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Surficial Geology and Implications for Mineral Exploration at the October Gold Property

Northern Ontario

Palmer Project #
2109201

Prepared For
Genesis Metals Corporation

March 1, 2022

470 Granville Street, Suite 630, Vancouver, BC V6C 1V5
Tel: 604-629-9075 | www.pecg.ca

March 1, 2022

David A. Terry, Ph.D., P.Geo.
President, CEO, Director
Genesis Metals Corporation
Suite 1430 – 800 W. Pender St
Vancouver, BC, V6C 2V6

Dear David Terry:

Re: Surficial Geology and Implications for Mineral Exploration at the October Gold Property
Project #: 2109201

Palmer is pleased to provide Genesis Metals Corporation with surficial geology mapping for the October Gold Property. This report provides the mapped surficial geology, glacial history and the implications and recommendations for mineral exploration. Map data are provided as spatial data files and as 1:20 000-scale surficial geology, till sampling suitability and drift thickness PDF map sets. The interpretations provided herein are supported by field work that was completed in September-October 2021. The information and mapping contained in this report provide a surficial geology framework to optimize exploration activities within the October Gold Property.

Should you have any questions, please do not hesitate to contact Dave Sacco (778-689-2721, dave.sacco@pecg.ca) or Shirley McCuaig (780-716-5750, shirley.mccuaig@pecg.ca).

Yours truly,
Palmer

Shirley McCuaig, Ph.D., P.Geo.
Senior Surficial Geologist

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Senior Surficial Exploration Manager

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Appendix A. October Gold Property surficial geology mapping
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1. Introduction

Palmer is pleased to provide Genesis Metals Corporation (Genesis) with the results of our 1:20 000-scale surficial geology, till sampling suitability and drift thickness mapping for the October Gold Property (the Property) (Figure 1). A comprehensive knowledge of surficial geology, sediment stratigraphy and sediment transport history are required to determine a strategy for surficial mineral exploration. Palmer was retained by Genesis to assess the surficial geology at the Property and to aid in the development of an exploration strategy that is tailored to the specific surficial setting of the Property.

Field work was completed in advance of the mapping. The results of the field work, including reconnaissance till sampling, descriptions of surficial materials and access, and preliminary implications for exploration were provided in a previous field report (Palmer, 2021). The field observations were used to calibrate the surficial geology interpretations presented in this report. The surficial geology mapping was used to derive till sampling suitability (TSS) and relative drift thickness maps. These derivative products provide an understanding of what methods of exploration are applicable to different areas of the Property, and they directly inform the feasibility and design of till sampling surveys. Recommendations for the next phases of exploration are provided based on this information. The ultimate goal of the work summarized herein is to assist Genesis in the development and execution of a mineral exploration strategy that can identify and refine exploration targets.

