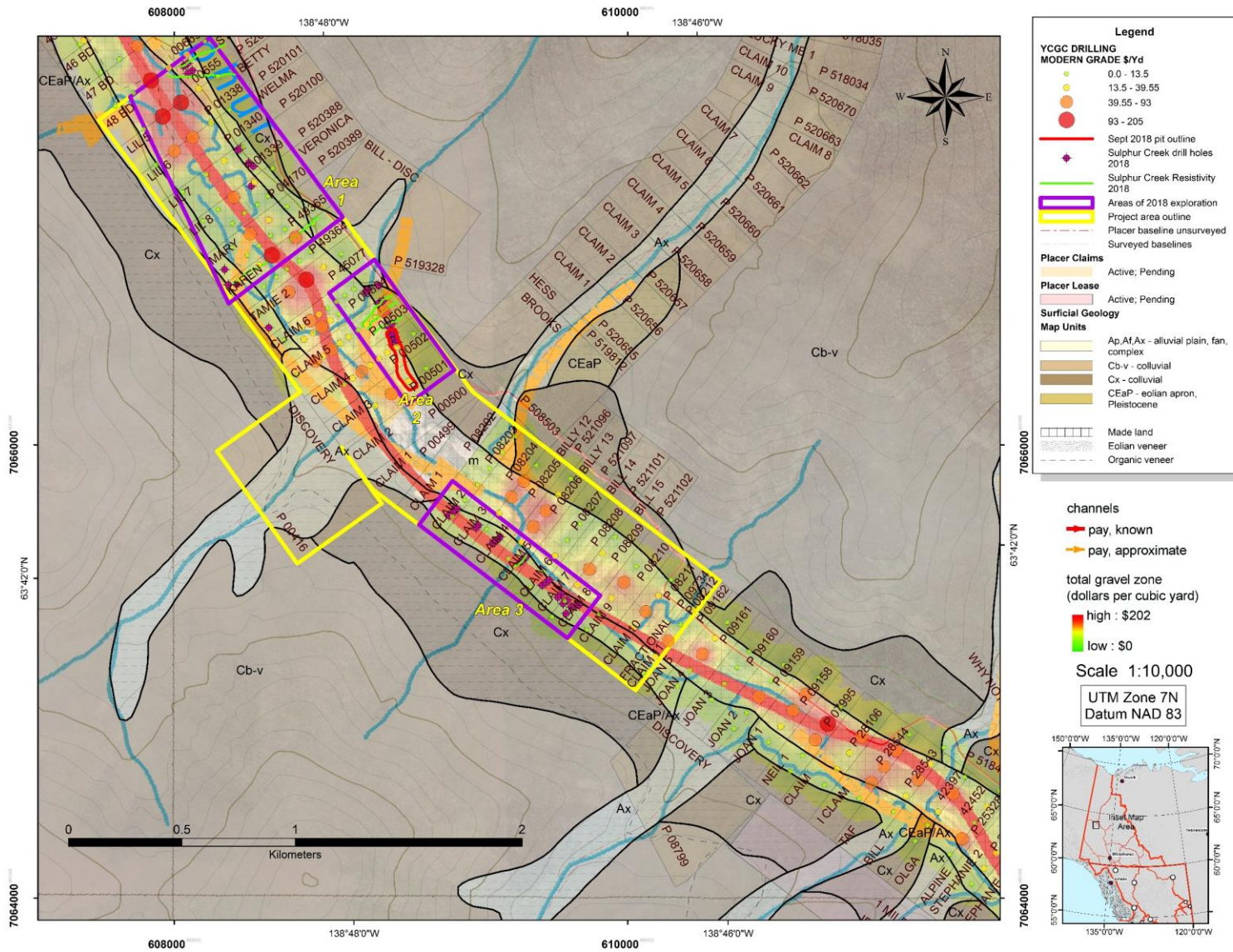


Figure 6 – Sulphur Creek placer property showing areas of 2018 exploration along with surficial geology (after Froese and Jackson, 2005), YCGC drill holes, inferred and known paystreaks and modern values per cubic yard (after van Loon, 2017). A figure of \$1400 CDN per fine ounce was used to calculate the modern grade in \$/yard.

## Resistivity Surveys

### *Introduction*

A total of 8 resistivity lines totalling 1601 metres were conducted and interpreted for Tusk Exploration Ltd. by Selena Magel and William LeBarge of Geoplacer Exploration Ltd. The surveys were conducted between May 15, 2018 and October 19, 2018.

### *Methodology*

The Lippmann 4-Point Light Resistivity System was used to conduct the surveys. The resistivity technique injects an electrical current into the subsurface through stainless steel spikes and then measures the remaining voltage at various distances away from the injection point. Ground materials have different resistances to the current, and give data points in a cross section of the subsurface. With the data points, a tomogram or pseudo section can be created representing changes of resistivity in the ground. Data was collected using Geotest software, while the inversion and data filtering was completed with RES2DINV software. Data points with poor contact resistance were exterminated and noisy data was filtered statistically with root mean squared data trimming. Two-dimensional tomograms were produced using least squares damped inversion parameters to display the resistivity properties and to display potential contacts.

The two-dimensional images are used for preliminary interpretations of bedrock structure. The images were interpreted by William LeBarge and Selena Magel.

General principles and assumptions of electrical resistivity are:

1. Low resistivity can indicate thawed and water saturated areas, as well as fine-grained material.
2. Very high resistivity values can be due to ice rich material and frozen or highly disturbed ground.
3. Dry gravels, cobbles and boulders generally have high resistivity values.
4. The contrasts between values is more important in determining contacts than the absolute values found with resistivity data.

### *Limitations and Disclaimer*

The interpreted sections provide an estimate of the conditions beneath the surface to the depths conducted and are within the accuracy of the system and methods. The data becomes more uncertain with depth and are more accurate toward the surface and is further complicated if there is permafrost present in the region. The materials are interpreted based upon local geology observed, as well as geologic knowledge of the area. Certain materials may be similar in composition and result in uncertain results. The accuracy of the information presented is not guaranteed and all mine development is the client's responsibility. William LeBarge and Selena Magel of Geoplacer Exploration Ltd. accept no liability for any use or application of these data by any and all authorized or unauthorized parties.

## Results

The presence of permafrost throughout the survey areas increased the uncertainty of the interpreted results. Permafrost was continuous on north and east-facing slopes, and discontinuous on portions of south and west-facing slopes. Parts of the valleys which had been mined or disturbed were usually thawed and associated with high water saturation. In these areas, contrasts between low and high resistivity values were likely partially or wholly a reflection of varying groundwater and permafrost conditions, rather than strictly lithological boundaries.

The geographic coordinates of the endpoints of the surveyed lines are shown in Table 3, and the lines are plotted on Figures 6, 7, 12 and 16. The interpreted profiles are shown as Figures 8 to 11, 13 to 15, and Figure 17.

Table 3 – 2018 resistivity survey lengths, grant number locations and endpoint geographic coordinates, Sulphur Creek.

Survey Name	Grant Number	Start Point		End Point		Length (m)
		Latitude	Longitude	Latitude	Longitude	
<b>RES18-48BD-02</b>	0655	63.7208751	-138.808919	63.7200853	-138.81295	230
<b>RES18-48BD-03</b>	0655	63.7196582	-138.808097	63.7197029	-138.81405	327
<b>RES18-KAREN-01</b>	P 49364	63.7138979	-138.801084	63.7129698	-138.80377	188
<b>RES18-KAREN-02</b>	P 49364	63.7122923	-138.805704	63.7114244	-138.80889	203
<b>RES18-CLAIM 5-01</b>	P 00503	63.7104756	-138.794325	63.709393	-138.79703	196
<b>RES18-CLAIM 5-02</b>	P 00503	63.7107134	-138.794692	63.7095348	-138.79751	223
<b>RES18-CLAIM 5-03</b>	P 00503	63.7098623	-138.794021	63.7092104	-138.7965	151
<b>RES18-CLAIM 5 (lower)-01</b>	P 08206	63.7002589	-138.783596	63.6997622	-138.78466	84

