

Report on Prospecting on Claims  
1227076 & 1222223  
in the Federal Mine Property  
Teck Township  
Larder Lake Mining Division

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*July 19, 2015*

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## **Introduction**

This report is written for submission to the Ministry of Northern Development and Mines to fulfill the assessment work requirements for part of the historic Federal Mine property. This report summarizes the activities completed in the period of July 11 to July 13, 2016 on the un-patented mining claims 1227076 & 1222223. This report was prepared by Canadian Malartic Corporation (CMC) geologist Christopher A. L. Clarke, P.Geo under supervision from Mark Masson, P.Geo.

## **Summary**

The claims 1227076 & 1222223 in Teck Township are associated with the historic Federal Mine property, whose shaft is located on claim 1222223. The claims are held by Canadian Malartic Corporation and are contiguous with other claims on the Federal Mine property which Canadian Malartic also holds. Both claims 1227076 & 1222223 were staked on August 10, 1998. Workers for Canadian Malartic conducted a prospecting and sampling program to fulfill the work requirements of the claim. Historically, the Federal Mine property has been the focus of extensive exploration both above and below ground.

## **Property Descriptions and Access**

Claims 1227076 & 1222223 are situated along the north-eastern edge of the Town of Kirkland Lake in Teck Township, District of Temiskaming, Larder Lake Mining Division, Ontario, Canada (Figure 1). Claims 1227076 & 1222223 can be accessed along the east side of Goodfish road, 1.5-2km from the intersection of Duncan Ave and Goodfish Rd and ranges 80-300m from the road or from the south via Federal Street. There are several ATV trails/old dirt roads leading to the claims. The property is immediately north of a residential neighborhood (Wishman Avenue) and abandoned residential lots. The claims can also be accessed from the south via Wilson Avenue which leads to Finntown. To the

north of the claims is a man-made dam which defines the Wright-Hargreaves mine tailings pond to the east.

Each claim is composed of one, un-patented unit roughly 16 hectares in size. The surface right owner is the Town of Kirkland Lake (SRO claim #2260 for 1227076 and #6527 for 1222223).