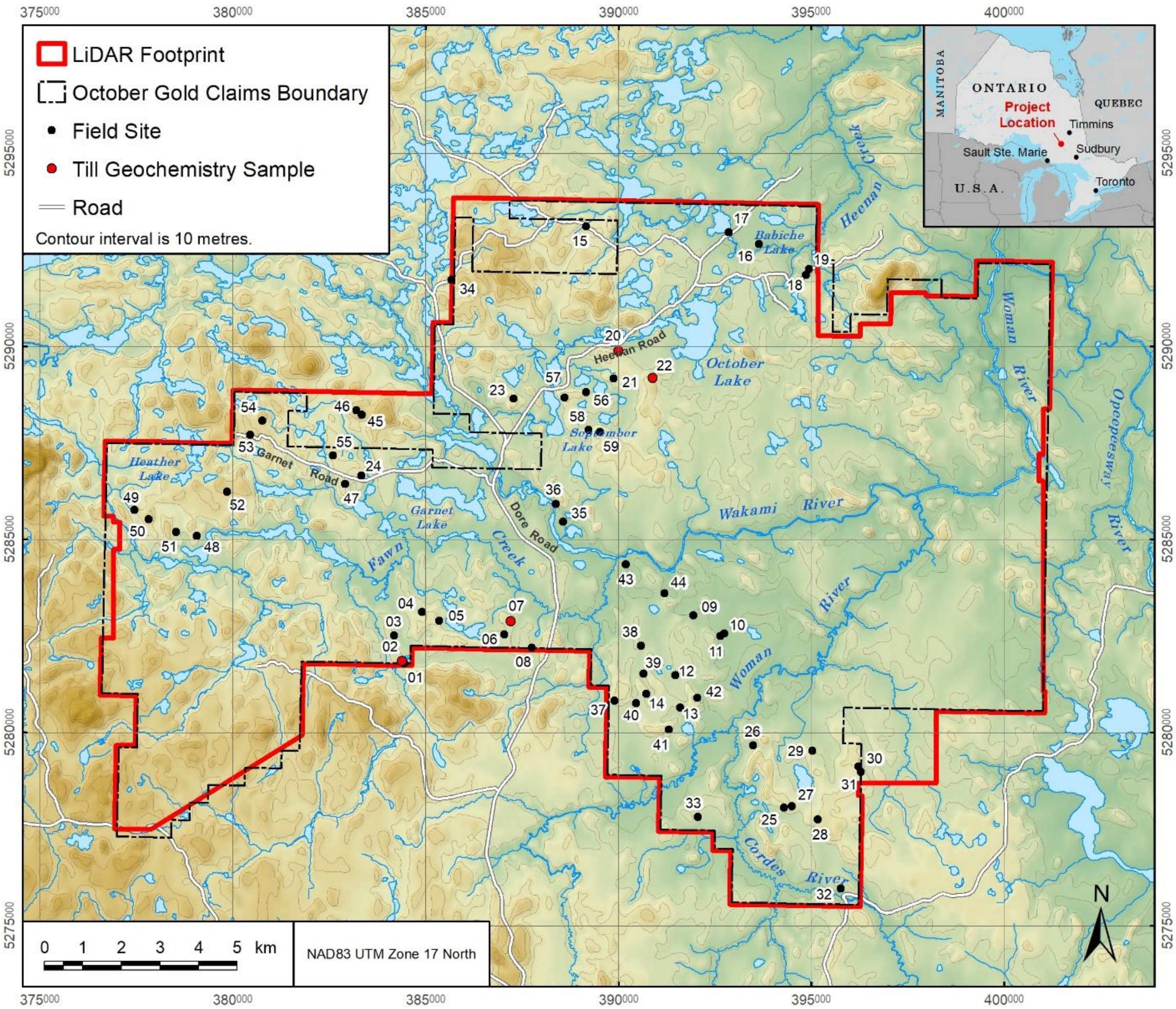

Figure 1. The October Gold property as of August 17th, 2021.

1.1 Property Setting

The Property is in northern Ontario near Timmins, approximately 50 km south of Foleyet and 10 km northeast of Sultan (Figure 1). It encompasses approximately 270 km^2 and is characterized by subdued but rugged hills with intervening flatter areas formed where sediment accumulated within bedrock depressions. Elevations range from 370 to 460 m asl. Lakes are abundant in the northwest, and include September, October, Babiche, Garnet and Heather lakes. Larger rivers include the Cordes, Woman and Wakami, while smaller watercourses include Heenan and Fawn creeks. The Property is situated within the Upper Groundhog drainage basin, which is part of a series of adjacent drainage basins dipping gently north to Hudson Bay. Road access is via Dore, Garnet and Heenan roads (Figure 1), but many smaller forestry roads accessible by UTV are also present (field tracklogs are provided in Appendix B3). Some of the smaller roads are too overgrown for motorized access, but minor brushing would allow passage. Although there is road system within the Property, many areas are not accessible. These include the eastern portion of the Property and the southwestern portion. The latter has numerous roads, but the access road from Dore road, south of the Property, has been decommissioned. Access to the southwest corner from west of the Property may be possible but was not at the time of field work.

1.2 Background

Existing mapping completed by the Ontario Geological Survey (OGS) provides information on surficial geology at 1:50 000 scale, which is insufficient for Property-scale till sampling survey design but provides useful background information for the region (Bernier, 1998a-c, Kristjansson and Bernier, 1998). The OGS maps indicate that The Property is underlain by rocks of the Swayze greenstone belt, which consist of Archean felsic to mafic metavolcanic and metasedimentary rocks, mafic to ultramafic intrusions, granite, granodiorite and minor migmatite (Bernier *et al*., 1995).

1.2.1 Regional Glacial History and Surficial Geology

The Timmins region was crossed by the Laurentide Ice Sheet during the last glaciation (Fulton, 1989). Ice flow during the glacial maximum was mainly south to south-southwestward, with late-stage southwestward and localized southeastward flow events (Bernier, 1994a,b; Bernier and Pierna, 1995a,b). Striation data suggests that the late-stage southeastward flow is younger than the southwestward flow (Bernier and Pierna, 1995b).

Till deposited during these events is described as generally thin and discontinuous, and generally overlies bedrock uplands (Bernier, 1994b; Bernier, 1998a-c; Kristjansson and Bernier, 1998). Till dispersion is suggested to be mainly associated with the south-southwestward ice flow direction, although there is potential for late-stage dispersion to the southeast and southwest (*cf.* Bernier, 1994b). Subglacial and ablation till facies are both present. They are locally affected at surface by reworking in glaciolacustrine or glaciofluvial settings, and are commonly overlain by glaciolacustrine sediments (Bernier, 1994b; Bernier and Goff, 1993). Where *in situ*, subglacial till is best suited for sampling to support mineral exploration. Ablation till is less suitable due to its interaction with meltwater during deposition and uncertainties with transport history. Dispersal patterns in ablation till are typically poorly defined and can be difficult to reconcile.