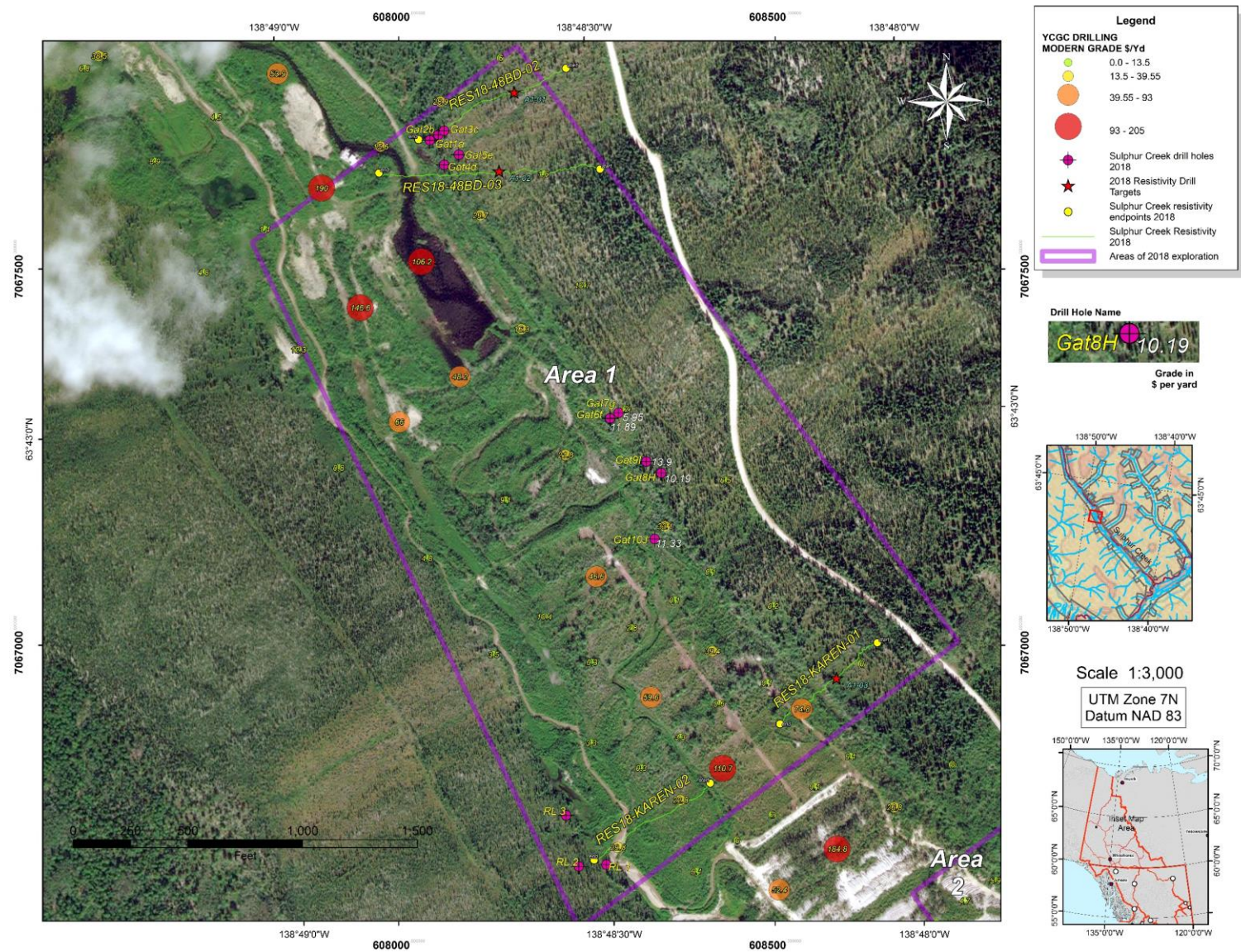


Figure 7 - Detailed map of Area 1, showing 2018 resistivity surveys, auger drill holes with grades, nearby historic YCGC drill holes and drill targets. Auger drill hole grades of zero are not shown.

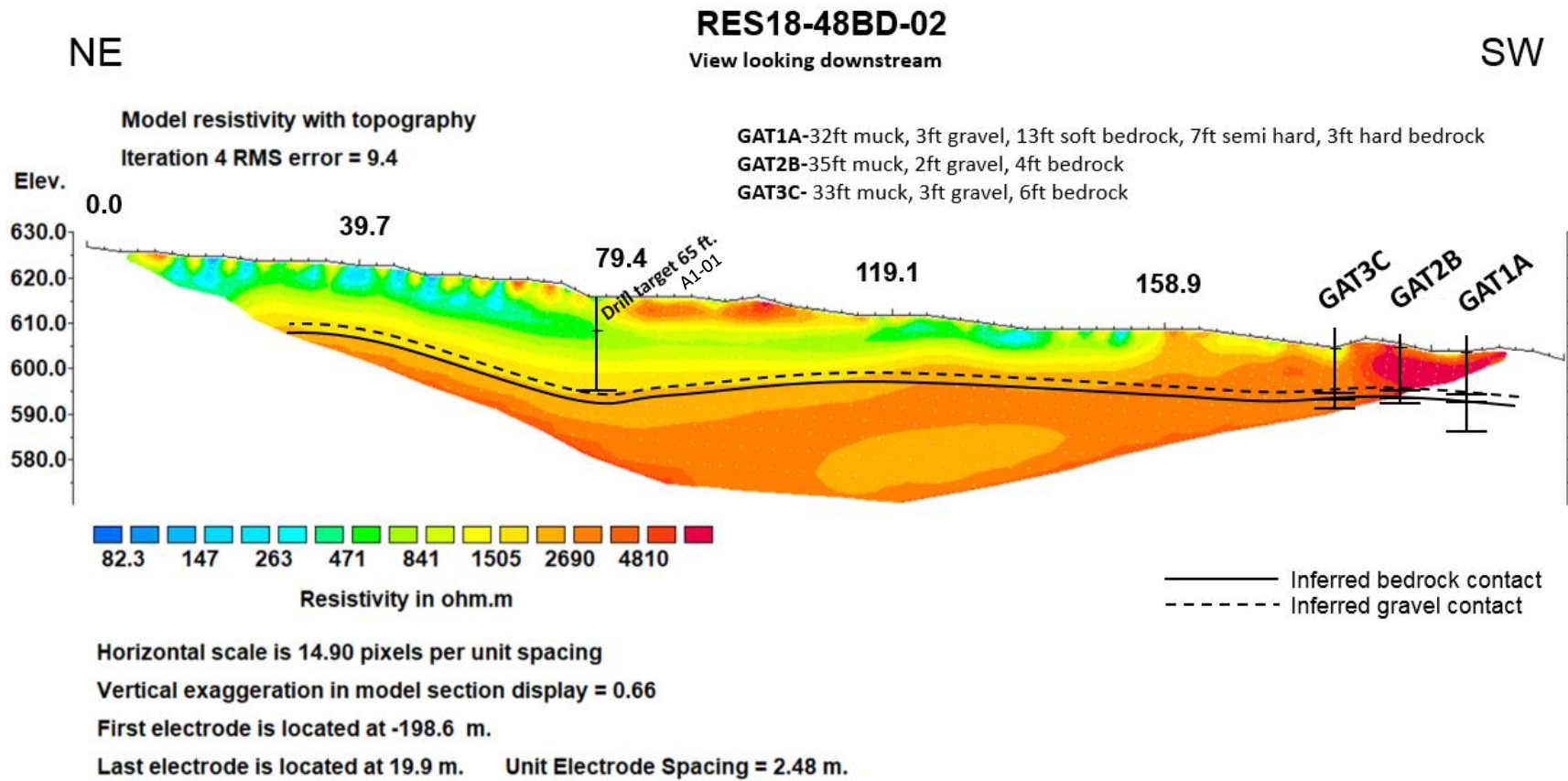


Figure 8 - RES18-48BD-02 was surveyed across 3 auger drill holes, GAT1A, GAT2B, and GAT3C. All of the drill holes encountered black muck, and a thin gravel layer that lies above bedrock. The bedrock has been interpreted with a gentle undulation near 79 metre mark that is a drill target at a depth of 20 m (65 ft.).