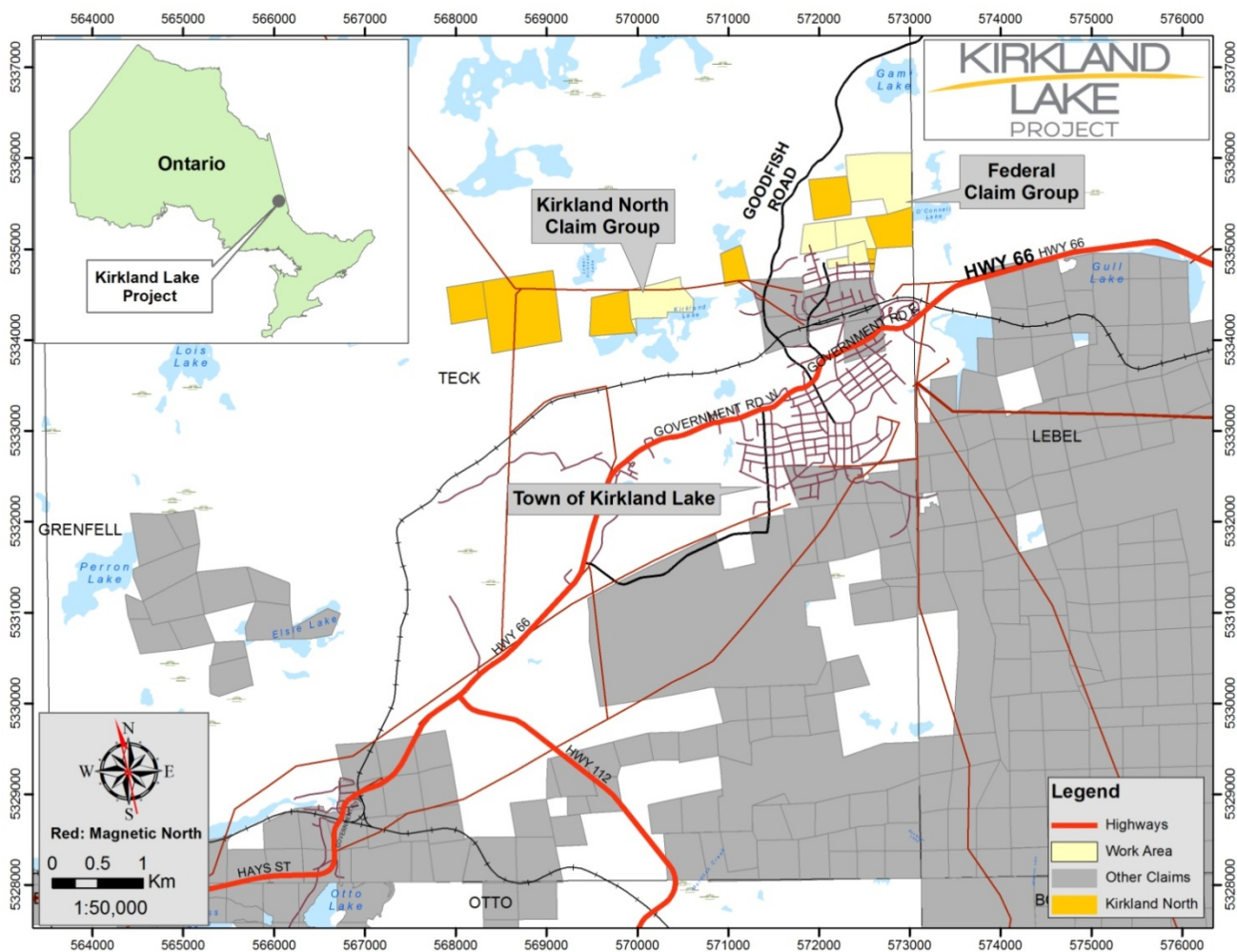


Figure 1: Location of Teck Township relative to the Province of Ontario and Canadian Malartic Claims (shaded grey); where the claims 1227076 & 1222223 are located (shaded pale orange).

## History

Both claims 1227076 & 1222223 were staked on August 10, 1998. The most recent work conducted on the claims was reported in assessment file 42A01NE2038 which was filed in 2000 (including claim 1222221). The property has been part of previous claims and an active Mine. The claims to the north: 4272931 & 1199564 were reported by Canadian Malartic Corporation in 2015-2016 and consisted of prospecting and geochemical sampling. Work was also conducted by Vault Minerals in 2006 and published in 2013 under assessment files AFRI# 20000001685 and 20000001686. The Vault Minerals

work was designed to assess the Kirkland Basin and Federal Kirkland historic properties. Vault Minerals was 100% acquired by Queenston Mining Inc. which in turn was 100% acquired by Osisko Mining Ltd and was then acquired by a 50-50% agreement between Agnico Eagle and Yamana Gold who formed the Osisko properties into the Canadian Malartic Corporation. Vault Minerals conducted a mapping and sampling program on their claims on the Federal Mine property.

Historically, The Federal Mine property has had extensive and near continuous work conducted on it, most notably a 745 ft shaft which is currently capped in the northeast corner of claim #1222223. The underground workings consist of four levels situated at 200, 400, 500 and 700 feet below surface with pervasive drifting. Another notable period in the Federal Mine property was in 1986 and 1987, when a drill program was initiated by Goldhunter Explorations Inc. The drill program consisted of 27 diamond drill holes primarily targeting the mine workings on claim #1222223 and 1227076.

The historic drilling and stripping programs listed by Goldhunter Explorations Inc. or other assessment files appears to have been concentrated in claim 1222223. Only limited prospecting and mapping appears to have been reported on the claim area.

## **Property Geology**

The claims 1227076 & 1222223 are situated within the prolific Kirkland Lake gold camp which is part of the Abitibi Greenstone belt in the Superior Province. The Abitibi Greenstone belt is Archean in age and is composed of greenschist facies volcanic and sedimentary rocks with localized syn-post tectonic intrusions of granitic to dioritic dykes to batholiths. The Abitibi Greenstone belt forms an east plunging synclinorium between the Abitibi batholith, northeast of Timmins and the Round Lake batholith, south of Kirkland Lake. Mesozoic aged kimberlitic dykes are also present in the Kirkland Lake Camp but are rare in occurrence. The Kirkland Lake Camp hosts Keewatin (2750-2700 Ma) and