Glacial Lake Sultan developed west of the Property during deglaciation, which began around 10,000 years ago and continued for about 2,000 years (Boissonneau, 1968; Bernier and Goff, 1993; Dredge and Cowan, 1989). A record of at least three different lake levels is preserved in the region, but the extent of inundation associated with different lake configurations has not been defined. Lake elevations were controlled by ice margin location and by drainage through spillways located at the current locations of Wakami River within the Property, and Wakami and Hepburn lakes southwest of the Property (Bernier and Goff, 1993). The elevation of Glacial Lake Sultan deposits suggest that it did not extend into the Property; however, a glacial lake of some description did develop over the Property. It was similarly impounded against the ice margin and the slope of land.

Deglacial deposits include extensive glaciolacustrine mantles consisting of sand that grades laterally to sand and silt. The available government mapping shows that glaciofluvial sand and gravel deposits occupy low areas between hills in the central portion of the Property (Bernier, 1994b; Bernier, 1998a-c; Kristjansson and Bernier, 1998). Large north/south trending esker systems are found in the western and southern parts of the Property, while smaller southwest-trending eskers are found at the far southwestern corner, at the northern edge and in the central portion of the Property. Eskers are commonly flanked by glaciolacustrine sand and silt or glaciofluvial sand and gravel deposited in outwash plains. They may be overlain locally by glaciolacustrine deposits (Bernier, 1994b; Bernier, 1998a-c, Kristjansson and Bernier, 1998).

Post-glacial eolian activity deposited sheets of sand over the earlier deposits and both parabolic and longitudinal dunes formed in the eastern half of the Property (Bernier and Goff, 1993, Bernier, 1998a-c, Kristjansson and Bernier, 1998). Post-glacial fluvial deposits flank modern rivers and streams and comprise sand, silt and organic-rich sediments (Bernier, 1998a-c, Kristjansson and Bernier, 1998). Organic deposits are common in most poorly drained depressions and along the periphery of rivers and lakes (Evans and Cameron, 1984; Bernier, 1998a-c, Kristjansson and Bernier, 1998).

2. Methods

2.1 Surficial Geology Mapping

The surficial geology was interpreted at a scale of roughly 1:20 000 from high-resolution, colour 3D imagery and LiDAR data provided by Genesis. LiDAR data was rendered as a bare earth hillshade image at a resolution of 25 cm and used to identify map unit boundaries with greater precision, and landforms that are obscured by vegetation in the imagery. The interpretations were calibrated with field data and field photos (Appendix B). Mapping was completed using DAT/EM's Summit 3D mapping software and ArcGIS by Esri.

Polygons were delineated based on surface material and expression using the standard surficial geology mapping guidelines provided by the Geological Survey of Canada (Deblonde *et al.*, 2018). Following these protocols, up to two surficial materials can be identified within each mapped polygon as either a primary and secondary material, or with a stratigraphic relation. Polygons are coloured according to the primary surficial material. Materials that occupy less than 10% of the polygon area may be omitted from the map unit label. Our interpretations are intended to inform mineral exploration, and therefore, the landscape is strategically divided in such a way that the TSS and drift thicknesses can be accurately derived. This entails defining and delineating repeated landscape assemblages that include materials with similar properties (*e.g.*, genesis, thickness).

Linear landforms (*e.g.,* streamlined or meltwater features) were delineated with a single centreline following the length of the feature. Indications of paleo-flow direction were included if they could be determined. Point symbols were used to identify landforms too small to delineate as polygons at the map scale (*e.g.,* kettles and bedrock outcrops). Striations measured in the field are also plotted as point symbols. Cartographic symbology is based on the GSC style guide, for which layer files are provided in Appendix A4.

Our interpretations were primarily based on surface expressions and supplemented with our understanding of landform associations, landscape and morphology, vegetation patterns and field data. The general interpretive framework assumes that thin mantles of till were deposited discontinuously on upland surfaces while thicker till deposits accumulated in depressions. A series of temporary A temporary glacial lakes were present across much of the Property, and further infilled depressions with fine-grained materials. Other material may be present within the stratigraphic sequence. In general, thicker deposits are interpreted to be present in lowland settings and depressions, whereas thinner deposits were interpreted as having formed on convex or upland surfaces and in locations where bedrock is exposed nearby. The presence of till underlying other materials was inferred as much as possible to help with design of till sampling programs. These interpretations assume till is preserved below passively deposited material (*i.e.,* glaciolacustrine), while it was most likely eroded or reworked in higher energy depositional environments (*i.e.,* glaciofluvial). Note that these interpretations are meant as a guideline only and actual thicknesses of deposits and subsurface stratigraphy should be verified with test drilling or geophysics. These inferences also provide an indication of relative sediment thickness that is useful for determining what type of machinery might be needed to access material at depth.