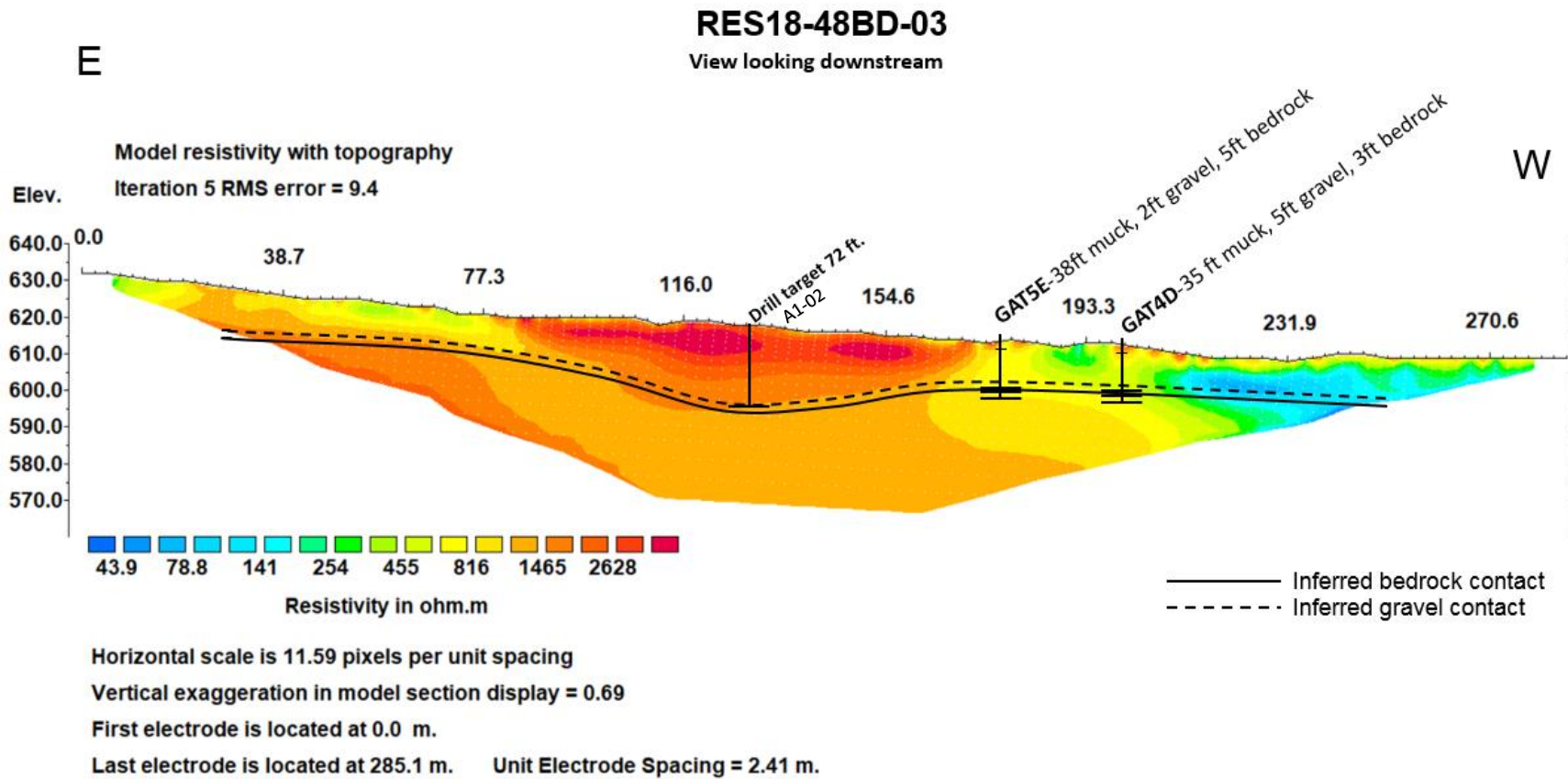


Figure 9 - RES18-48BD-03 was surveyed across 2 drill holes, GAT5E and GAT4D. The drill holes both encountered black muck and a thin gravel layer on bedrock. There is a gentle undulation around the 130m mark that is a drill target at 22 m (72 ft.) for exploration of placer gold. This target is in line with the target on RES18-48BD-02 and could be indicating a bench channel deposit.



# RES18-KAREN-01

NE

View looking downstream

SW

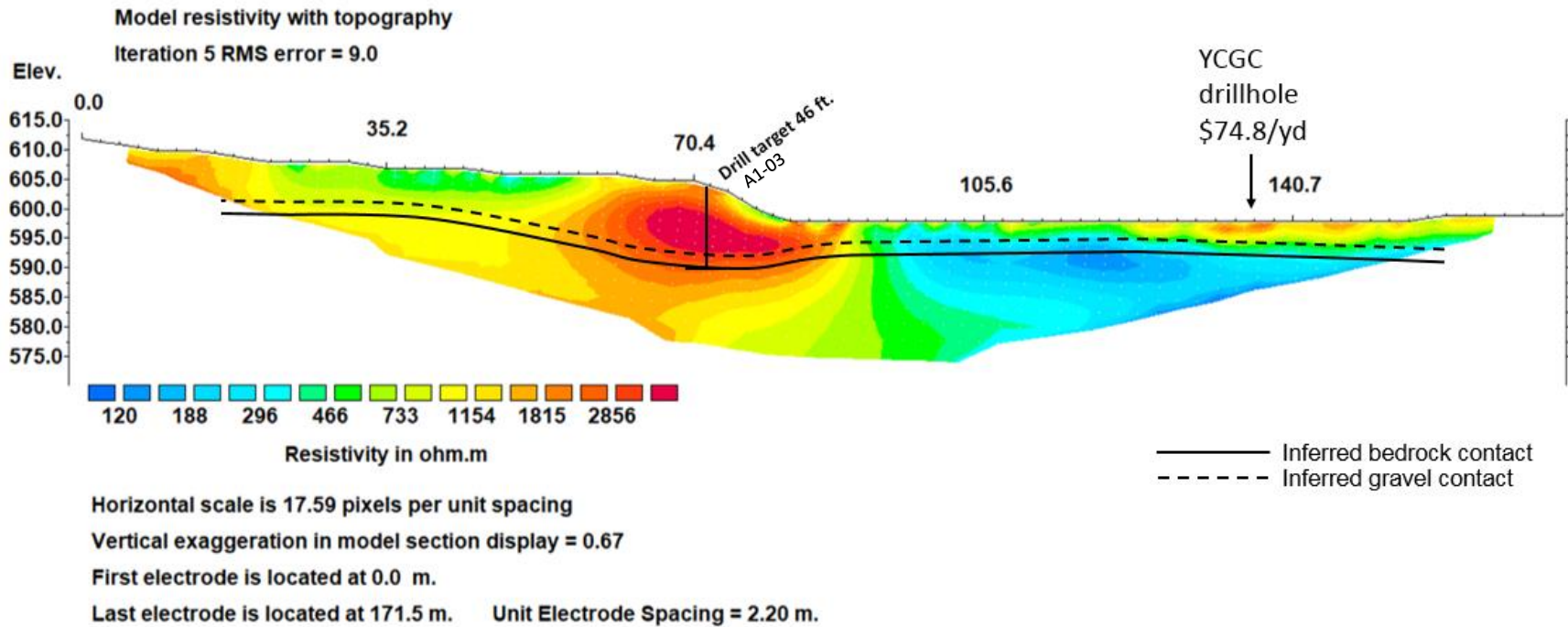


Figure 10 - RES18-KAREN-01 was surveyed on the left limit across a YCGC drill hole which had a grade of \$74.8/yd<sup>3</sup>. The bedrock and gravel contacts are interpreted as gently undulating and following topography. One potential drill target at a depth of 14 m (46 ft.) is shown at the 70 metre mark.

# RES18-KAREN-02

View looking downstream

NE

SW

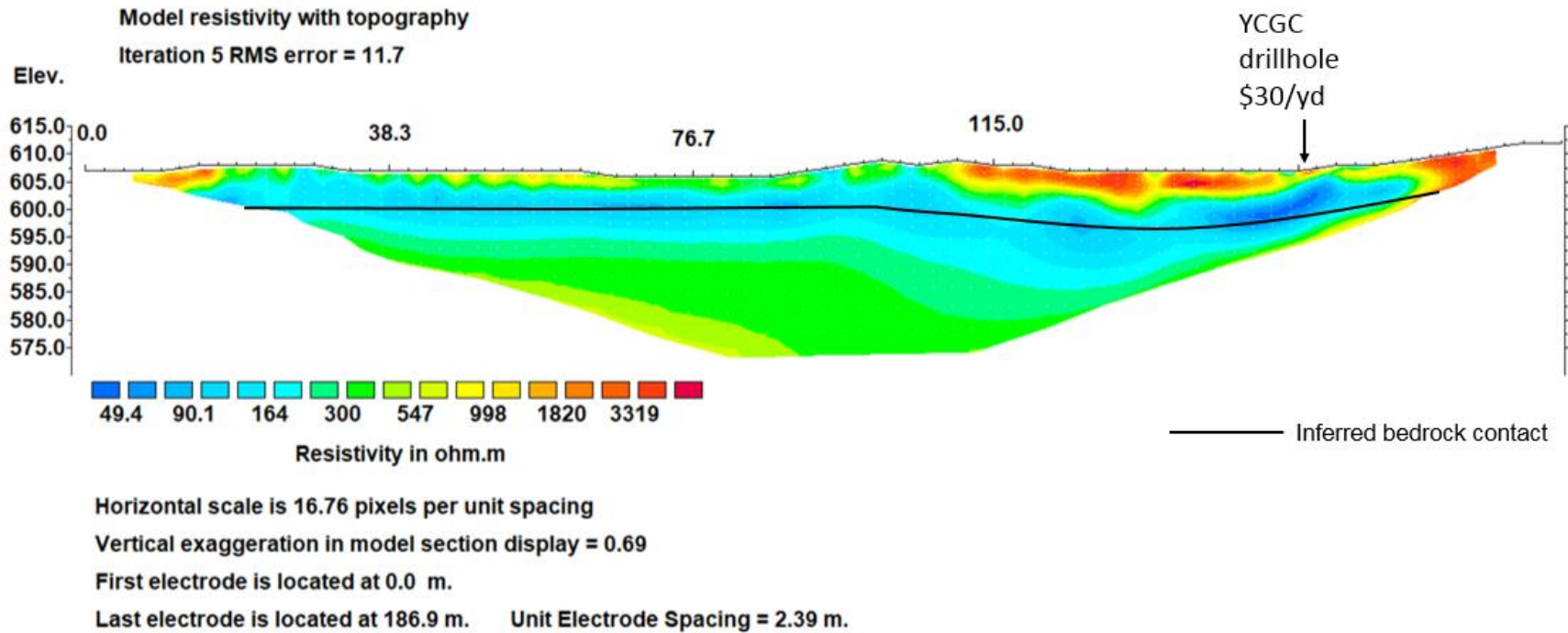


Figure 11- RES18-KAREN2-02 was surveyed in the flat valley bottom and crosses over a historic YCGC drill hole with a value of \$30/yd<sup>3</sup>. The bedrock is interpreted as relatively flat with small undulations. No obvious drill targets were identified.