Temiskaming (2690-2670 Ma) aged assemblages associated with the Abitibi Greenstone belt. The Keewatin assemblages within the Kirkland Lake Camp are composed of the greenschist facies volcanoclastic sedimentary lithologies of the: Pacaud, Deloro, Stoughton-Roquemaure, Kidd-Munro, Tisdale, Kinojevis, and Blake River groups. The Temiskaming assemblage within the Kirkland Lake camp is the Temiskaming group, noted for its non-marine, variably metamorphosed, pyroclastic and clastic-sedimentary (conglomerate) lithological units. Temiskaming group meta-sedimentary rocks form along the north facing side of the Larder Lake-Cadillac Deformation Zone (LLCDZ), a major east-west structural control associated with chemical alteration and sulphide mineralization. The LLCDZ length coincides with a folded and deformed sinuous belt of sedimentary rocks of Temiskaming age.

The claim 1227076 hosts Temiskaming meta-sediments (conglomerate) and a Kinojevis mafic intrusive suite (gabbro, **Error! Reference source not found.**). The Temiskaming sediments are present in the northwest while the mafic intrusives are in the north of the claim 1227076. Claim 1222223 largely hosts intrusive volcanic units which are generally described as augite syenites, porphyries, trachytes and lamprophyres. The inferred contact from Ontario Geological Survey maps is striking northeast, through the centre of the claim. Both map units host various degrees of structural deformation from brittle (faults) to ductile (foliation/shearing); notably the north-south Sylvanite fault passes through the centre of the claim 1227076.

To the North of the claims are a series of Keewatin aged basic volcanics (greenstone) of the Kinojevis Group. To the south are a series of Temiskaming meta-sedimentary units and felsic-intermediate intrusives (syenite-diorite).