2.2 Till Sampling Suitability

Till sampling suitability maps support the design, execution and interpretation of till sampling programs and data. These thematic maps are derived from the surficial geology interpretations and inferences and identify areas with high potential for *in situ* subglacial till suitable for mineralogical or geochemical analysis. Subglacial till is widely considered the optimal sample media for mineral exploration in glaciated terrain (*cf.* Shilts, 1993; Levson, 2001). It is predominantly a first derivative of bedrock, its transport history can be determined using the local ice-flow history, and it provides a detectible anomaly footprint that is areally more extensive and consistent than those in other sample media. Anomalies in subglacial till are reliable, can be confidently traced back to a source region, and can be detected with significantly fewer samples than other sample media.

Till sampling suitability was derived by classifying the 1:20 000-scale surficial geology map units into categories that reflect the specific setting of the Property. Classifications were based on the spatial and genetic association of subglacial till with other surficial materials, their depositional environments, potential for post-depositional modification and potential for till to occur in the subsurface stratigraphy. This classification provides an estimation of the proportion of a polygon that consists of till suitable for sampling and where in the stratigraphic sequence it is likely to occur. The classifications consider the potential for till to be present at depth and the effort or resources required to collect samples at that depth. For example, a veneer (material up to 2 m thick) of glaciolacustrine sediment overlying till is assigned a relatively high TSS score even though till is not exposed at surface, as the till may be reached through shallow excavation, or with a shallow-drilling system. A low TSS rating does not necessarily mean that suitable till cannot be found within a particular mapped unit, nor does a high rating ensure that all material within a particular area is suitable for sampling.

2.3 Drift Thickness Modelling

The relative drift thickness modelling was derived from the 1:20 000-scale surficial geology interpretations. It informs several aspects of mineral exploration–from guiding bedrock mapping and prospecting programs by distinguishing areas where bedrock is exposed at surface or can be accessed with hand tools to identifying those locations where mechanical assistance may be required to access bedrock. The drift thickness modelling also identifies areas where drill-supported till sampling may be necessary and can provide additional information for drift-based exploration programs. It can be used in comparison with other exploration datasets (*e.g.*, geophysics or soil geochemistry) to assess the potential influence of drift thickness on their interpretations. Interpretations of thickness were locally calibrated where bedrock is exposed or is near surface. These interpretations have otherwise not been calibrated with known depths to bedrock.

The drift thickness modelling was completed in two phases. The first phase represented the information in polygon form. Each unique surficial geology unit was reclassified into categories based on the relative thicknesses and stratigraphic relationships of surficial materials. The second phase of the modelling rasterized and smoothed the polygon data. The raster model of drift thickness more realistically depicts variations in drift thickness across the Property by smoothing sharp transitions at polygon borders and incorporating bedrock outcrop control points (*i.e.*, outcrop point features, striation measurements). The drift thickness polygons were first transformed to a 20 m-resolution raster, excluding lakes. A second raster was created using a 25 m buffer around each bedrock control point and used to override the original drift thickness raster. To smooth the data, two roaming averages were calculated using a roaming window of 100 m and 200 m. The roaming average rasters were then averaged, and the resulting raster was down-sampled using a B-spline interpolation. An iterative approach of smoothing and re-introducing the bedrock control points was used to ensure the bedrock control points were not overridden by the interpolations, resulting in the maintenance of the specific point features and smoothed, realistic transitions.

3. Results and Discussion

3.1 Surficial Geology

The surficial geology interpretations identify the various surficial materials of the Property, with an emphasis on details that can influence mineral exploration decisions. The simplified surficial geology of the Property is presented in Figure 2 and the detailed mapping is provided in Appendix A1. The spatial data are provided separately in Appendix A4. Field site locations are shown on the map series and on Figure 1, and field photos are included in Appendix B2.

Surficial geology mapping was challenging in this area due to the numerous deglacial processes that contributed to the development of the landscape. As the ice sheet retreated and downwasted, subglacial meltwater eroded the subglacial till and formed eskers. Ablation till was deposited at this time as well. A series of glacial lakes formed, likely dammed by northward-retreating ice, within which mantles of clay, silt and sand were deposited. Proglacial outwash incised and remobilized the existing glaciofluvial landforms. When the lakes receded, fine-grained sediments from glaciofluvial and glaciolacustrine deposits were remobilized by wind, forming extensive dune fields that were eventually stabilized by vegetation. Modern streams continued to modify the landscape as they meandered across and incised the glacial deposits.

The resulting landscape is complex with subtle differences that have significant implications for mineral exploration. For example, sand was deposited by four different processes and distinguishing glaciofluvial sand from other deposit types consisting of sand was important, because it forms the basis for determining the potential for till preservation. The surficial deposits and their distribution and implications for exploration are described below. Although we are confident in our interpretations, the local-scale complexity of the surficial geology and stratigraphy that cannot be resolved remotely or at this scale of mapping may necessitate additional site-specific ground observations before commitment to some exploration methods.