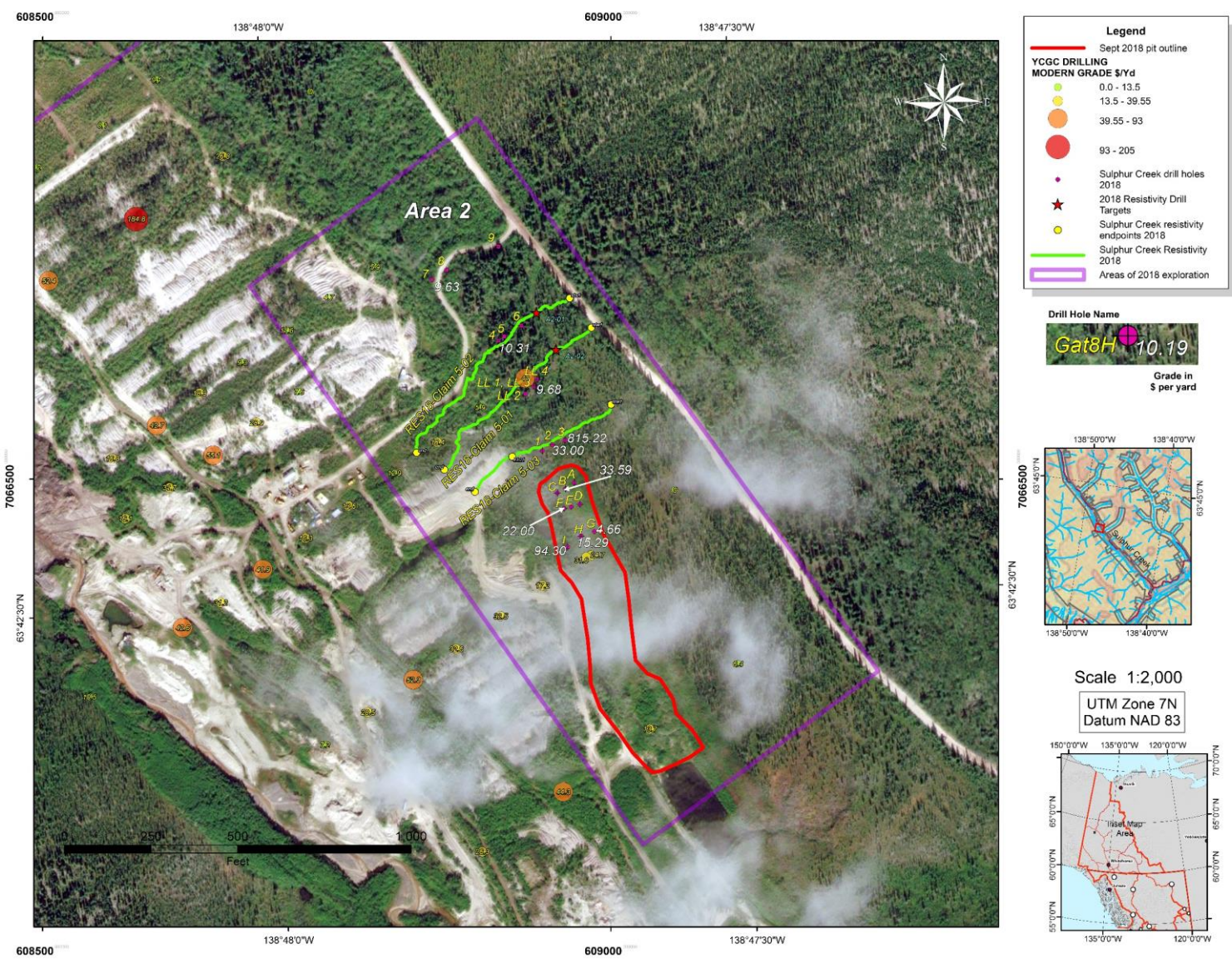


Figure 12 - Detailed map of Area 2, showing 2018 resistivity surveys with drill targets, auger drill holes with grades, the 2018 active mining pit and nearby historic YCGC drill holes. Auger drill hole grades of zero are not shown.

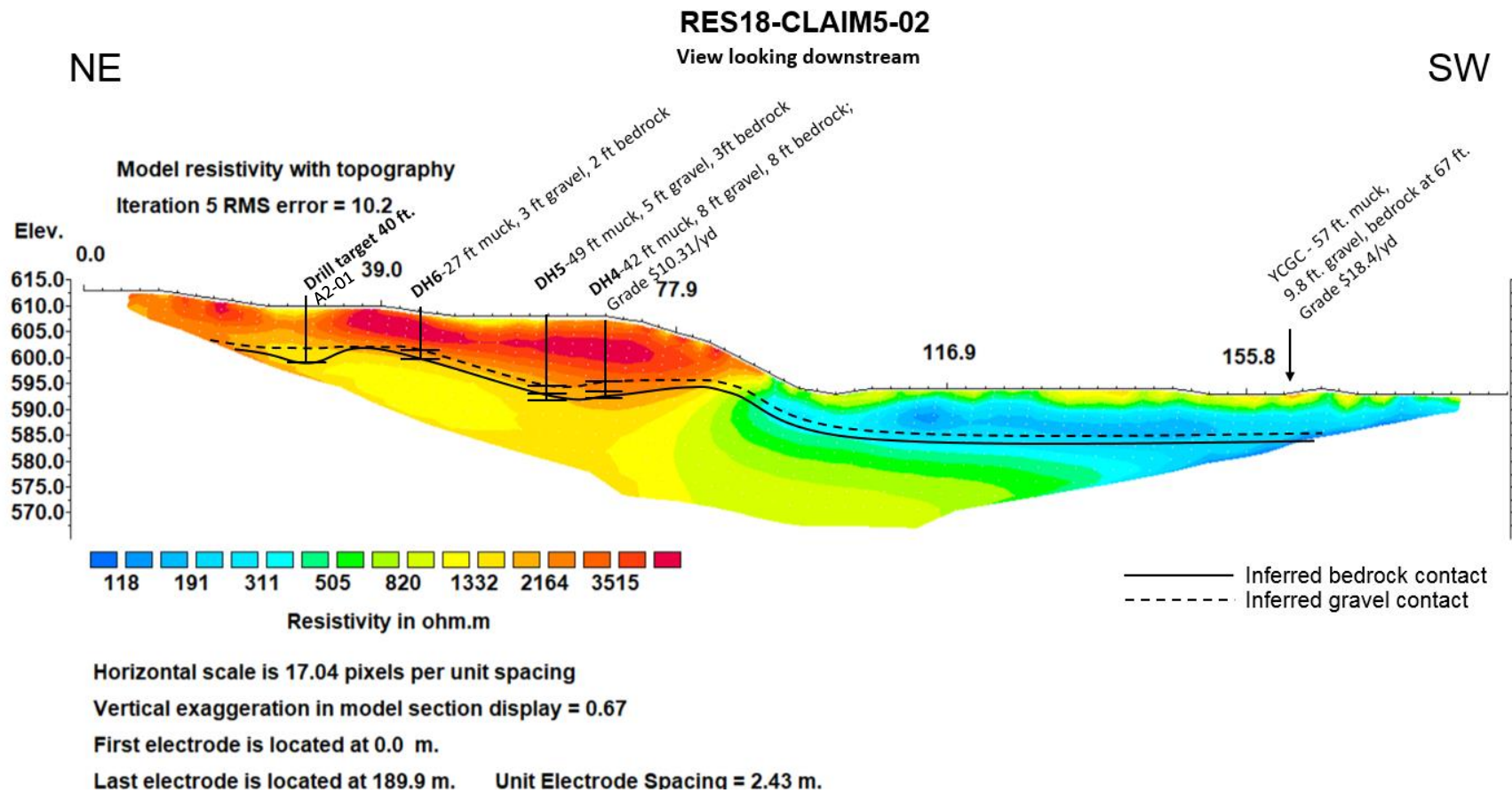


Figure 13 - RES18-CLAIM5-02 was surveyed across 3 drill holes, DH4, DH5, and DH6. The drill holes assisted in interpreting a bedrock contact, which appears slightly undulating on the left limit bench and relatively flat in the creek valley. The bench bedrock undulations may indicate a side channel with placer gold potential, shown by DH4 which had a gold grade of \$10.31/yd<sup>3</sup>. The bedrock undulations resemble the bedrock displayed in downstream profile RES18-CLAIM5-01.