## General Description of Sampled Rock Units

### *Meta-Sediment: Greywacke*

**Grain Size:** Fine grained (fine sand sized grains)

**Texture:** massive with conchoidal breaks

**Alteration:** Generally fresh with weak to moderate carbonate (ankerite?) alteration

**Mineralization:** <1-1mm anhedral pyrite disseminated within matrix

**Magnetism:** non-magnetic

**Veining:** There are <1% abundant, <1-3mm thick, milky quartz-carbonate stringers

### *Mafic Syenite*

**Grain Size:** Fine-medium grained (euhedral grains) with 2-3mm augite grains

**Texture:** massive

**Alteration:** Generally fresh with weak to moderate carbonate (calcite/ankerite) alteration

**Mineralization:** non-visible

**Magnetism:** weak to moderate

**Veining:** There are <1% abundant, <1-3mm thick, milky quartz-carbonate stringers

### *Syenite Porphyry*

**Grain size:** Coarse grained: 3-6mm euhedral plagioclase grains

**Texture:** massive

**Alteration:** bleached white-pink weathering colour, weak patches of red hematite alteration along joints

**Mineralization:** non-visible

**Magnetism:** non-magnetic

**Veining:** isolated, sub-planar stringers of <2mm thick quartz-carbonate which are <<1% abundant.



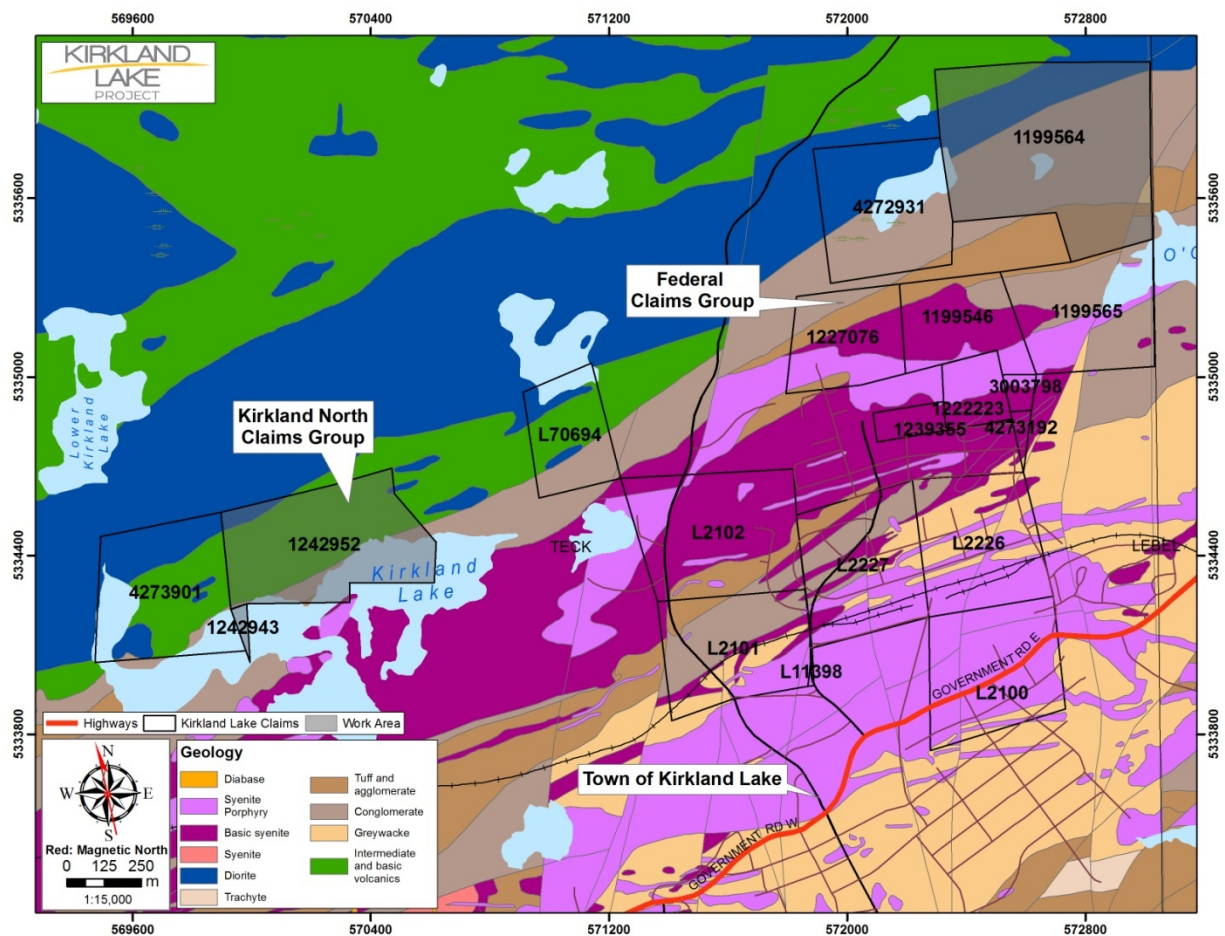


Figure 3: Local Geology in the Claim area north of Kirkland Lake. The map shows the bands of Temiskaming meta-sediments intruded with felsic-intermediate intrusives and Keewatin volcanics in contact to the north of the Temiskaming sediments.

## Description of Recent Work

The work conducted was prospecting, sampling and limited mapping. The goal of the work was to gain an understanding of the geology of the claim, identify historic trenches and pits, map outcrops, gather samples for gold and major-trace element abundances, and recording the locations using a GPS. The majority of the claim 1227076 was covered with swampland in the centre of the claim and municipal workings (dirt fill) in the southwest quadrant of the claim. An abandoned and ruined neighbourhood defined the northern part of the claim as well. Outcrops were generally exposed in the areas that were not in dense swamp or in the municipal areas where dirt had been used to grade and level housing lots. Three grab samples were taken within the claim and were identified as syenite porphyry, mafic syenite and meta-sediment. The samples did not display significant mineralization or alteration.

The majority of the claim 1222223 was dominated with a swamp/pond in the northern third of the claim and municipal housing in the southern third of the claim. The central third of the claim was covered with alders and sporadic outcropping with an east-west ridgeline composed of boulders, muck and dirt and other physical evidence of the Federal mine workings. The Federal shaft was located and was found to be in good condition in terms of its cement cap. Outcrop near the shaft was a non-descript fine-medium grained grey meta-sediment with variable carbonate alteration and a deformation zone (undulose but overall east-west striking). Three samples were taken from the area along the deformation zone; one sample (S141057) hosted 1-2% disseminated pyrite and 1-3mm thick quartz veining while the other two samples did not have noticeable mineralization.

A total of six grab samples were collected on the claims (plus a blank and standard for QA/QC purposes) and sent for major oxide, trace element (reported separately) and gold assay to ALS minerals (see attached certificates). Only one sample, S141056, yielded a noticeable gold result of 3.85g/t; the

sample was taken directly from the deformation zone which hosted 1-3% pyrite with rusty weathered carbonate(ankerite? –test with potassium ferro-cyanide) alteration.