3.1.1 Surficial Materials and Landforms

The surficial deposits and landforms identified on the Property are listed and defined in Tables 1 and 2. Our interpretations of the surficial geology are broadly similar to the distributions and thicknesses indicated by the OGS mapping, but with local variations due to the finer mapping scale. One notable difference is that exposed bedrock is significantly less abundant than depicted on the OGS surficial geology maps; however, the OGS maps define the bedrock unit as a bedrock/drift complex, with the bedrock covered by thin and discontinuous till up to 3 m thick. This is consistent with our mapping, but we map these areas as till veneer, because visible bedrock outcrops are rare, and till was commonly identified at surface in these areas during field work. Glaciolacustrine deposits were also found to be more extensive than depicted in the OGS mapping. The glaciolacustrine deposits are poorly drained and commonly overlain by wetlands or organic accumulations, but we have emphasized the presence of glaciolacustrine material as it has implications for exploration.

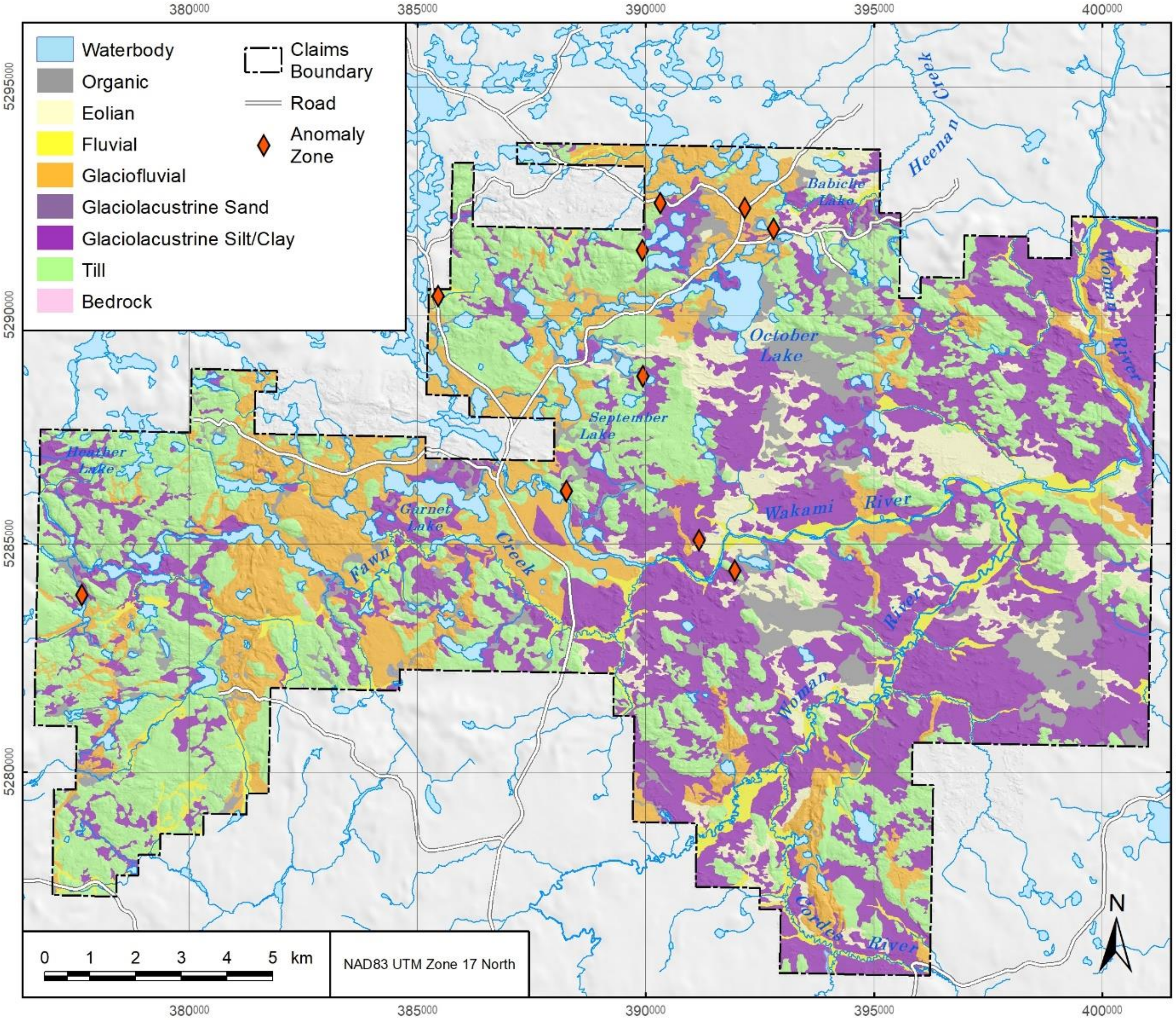

Figure 2. Simplified surficial geology of the October Gold Property. Map units are coloured based on primary surficial material. Geochemical anomaly zones are from Bernier et al. (1995).

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Table 1. Surficial material definitions and areal percent coverage for the October Gold property. Percentages are calculated based on the dominant surficial material in a polygon.