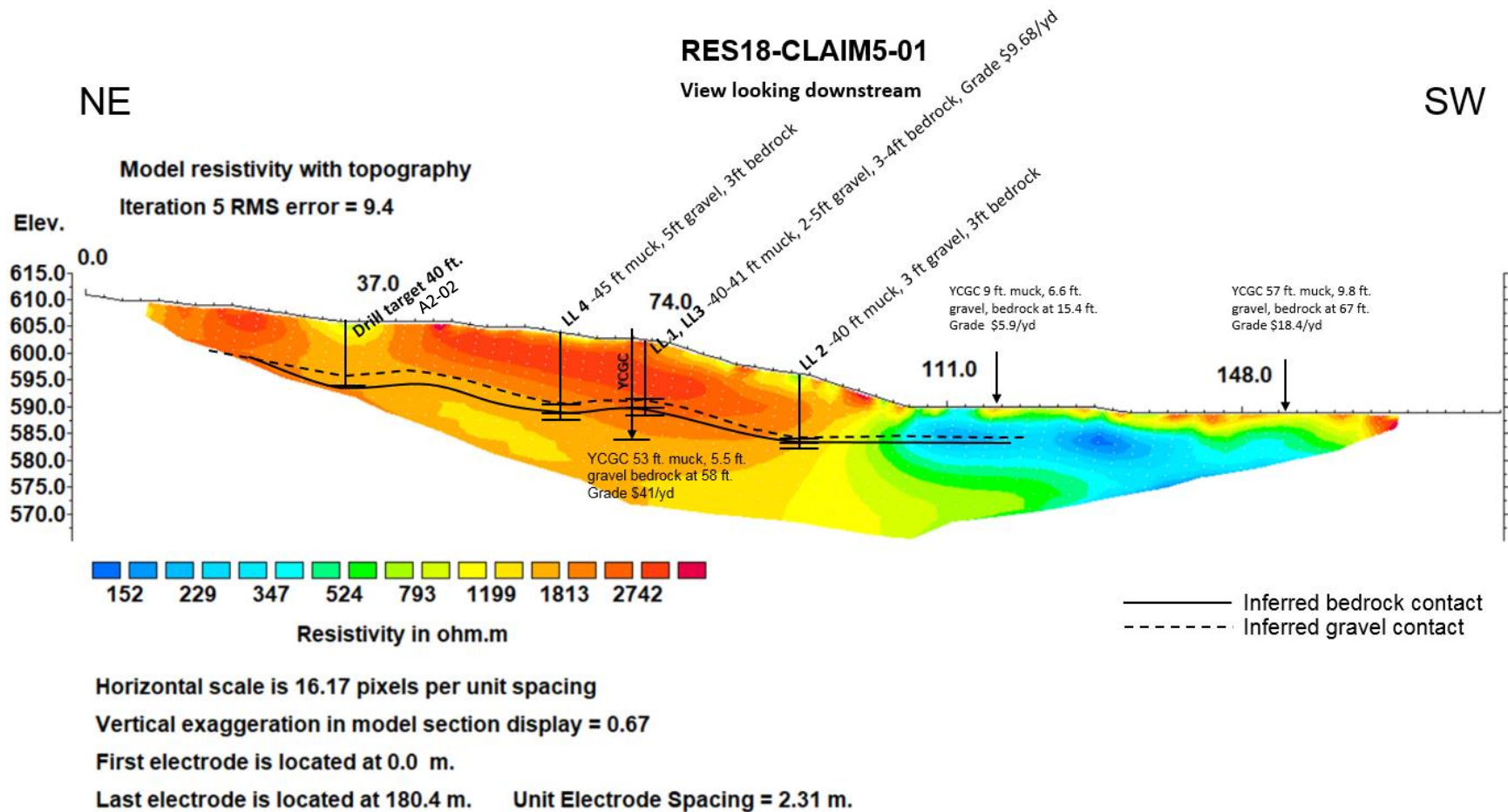


Figure 14 - RES18-CLAIM5-01 was surveyed on the left limit bench across 3 historic YCGC drill holes, and across auger drill holes LL1, LL2, LL3 and LL4. The YCGC gold grades are displayed in the image. The bedrock is interpreted with some undulations on the left limit which could indicate a channel with placer gold potential, demonstrated by auger drill hole LL3 which had a gold grade of \$9.68/yd<sup>3</sup>.

NE

### RES18-CLAIM5-03

View looking downstream

SW

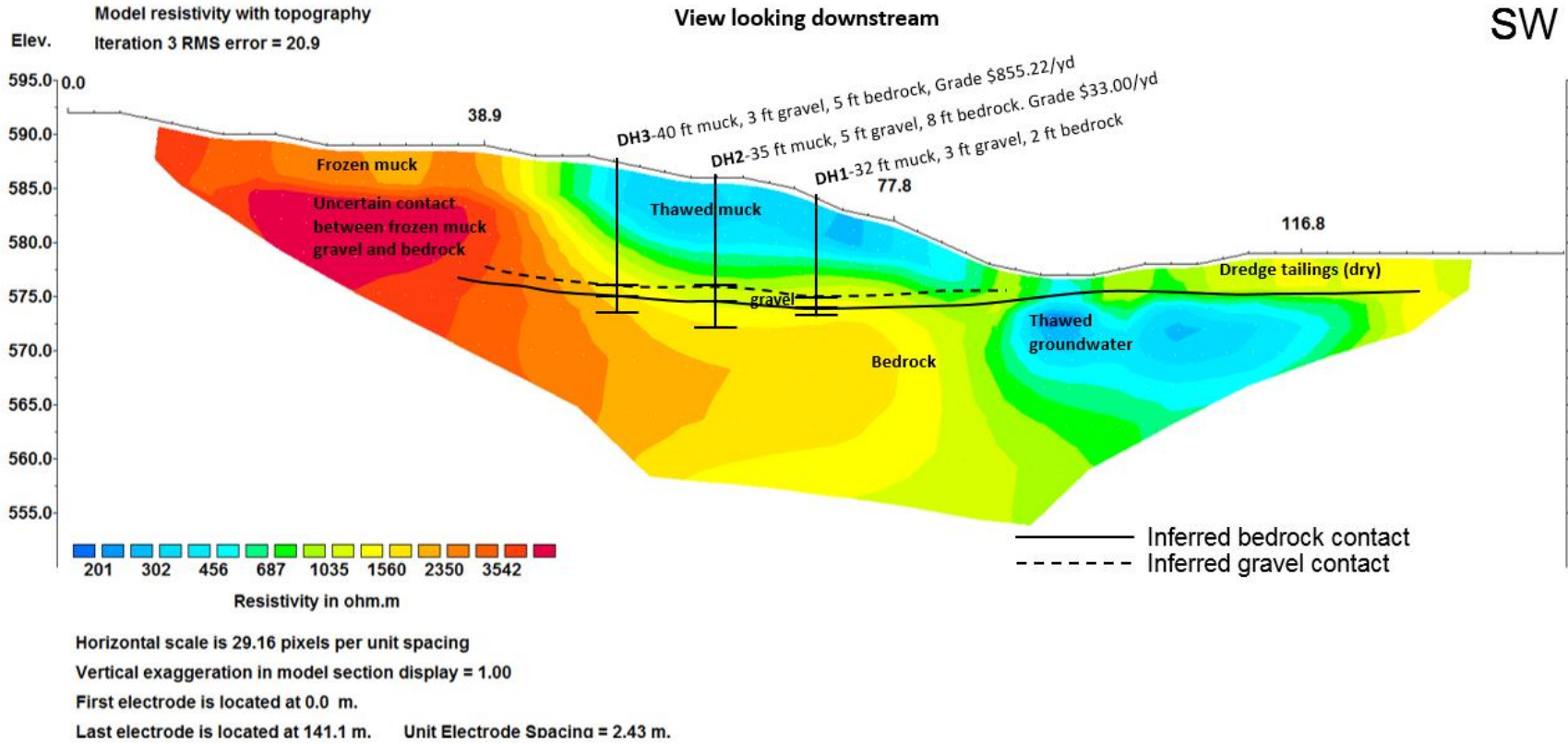


Figure 15 - RES18-CLAIM5-03 was surveyed on the left limit bench across auger drill holes DH1, DH2 and DH3, which intersected a layer of gravel between 3 and 5 ft. thick. The 2018 auger drill holes had high values from \$33 to \$815.22/yd<sup>3</sup>. However, due in part to the presence of the active mining pit immediately downstream, part of the profile was thawed and part of it was frozen. This lateral variation in physical characteristics resulted in a large resistivity contrast which overprinted most of the vertical stratigraphic and lithological transitions which would usually be evident.