## **Conclusions and Recommendations**

A grid should be established in a low impact manner to reduce disturbance of the environment and residents. Following the establishment of a grid an IP survey and limited stripping should be conducted pending the geochemical results of the grab sample analysis. The outcrop around the Federal shaft should be re-stripped and washed so a highly detailed outcrop map can be produced.

Respectfully Submitted,  
Christopher A. L. Clarke

## Data

*The work was carried out as follows:*

**Field:**

Prospecting      July 12, 2016 to July 14, 2016

**Office:**

Report              July 14, 2016

*Persons who carried out the work:*

**Prospecting:**

Christopher A.L. Clarke              Larder Lake, On

Christal Hanuszcak                  Kirkland Lake, On

**Report:**

Christopher A.L. Clarke

*Sample List (UTM zone 17 NAD 83)*

Waypoint	Northing	Easting	Rock Type
S141056	5334970	572456	Metasediment
S141057	5334960	572444	Metasediment
S141058	5334959	572435	Metasediment
S141059	5335085	571961	Syenite Porphyry
S141060	5335134	571983	Mafic Syenite
S141061	5335111	572024	Syenite Porphyry

### **July 12, 2016 – 1 Day Prospecting**

Workers: Christopher Clarke; Christal Hanuszcak

Weather: Heat warning, sunny and humid (36%)

We drove our truck to 'Finn Town' which is the northern (unmapped) extent of Foss Rd. and parked our vehicle just south of the town by an ATV trail. The objective for the day was locating the historic Federal shaft. Using the AMIS co-ordinates for the shaft we proceeded down an ATV trail looking for the shaft which appeared to be situated near the trail. Walking down the trail we did not encounter the shaft leading us to leave the trail and head south towards the AMIS co-ordinates. Heading south from the trail we encountered dense alder patches and a moderate incline composed of rubble/muck. At the summit of the incline was the shaft along with an east-west trending outcrops. The shaft was capped and in good condition and defined the eastern boundary of the outcrop. The outcrop extended to the west for approximately 40m and appeared to be a single lithology with a ductile deformation structure through it. The outcrop appeared to be a meta-sediment which was fine-medium grained, grey coloured on fresh surfaces, rust brown on weathered surfaces, and with carbonate alteration. The carbonate alteration increased near a ductile deformation zone trending east-west along the southern edge of the outcrop. The deformation zone was a dark brown colour with 1-4mm thick carbonate veining, there were no visible sulphides but there was a channel sample running perpendicular through the deformation near the shaft. Three samples were taken: S141056-S141058 at intervals along the outcrop and generally taken near the deformation zone. After the samples were taken and recorded we proceeded to locate the historic road to the shaft, however, the road was completely overgrown with alders and we had difficulty following it back to Foss Road. After returning to the road we returned to the truck and completed the day.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, P.Geo

### **July 13, 2016 – 2 Day Prospecting**

Workers: Christopher Clarke; Christal Hanuszcak

Weather: Heat warning, sunny/overcast and humid (36%)

We drove our truck to the northern end of Wilson Ave. and parked our truck there. We then proceeded to locate any outcrops within the southern portion of the claim. During this traverse it became clear that the southwest quadrant of the claim has largely been built up with dirt for municipal housing. There were several ruined foundations in this area which was also graded and flat though overgrown with grass and alders. Along the edges of this flat area, the ground level dropped precipitously by several metres into a marsh/swamp. Descending into the swampland we located several outcrops which formed a roughly ENE trend in the centre of the claim. The outcrop was generally covered with moss and spruce trees instead of alders. The outcrop lithologies alternated between medium grained plagioclase syenite porphyry and 'Kirkland Lake' mafic syenite (augite phenocrysts 1-3mm in size). The mafic syenite was magnetic while the porphyry was non-magnetic. We took three samples in three outcrops within this

area: two of porphyry and one of mafic syenite (Samples S141059-S141061). There was no visible mineralization within the samples.