Map unit	Surficial material	Description	Percentage of Property Area[1]
		Holocene	
O	Organic deposits	Accumulations of live and decaying plant matter, such as peat or organic mud; variable thickness; common in poorly drained topographic lows and on floodplains.	6
Av	Alluvial sediment, veneer	Sediment transported and deposited by streams and rivers; <2 m thick; consists of beds of silt, sand and gravel; may include minor organics.	5.2
Ap	Alluvial sediment, plain	Sediment transported and deposited by streams and rivers; >2 m thick; forms flat floodplain deposits that mask the form of underlying materials; consists of organic-rich beds of silt, sand, and gravel; commonly overlies glaciolacustrine deposits.	
Ev	Eolian sediment, veneer	Sediment transported and deposited by wind; <2 m thick; massive or bedded and laminated fine- to medium-grained sand; may be discontinuous.	7.6
Er	Eolian sediment, ridge	Sediment transported and deposited by wind; >2 m thick; massive or bedded and laminated fine- to medium-grained sand; forms inactive parabolic, star and longitudinal dunes.	
Eu	Eolian sediment, undulating	Sediment transported and deposited by wind; >2 m thick; massive or bedded and laminated fine- to medium-grained sand; forms gently undulating topography.	
		Late Wisconsinan	
GLv	Glaciolacustrine sediment, veneer	Material deposited in glacial lakes; <2 m thick; composed of massive to laminated deposits dominantly composed of sand and less commonly silt and clay; mantles underlying topography.	32.4
GLb	Glaciolacustrine sediment, blanket	Material deposited in glacial lakes; >2 m thick; composed of massive to laminated deposits dominantly composed of sand and less commonly silt and clay; generally forms flat surfaces with subtle indications of underlying topography; may include eolian veneer.	
GLp	Glaciolacustrine sediment, plain	Material deposited in glacial lakes; >2 m thick; composed of massive to laminated clay, silt and sand; forms flat topography that masks the form of underlying deposits or bedrock; may include eolian veneer.	

Map unit	Surficial material	Description	Percentage of Property Area[1]
GFv	Glaciofluvial sediment, veneer	Material deposited by glacial meltwater streams; <2 m thick; composed of bedded sand and sandy pebble, cobble and boulder gravel.	14.7
GFb	Glaciofluvial sediment, blanket	Material deposited by glacial meltwater streams; >2 m thick; may be stratified; comprises massive to bedded sand and sandy pebble, cobble and boulder gravel; may be overlain by glaciolacustrine mantle.	
GFu	Glaciofluvial sediment, undulating	Material deposited by glacial meltwater streams; >2 m thick; comprises bedded sand and sandy pebble, cobble and boulder gravel; forms gently undulating topography; undulations may be a result of ice contact deposition or erosion.	
GFh	Glaciofluvial sediment, hummocky	Material deposited by glacial meltwater streams; >2 m thick; comprises bedded sand and sandy pebble, cobble and boulder gravel; forms mounds and small hills; likely deposited in contact with ice.	
GFr	Glaciofluvial sediment, esker ridge	Material deposited by glacial meltwater streams; >2 m thick; composed of of bedded sand and sandy pebble, cobble and boulder gravel; forms a single or a complex of ridges deposited by meltwater within ice tunnels or on top of the ice.	
GFc	Glaciofluvial sediment; ice-contact	Complex of glaciofluvial landforms deposited in direct contact with glacial ice; variable thickness; composition can include poorly sorted coarse sand and gravel with minor diamicton and lenses of fine sand and silt to sorted and stratified sand and gravel.	
GFp	Glaciofluvial sediment, plain	Material deposited by glacial meltwater streams; >2 m thick; composed of of bedded sand and sandy pebble, cobble and boulder gravel; forms flat topography that masks the form of underlying materials; may contain kettle holes and be overlain by glaciolacustrine mantle.	
GFt	Glaciofluvial sediment, terrace	Material deposited by glacial meltwater streams; >2 m thick; composed of of bedded sand and sandy pebble, cobble and boulder gravel; forms stepped topography with steep slopes adjacent to flat surfaces; may contain kettle holes or be overlain by a glaciolacustrine mantle.	
Tv	Glacial sediments (till), veneer	Material deposited directly by glacial ice; <2 m thick; composed of sandy to silty-sandy diamicton with pebbles, cobbles, and boulders; follows surface expression of underlying bedrock; may include minor outcrops; upper few metres may be composed of poorly consolidated and sandy ablation till that grades downward into siltier and more fissile subglacial till; commonly reworked by wave action at surface and thin deposits may be weathered to the depth of bedrock.	28.1
Tb	Glacial sediments (till), blanket	Material deposited directly by glacial ice; >2 m thick; composed of sandy to silty-sandy diamicton with pebbles, cobbles, and boulders; generally follows surface expression of underlying bedrock; upper few metres may be composed of poorly consolidated and sandy ablation till that grades downward into siltier and more fissile subglacial lodgement till; commonly reworked by wave action at surface.	
Th	Glacial sediments (till), hummocky	Material deposited during the down-wasting of slow-moving or stagnant glacial ice (ablation till); >2 m thick; composed of sandy diamicton with pebbles, cobbles, and boulders with sorting and clast contents that may vary vertically and horizontally; forms mounds and small hills that are likely underlain by more consolidated and fissile subglacial till.	
Ts	Glacial sediments (till), streamlined	Material deposited directly by glacial ice; >2 m thick; comprises silty sand, matrix-supported diamicton with pebbles, cobbles, and boulders; fissile; forms elongated landforms oriented in the direction of ice flow, may be overlain by a veneer of ablation till.	
R	Bedrock, undifferentiated	Bedrock; undifferentiated; generally rugged; faulted and jointed; may be glacially smoothed at surface.	<0.1