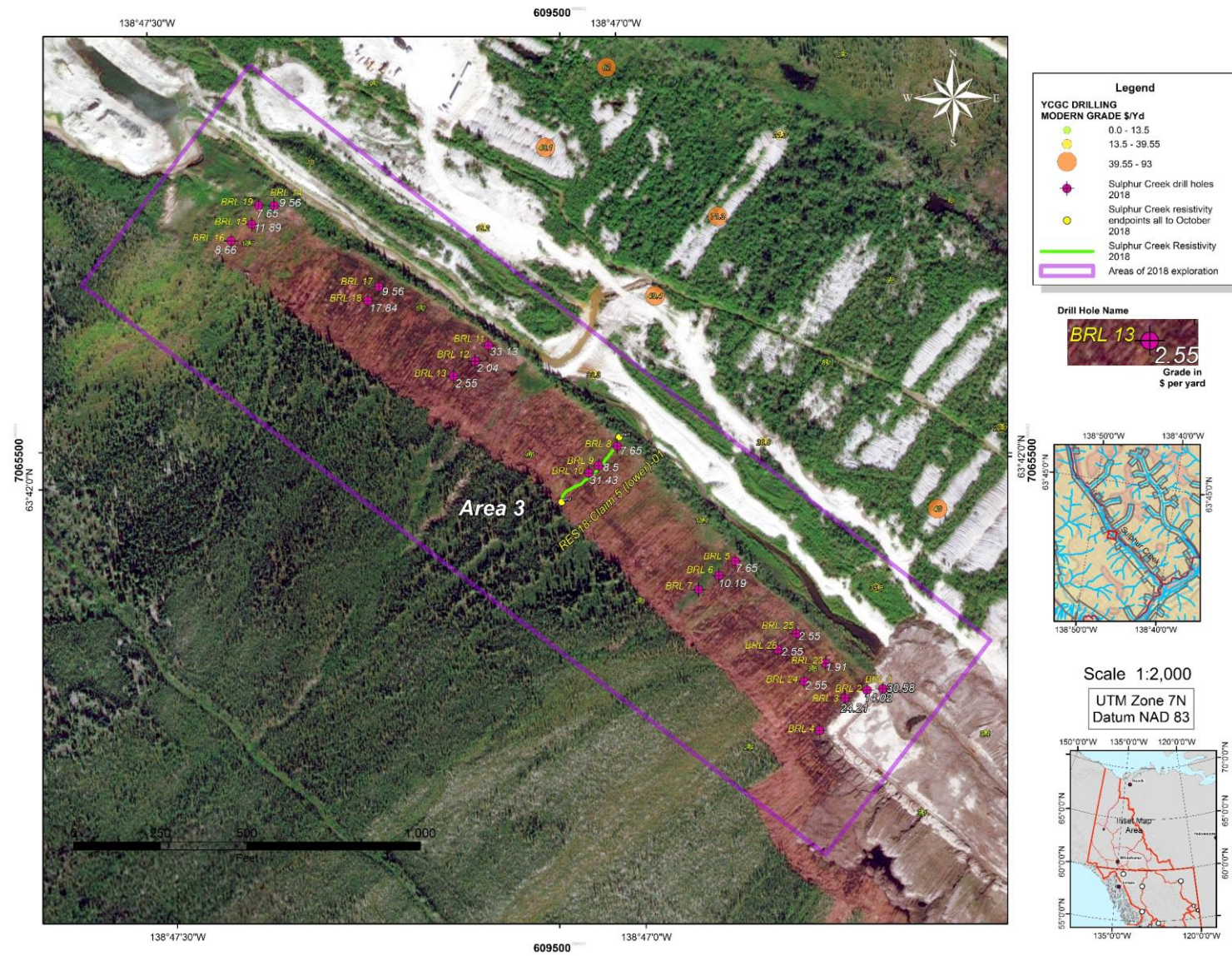


Figure 16 - Detailed map of Area 3, showing 2018 resistivity surveys, auger drill holes with grades and nearby historic YCGC drill holes. Auger drill hole grades of zero are not shown.

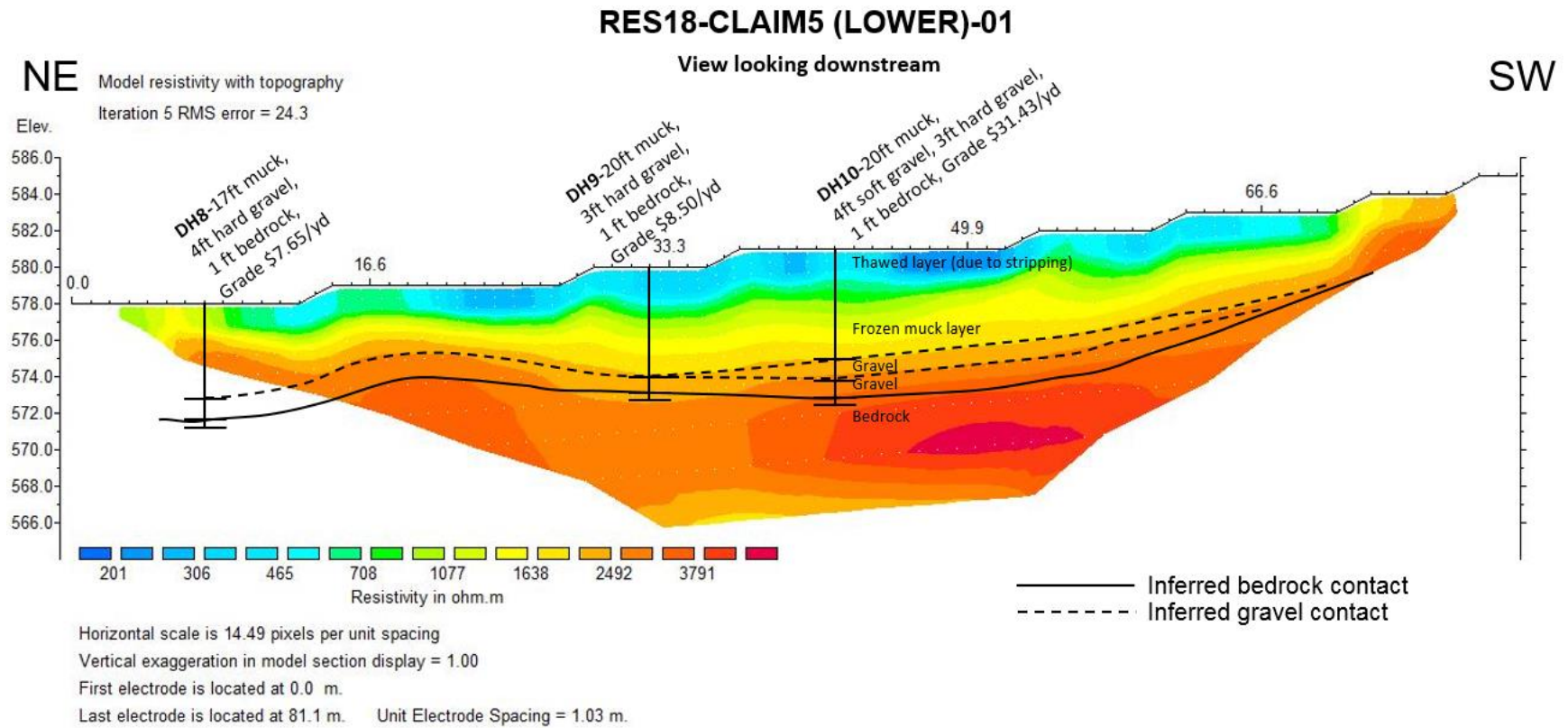


Figure 17 - RES18-CLAIM5 (Lower)-01 was surveyed on the right limit bench across three auger drill holes, DH8, DH9 and DH10. The drill results show a layer of gravel under black muck and the bedrock is interpreted as slightly undulating and dipping with topography. Gold grades in the auger holes were as high as \$31.43/yd<sup>3</sup>.



## 2018 Test Mining Pit

Figure 12 shows the extent of the test mining pit excavated in Exploration Area 2 on the left limit of the property, and photos of the pit are shown as Figures 18-20. Several 2018 auger drill holes and some historic YCGC drill holes were mined through by this pit during the 2018 exploration program.



Figure 18 - At the southern end of the left limit mining pit, a 6 ft. thick section of clast-supported, crudely-stratified, Mn-stained, cryoturbated cobble-pebble gravel was exposed on May 18, 2018. This unit was overlying a decomposed schist/gneiss bedrock at this location.

The relatively high values of the auger drill holes (in particular B, F, G, H, I - see Table 2 and Figure 19) were corroborated by economic placer gold values which were encountered during the 2018 mining.