At this point we returned to the truck and drove to Goodfish Road with the objective of accessing the northern portion of the claim since deep swamp and creeks blocked our access from the south. We left Goodfish Road and entered an abandoned neighbourhood we located last year during our work on claim 4272931. The abandoned neighbourhood occupies the northern portion of the claim. We located one outcrop in the west-central edge of the claim along the boundary between the swamp and abandoned neighbourhood. The outcrop was composed of a cryptic lithology which had a fine grained matrix and ovoid alteration 'rings' and euhedral grains which led us to suspect it was either an altered trachyte or some form of meta-sediment. We could not break off an adequate fresh piece to determine the lithology definitively. At this point the heat and humidity began to affect us and we returned to the truck and ended the day.

Prospecting Diary for Christopher Clarke, B.Sc, M.Sc, P.Geo

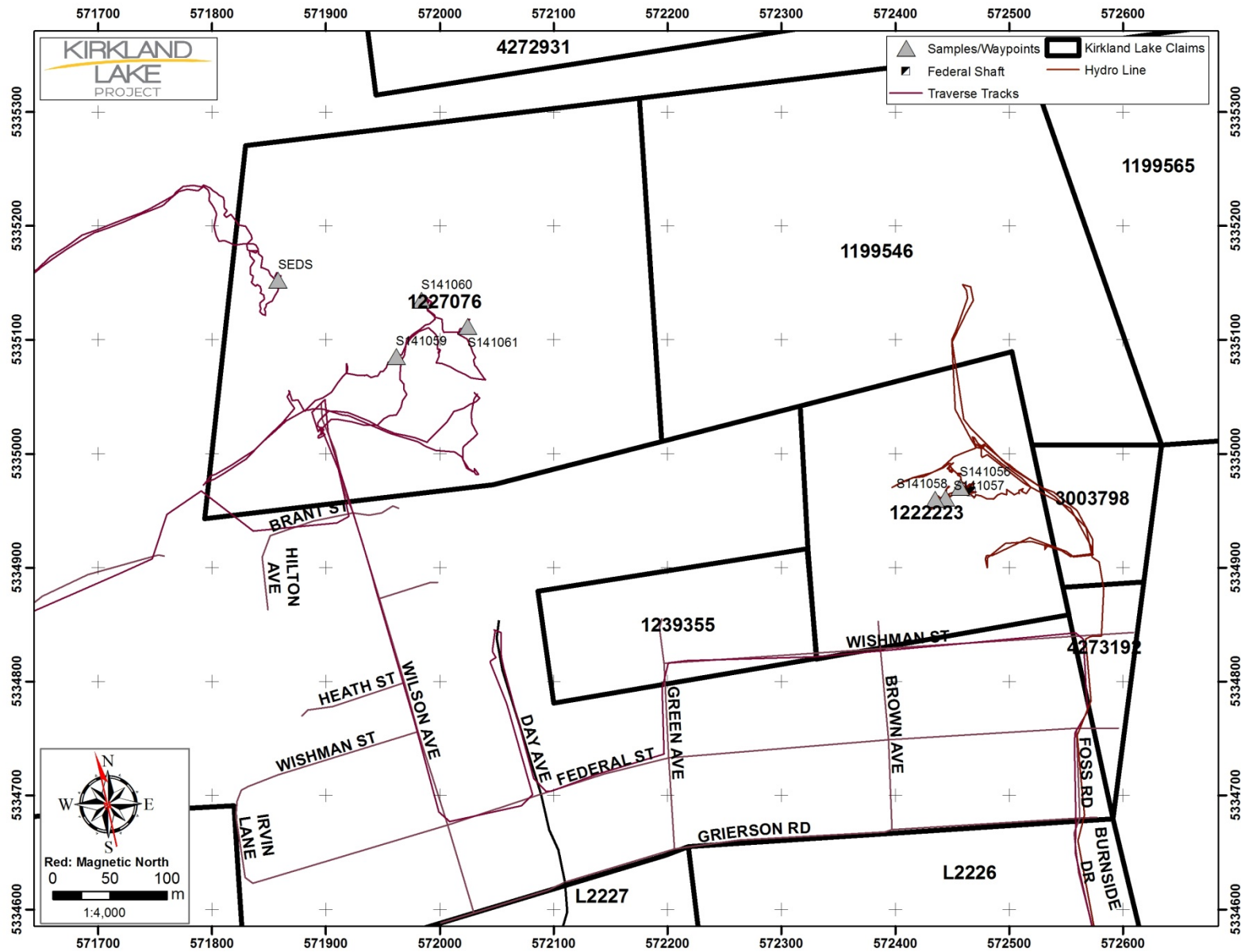


Figure 4: Map showing the GPS tracks and waypoints for the worker's traverses on July 12-13, 2016 for claims 1227076 & 122223.