[1] *Remaining area comprises lakes.*

Table 2. Surficial landform definitions and symbology.

Landform	Symbol	Description
Esker	>>>>>>>	Ridge of glaciofluvial material; paleoflow direction shown; formed by meltwater flowing within glacial ice.
Meltwater channel	++++++++➤ ++++++++	Eroded channel carved into substrate glacial meltwater; paleoflow direction known (arrow) or unknown.
Spillway	^^^^^^^➤	Drainage channel formed where a glacial lake drained over a low point in the impounding landform.
Dune ridge	- - - - - - - - -	An elongated ridge of sand formed by wind during the period between deglaciation and vegetative colonization; generally associated with sandy glaciofluvial or glaciolacustrine deposits.
Streamlined feature	______	Elongated feature formed by flowing ice; typically composed of till or bedrock but may include other deposits overridden during a glacial readvance.
Crag and tail	—•→	Elongated feature consisting of a bedrock knob and a till tail that is oriented in the direction of ice flow.
Kettle	Ⓚ	Depression caused by the melting of buried glacial ice blocks; commonly infilled with glaciolacustrine sediment or accumulations of organic material.
Outcrop	x	Small bedrock outcrop
Striation	↑ ⇕	Scratches or grooves, commonly parallel, on smooth rock surfaces formed by abrasion by debris on the sole of a flowing glacier. Striations are finer than grooves. Ice flow direction known (arrow) or unknown.

3.1.1.1 Till

Till occurs at surface over 28.1% of the Property. It forms veneers, blankets (>2 m thick), streamlined landforms or hummocky topography. Streamlined till (or bedrock mantled by till) and crag and tail landforms are indicated on the maps with line symbols (Table 2; Figure 4). These features were generally oriented southward or slightly southwestward throughout the centre of the Property, while a notable cluster of southeast-oriented features was identified in the northwest, and a few southwestward-oriented features were identified in the southeast.

Till matrix comprises either sand or silt and sand. Clast content (*i.e.,* pebbles, cobbles, boulders) were observed ranging from 25% to 40% and clasts are angular to subangular, or occasionally, subrounded. Numerous clast lithologies were observed, with a large proportion being granitic and metavolcanic. Boulders are commonly dispersed on the ground surface. Clasts were occasionally striated, and some heavily weathered clasts were observed.

Two till facies were identified: subglacial till, which includes lodgement and subglacial melt-out till, and ablation (or possibly reworked) till. Subglacial till typically forms mantles or streamlined deposits overlying bedrock, whereas ablation till generally forms uneven or hummocky surfaces or thin mantles over subglacial till. Subglacial till is generally siltier and more fissile and compact than ablation till; however, it may be sandy if the source rock is coarse-grained. Reworked or ablation till is generally non-cohesive, non-fissile and sandy by comparison and contains more clasts and higher concentrations of boulders.

Subglacial till was either deposited at the ice-ground interface during glacial flow or it was entrained within the lowest portion of the ice profile and was deposited as the ice downwasted. Ablation till is typically composed of material transported higher in the ice profile and deposited during the melting of ice. These modes of till deposition resulted in a stratigraphy of ablation till overlying subglacial till, and thus, subglacial till is less common at surface than ablation till. Where subglacial till does occur at surface, it is commonly reworked by meltwater processes. It was not possible to consistently identify specific areas of reworking on the air photo or LiDAR images, but the wide extent of glaciolacustrine material suggests that much of the till, especially when mapped as a complex polygon with glaciolacustrine material (*e.g.,* Tv.GLv) was submerged in a glacial lake, and therefore, was likely affected by some amount of wave action or lake currents. Till affected by glaciofluvial meltwater processes is easier to discern and is typically mapped with a proportional component of glaciofluvial veneer, which indicates its poor suitability for sampling. Till veneer makes up a large proportion of the till identified at surface; in addition to potential reworking, the sandy nature of the till veneer allows for more pervasive weathering, which was commonly observed down to bedrock. Till veneers are likely less suitable for sampling due to the reworking and weathering processes that have affected it. In the field, subglacial till facies suitable for sampling were typically located more than 2 m below surface in roadcut or excavator pit exposures. Subglacial till was present at 1 m depth at one sample site, so it is possible that suitable till could be occasionally encountered at that depth, but in general, the common occurrence of overlying ablation till and reworking or weathering at surface necessitates sampling depths of greater than 2 m to reach unmodified subglacial till.