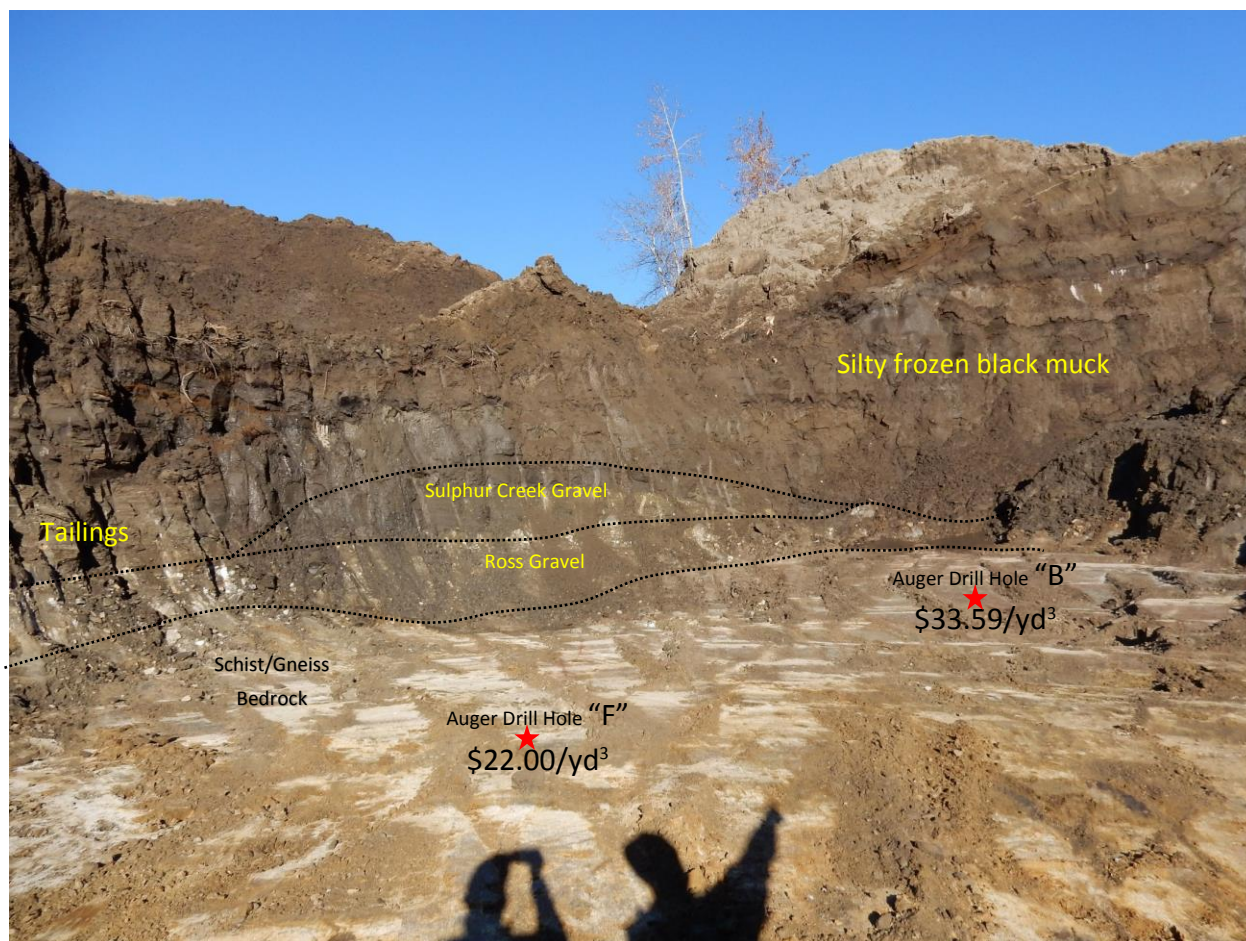


Figure 19 - View looking north of the most upstream exposure of the active mining pit on Sept 28, 2018. The stratigraphy consisted of a variably-decomposed quartz-feldspar gneiss bedrock overlain by 2 to 5 ft. of grey-white cobble pebble gravel, overlain by 30 to 40 feet of silty frozen black muck. The basal gravel here is likely the 780,000 year old "Ross Gravel" described by Froese et. al. (2001). This gravel appears to be incised by and overlain in places by the younger Sulphur Creek gravel. Towards the centre of the valley (left side of the photo) dredge tailings and slickens abut against the virgin gravels of the pit.



Figure 20 – View of the pit wall looking east towards the left limit, Sept 28, 2018. The 5 ft. thick white-grey gravel at the base of the section is likely the "Ross Gravel", which at 780,000 years B.P. is older than the overlying Sulphur Creek gravel.

## Conclusions and Recommendations

Three main areas were explored in 2018. Exploration in Area 1 was concentrated on the left limit bench. Some encouraging auger drill hole results were obtained, including grades of \$5.95 to \$13.90/yd<sup>3</sup> in drill holes GAT6F to GAT10J. Bedrock depths in drill holes varied from 32 ft. to 48 ft. Only four widely-spaced resistivity geophysical lines were surveyed in this area, however, potential drill targets were identified on three of the four surveys. The details of these drill targets are shown in Table 4 along with the resistivity drill targets identified in Area 2.

The geophysical surveys also showed that the bedrock rim on the left limit bench in this location rises moderately, which would allow for the presence of potential placer gravels over this broad area. Further exploration in Area 1 should consist of several more resistivity geophysical surveys across the bench, followed by auger drill holes which target potential paleochannels that are identified by the geophysical surveys. Promising drill results should be followed-up by excavator test-pitting and bulk sampling.

Table 4 - Drill Targets identified from resistivity surveys, Sulphur Creek.

Name	Exploration Area	Resistivity Line	Latitude	Longitude	Target Depth ft.	Target Depth m
A1-01	Area 1	RES18-48BD-02	63.72061	-138.810336	65	20
A1-02	Area 1	RES18-48BD-03	63.719677	-138.810814	72	22
A1-03	Area 1	RES18-KAREN-01	63.713493	-138.802216	46	14
A2-01	Area 2	RES18-CLAIM5-02	63.710608	-138.795293	40	12
A2-02	Area 2	RES18-CLAIM5-01	63.710312	-138.794967	40	12

In Area 2, the locale of the active test mining pit, many of the high-value 2018 auger drill holes and historic YCGC drill holes were coincident with economic mining values subsequently mined in the pit. Geophysical surveys which were conducted in the frozen ground some distance upstream of the active pit showed distinctive contacts which were correlative with the bedrock contacts encountered in the auger drill holes. However, in disturbed areas and in the pit wall immediately adjacent to the active mining pit, the permafrost content was highly variable and discontinuous. This had a detrimental effect on the resistivity results, making interpretation of muck, gravel and bedrock contacts in the nearest profile difficult.

Auger drill holes DH2, DH3, DH4 and LIL 3 in the area upstream of the test mining pit had some very promising results, including a high of \$855.22/yd<sup>3</sup> in DH3. In addition, a historic YCGC drill hole with a value of \$41/yd<sup>3</sup> is located in this area.

Further exploration in Area 2 should consist of an expansion of the 2018 mining pit upstream (north) along the left limit in the direction of the high-grade drill targets. This should be conducted while observing the dredge limit boundary on the west towards the centre of the valley, and rising bedrock towards the rim on the east. Additional resistivity geophysical surveys, along with corresponding auger drill holes for calibration, should be used to guide this process.

Area 3 consisted of a partially-stripped right-limit bench downstream of the camp. It is bounded upstream and downstream by historic mining pits. Twenty-six auger drill holes were drilled in this area, and depths to bedrock were shallower than those encountered on the left-limit, varying from 12 ft. to 28 ft. Many of the auger drill holes showed promising grades, including highs of \$33.13/yd<sup>3</sup> in drill hole BRL 11 and \$31.43/yd<sup>3</sup> in BRL 10. Only one geophysical survey was conducted in this area, and it showed the bedrock contact as correlative with bedrock depths encountered in the nearby auger drill holes.

Further exploration in Area 3 should consist of several more resistivity geophysical surveys across the bench, followed by auger drill holes which target locations that are identified by the geophysical results. Promising drill results should be followed-up by excavator test-pitting and bulk sampling. In addition, the historic mining pit on the downstream extent of the bench area should be extended upstream. This should be conducted while noting the dredge limit boundary on the east towards the centre of the valley, and rising bedrock towards the rim on the west. Additional resistivity geophysical surveys, along with corresponding auger drill holes for calibration, should be used to guide this process.

## Statements of Qualifications

### William LeBarge

I, William LeBarge, of 13 Tigereye Crescent, Whitehorse, Yukon, Canada, DO HEREBY CERTIFY THAT:

1. I am a Consulting Geologist with current address at 13 Tigereye Crescent, Whitehorse, Yukon, Canada, Y1A 6G6.
2. I am a graduate of the University of Alberta (B.Sc., 1985, Geology) and the University of Calgary (M.Sc., 1993, Geology – Sedimentology)
3. I am a Practicing Member in Good Standing (#37932) of the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC).
4. I have practiced my Profession as a Geologist continuously since 1985.
5. I am President and sole shareholder of Geoplacer Exploration Ltd., a Yukon Registered Company.

Dated this 28<sup>th</sup> day of January, 2019

William LeBarge, P. Geo.



### Selena Magel

I, Selena Magel of 210B Strickland Street, Whitehorse, Canada, DO HEREBY CERTIFY THAT:

1. I am a Geologist in Training, registered with APEGA with current address at 210B Strickland Street, Whitehorse, Yukon, Canada Y1A 2J8.
2. I am a graduate of the University of Calgary (B.Sc., 2017, Geology).
3. I have practiced Geology since May 2017.
4. I have conducted and interpreted over 60 km of resistivity surveys since the summer of 2017.

Dated this 28<sup>th</sup> day of January, 2019

Selena Magel, G. I. T.