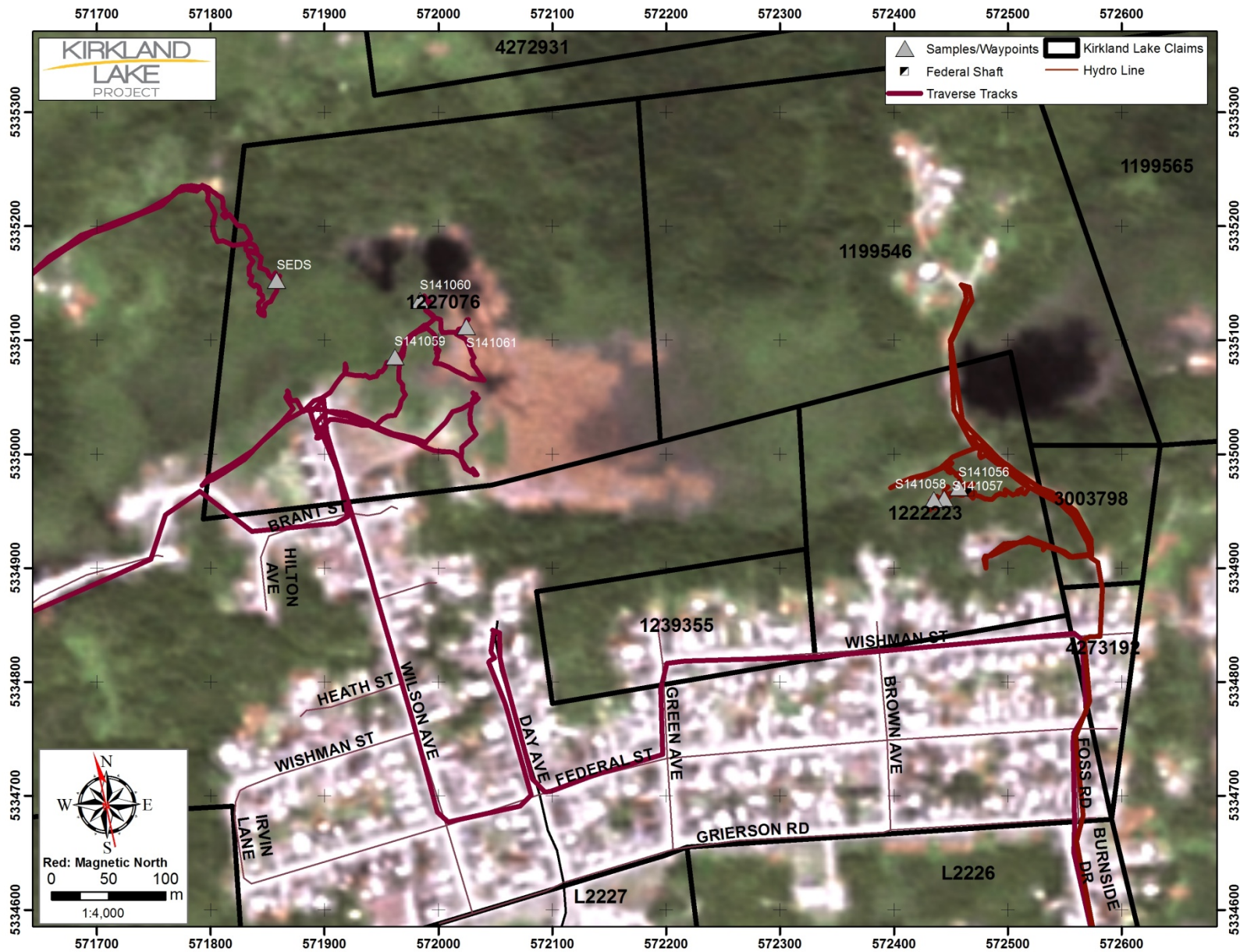


Figure 5: A 1:4,000 scale satellite map showing access and traverse tracks for claims 1227076 & 1222223.