## References

- Bond, J., and van Loon, S., 2016. Yukon Placer Industry Overview 2016, Presentation at Yukon Geoscience Forum, November 2016, Whitehorse, Yukon.
- Bond, J.D. and van Loon, S., 2018. Yukon Placer Mining Industry 2015-2017. Yukon Geological Survey, 284 p.
- Chapman, R.J., Mortensen, J.K., and LeBarge, W.P. 2011. Styles of lode gold mineralization contributing to the placers of the Indian River and Black Hills Creek, Yukon Territory, Canada as deduced from microchemical characterization of placer gold grains. *Miner Deposita.*, vol. 46, pp. 881–903.
- Colpron, M. and Nelson, J.L. (eds.), 2006. Paleozoic evolution and metallogeny of pericratonic terranes at the ancient Pacific margin of North America, Canadian and Alaskan Cordillera. Geological Association of Canada, Special Paper 45, 523 p.
- Duk-Rodkin, A., 1999. Glacial Limits Map of Yukon Territory. Geological Survey of Canada, Open File 3694, Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada, Geoscience Map 1999-2, 1:1 000 000 scale.
- Froese, D.G., Enkin, R.J., and Smith, D.G., 2001. Placer depositional settings and their ages along Dominion Creek, Klondike area, Yukon. In: Yukon Exploration and Geology 2000, D.S. Emond and L.H. Weston (eds.), Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p. 159-169.
- Froese, D.G. and Jackson, L.E., Jr., 2005. Surficial Geology, Granville, Yukon Territory. Geological Survey of Canada Open File 4587, Scale 1:50 000.
- Gordey, S.P. and Ryan, J.J., 2005. Geology map, Stewart River area (115 N, 115-O and part of 115 J), Yukon Territory. Geological Survey of Canada, Open File 4970, 1:250 000 scale.
- Green, L., 1977. The Gold Hustlers. Dredging the Klondike, 1898-1966. Dacher Printing Limited, Vancouver, B.C. 339 p.
- Jackson, L.E., Jr., Shimamura, K., and Huscroft, C.A., 2001. Late Cenozoic geology, Ancient Pacific Margin NATMAP Report 3: A re-evaluation of glacial limits in the Stewart River basin of Stewart River map area, Yukon Territory. Geological Survey of Canada, Current Research, 2001-A3, 8 p.
- LeBarge, W.P., 2007. Yukon Placer Database–Geology and mining activity of placer occurrences, Yukon Geological Survey, 2 CD-ROMs.
- LeBarge, W.P., and Welsh, C.S., 2007. Yukon Placer Mining Industry 2003-2006. Yukon Geological Survey, 235 p.
- LeBarge, W.P., and Nordling, M.G., 2011. Yukon Placer Mining Industry 2007-2009. Yukon Geological Survey, 151 p.

MacKenzie, D., Craw, D., and Mortensen, J.K., 2008. Structural controls on orogenic gold mineralisation in the Klondike goldfield, Canada. *Mineralium Deposita*, vol. 43, p. 435-448.

MacKenzie, D.J. and Craw, D., 2010. Structural controls on hydrothermal gold mineralization in the White River area, Yukon. *In: Yukon Exploration and Geology 2009*, K.E. MacFarlane, L.H. Weston and L.R. Blackburn (eds.), Yukon Geological Survey, p. 253-263.

MacKenzie, D. and Craw, D., 2012. Contrasting structural settings of mafic and ultramafic rocks in the Yukon-Tanana terrane. *In: Yukon Exploration and Geology 2011*, K.E. MacFarlane and P.J. Sack (eds.), Yukon Geological Survey, p. 115-127.

van Loon, S., and Bond, J., 2014. Yukon Placer Mining Industry 2010-2014. Yukon Geological Survey, Government of Yukon, 230 p.

van Loon, S., 2017. Digital analysis of historic drilling data to reconstruct the placer gold distribution in Sulphur Creek and lower Dominion Creek, central Yukon. *In: Yukon Exploration and Geology 2016*, K.E. MacFarlane and L.H. Weston (eds.), Yukon Geological Survey, p. 225-242.

Yukon Geological Survey, 2018. Digital Bedrock, Mineral Occurrence and Surficial Geology Compilations, available at <http://data.geology.yk.ca>



# Appendix A - Drill Logs

<b>PLACER DRILL LOG</b>			
<b>DATE:</b> May 15-Oct 19 2018	<b>DRILLER</b>	Jeff Dubois	
<b>TYPE OF DRILL</b>	Track Mounter Auger	<b>INSIDE DIAMETER OF DRILL:</b> 6 inch	
<b>LOCATION:</b> Sulphur Creek			<b>mg Gold found in entire hole</b>
<b>DRILL HOLE NAME</b>	<b>TOTAL FOOTAGE</b>	<b>BREAKDOWN IN FEET (of materials encountered)</b>	
1	37	32ft muck/3ft gravel/2ft bedrock	
2	48	35ft muck/5ft gravel/8ft bedrock	
3	48	40ft muck/3ft gravel/5ft bedrock	
4	58	42ft muck/2ft pea gravel/6ft gravel/8ft bedrock	
5	57	49ft muck/5ft gravel/3ft bedrock	
6	32	27ft muck/3ft gravel/2ft bedrock	
7	58	44ft muck/5ft gravel/9ft bedrock	
8	54	38ft muck/9ft gravel/2ft bedrock	
9	37	24ft muck/10ft gravel/3ft bedrock	
A	39	29ft muck/7ft gravel/3ft bedrock	
B	43	34ft muck/6ft gravel/3ft bedrock	
C	43	31ft muck/8ft gravel/4ft bedrock	
D	42	34ft muck/4ft gravel/4ft bedrock	
E	34	29ft muck/3ft gravel/2ft bedrock	
F	38	31ft muck/5ft gravel/2ft bedrock	
G	28	23ft muck/3ft gravel/2ft bedrock	
H	28	22ft muck/5ft gravel/1ft bedrock	
I	26	20ft muck/4ft gravel/2ft bedrock	
GAT 1A	58	32 ft muck/3 ft gravel/13 feet soft bedrock/10 ft hard bedrock	
GAT 2B	41	35 ft muck/2 ft gravel/4 ft bedrock	
GAT 3C	42	33 ft muck/3 ft gravel/6 ft bedrock	
GAT 4D	43	35 ft muck/5 ft gravel/3 ft bedrock	
GAT 5E	45	38 ft muck/2 ft gravel/5 ft bedrock	
GAT 6F	38	33 ft muck/2 ft gravel/3 ft bedrock	
GAT 7G	42	36 ft muck/2 ft gravel/4 ft bedrock	
GAT 8H	32	25 ft muck/4 ft gravel/3 ft bedrock	
GAT 9I	32	26 ft muck/4 ft gravel/2 ft bedrock	
GAT 10J	42	36 ft muck/2 ft gravel-hard/4 ft hard bedrock green limestone	
BRL 1	12	2ft road gravel/1ft muck/8ft gravel/1ft bedrock	
BRL 2	15	7 ft muck/6 ft gravel/2 ft bedrock	
BRL 3	18	12 ft muck/15 ft gravel/1 ft bedrock	
BRL 4	22	17 ft muck/4 ft gravel/1 ft bedrock	
BRL 5	25	14 ft muck/4 ft gravel/2 ft bedrock	

<b>PLACER DRILL LOG</b>			
<b>DATE:</b> May 15-Oct 19 2018	<b>DRILLER</b>	Jeff Dubois	
<b>TYPE OF DRILL</b>	Track Mounter Auger	<b>INSIDE DIAMETER OF DRILL:</b> 6 inch	
<b>LOCATION:</b> Sulphur Creek			<b>mg Gold found in entire hole</b>
<b>DRILL HOLE NAME</b>	<b>TOTAL FOOTAGE</b>	<b>BREAKDOWN IN FEET (of materials encountered)</b>	
BRL 6	25	20 ft muck/4 ft gravel/1 ft bedrock	12
BRL 7	26	23 ft muck/2 ft gravel/1 ft bedrock	<1
BRL 8	22	17 ft muck/4 ft gravel/1 ft bedrock	9
BRL 9	24	20 ft muck/3 ft gravel/1 ft bedrock	10
BRL 10	28	20 ft muck/7 ft gravel/1 ft bedrock	37
BRL 11	16	10 ft muck/4 ft gravel/2 ft bedrock	26
BRL 12	23	14 ft muck/8 ft gravel/1 ft bedrock	4
BRL 13	27	19 ft muck/5 ft gravel/3 ft bedrock	6
BRL 14	23	14 ft muck/6 ft gravel/3 ft bedrock	15
BRL 15	24	14 ft muck/6 ft gravel/4 ft bedrock	28
BRL 16	22	14 ft muck/5 ft gravel/3 ft bedrock	17
BRL 17	22	13 ft muck/5 ft gravel/4 ft bedrock	15
BRL 18	20	13 ft muck/4 ft gravel/3 ft bedrock	21
BRL 19	23	17 ft muck/4 ft gravel/2 ft bedrock	15
BRL 23	20	9ft muck/7ft gravel/1ft clay/3ft green bedrock	3
BRL 24	27	15ft muck/7ft gravel/5ft bluegreen bedrock	7
BRL 25	22	13ft muck/6ft brown gravel/3ft bedrock	5
BRL 26	23	15ft muck/6ft brown gravel/2ft bedrock	4
LL 1	47	41ft muck/2ft gravel/4 ft bedrock	<1
LL 2	46	40ft muck/3ft gravel/1ft clay/2ft soft bedrock	<1
LL 3	48	40ft muck/5ft green gravel/1ft clay/2ft soft brown bedrock	19
LL 4	53	45ft muck/5ft gravel/1ft clay/2ft bedrock	<1
RL 1	17	14 ft muck/1ft gravel/1ft clay/1ft bedrock	n/a
RL 2	27	23 ft muck/1ft gravel/2ft green silt/1ft soft bedrock	n/a
RL 3	25	21ft muck/2ft pea gravel/1ft green silt/1ft bedrock	n/a
RL 4	24	21ft muck/1ft green gravel/1ft silt/1ft bedrock	n/a
<b>TOTAL</b>	1961		