Thicker accumulations of subglacial till are expected in topographic lows, where they are commonly overlain by glaciolacustrine deposits that protect them from weathering. Suitable till for sampling is, therefore, expected to be present in the subsurface throughout more of the property than what is depicted on the maps based solely on till at surface. The tendency for glaciolacustrine deposits to be extensive and mask underlying topography makes it difficult to predict the exact thickness and distribution of subglacial till beneath them. While blankets or veneers of till have been identified as underlying the glaciolacustrine material, the interpretations are based on the nature of adjacent till deposits, and the actual amount of till present may be more or less than indicated. It is, therefore, advised that local drill testing or geophysics be completed prior to the initiation of any large sampling programs to better understand the actual distribution of till beneath extensive glaciolacustrine deposits.

Till is less likely to be preserved beneath glaciofluvial sediments, due to the erosive nature of that depositional environment. In addition, glaciofluvial sediments complicate drill-supported sampling programs, so it is recommended that attempts at sampling till below glaciofluvial deposits be avoided unless there is an indication from existing sample or other data that suggests high prospectivity for a particular area.

3.1.1.2 Glaciolacustrine, Organic, Eolian and Alluvial Deposits

Glaciolacustrine deposits are the most abundant deposit at surface, forming the dominant material across 32.4% of the Property. The actual amount of glaciolacustrine material occurring on the Property is higher still than what is depicted at surface as most eolian (7.6% of Property), organic (6% of Property), and alluvial (5.3% of Property) deposits overlie glaciolacustrine material. Figure 3 indicates the interpreted extent of glaciolacustrine sedimentation on the Property. The morphology of the glacial lakes was heavily influenced by the ice sheet configuration and changed throughout deglaciation, and therefore, it is likely that several lakes occurred that may have drained and refilled several times.

Glaciolacustrine sand is common in the north, central and western parts of the Property, where it formed in shallow water environments or near the ice margin. The sand deposits generally consist of massive fine or very fine sand, but rare horizontal bedding, pebbles, coarse sand and medium sand were observed in the field. Where present, clasts are subangular to subround and are interpreted as dropstones. In the east and south, bedded silt and clay are likely more common as these finer-grained deposits are generally deposited at the lowest elevations where the water was deepest. Extensive organic deposits may indicate the presence of finer-grained underlying material (most likely glaciolacustrine deposits), as organic material accumulates on poorly drained surfaces. Similarly, alluvial deposits may indicate underlying finer-grained glaciolacustrine material as watercourses generally flow over the lowest parts of the landscape and are commonly associated with organic deposits.

Glaciolacustrine deposits are most extensive in the east, where they were interpreted up to elevations of about 400 m asl. At lower elevations, these deposits are mapped as blankets and plains, while veneers are more common at higher elevations. Based on the relatively flat land surface in this part of the Property, the glacial lake in which the sediments were deposited was relatively extensive with probable depths ranging from 5-10 m. Therefore, it is likely that most glaciolacustrine blankets and plains range from 2-5 m in thickness with maximum thicknesses rarely exceeding 10 m. Till blankets are interpreted to occur beneath many of the glaciolacustrine blankets and plains because of the passive nature of glaciolacustrine deposition and the sediments' location within lowlands where till accumulations are generally thicker. The thick glaciolacustrine units are extensive and they mask any indication of the subsurface stratigraphy, so the actual amount of till beneath these deposits is difficult to determine and may be less extensive. Glaciolacustrine veneers are more common where surface elevations are near 400 m asl. Till blanket is interpreted to underlie glaciolacustrine veneer where the surface expression of bedrock is muted. Where indications of bedrock topography can be observed, till veneers are interpreted to be present beneath the glaciolacustrine material. In general, till sampling can be completed below most glaciolacustrine deposits in the central and eastern parts of the Property; however, the potential for intersecting till blanket is greater than intersecting veneer because blanket deposits form more continuous deposits while discontinuous deposition is more common with veneer deposits.

Glaciolacustrine veneers are also interpreted within localized depressions in upland areas in the west and northwest. These typically occur where the land surface slope was toward retreating ice and spillways are commonly identified that indicate where the lakes drained over the height of land. Many of these deposits are interpreted to overlie till that would have accumulated in the bedrock depressions; however, the depth of till is unknown and many of these depressions also served as meltwater channels, which reduces till preservation potential. Nonetheless, these settings are the best targets for till sampling because till would have been protected by the glaciolacustrine material from weathering. Generally, elongated depressions were more likely to have been conduits for meltwater and wider depressions are likely better targets for till sampling.

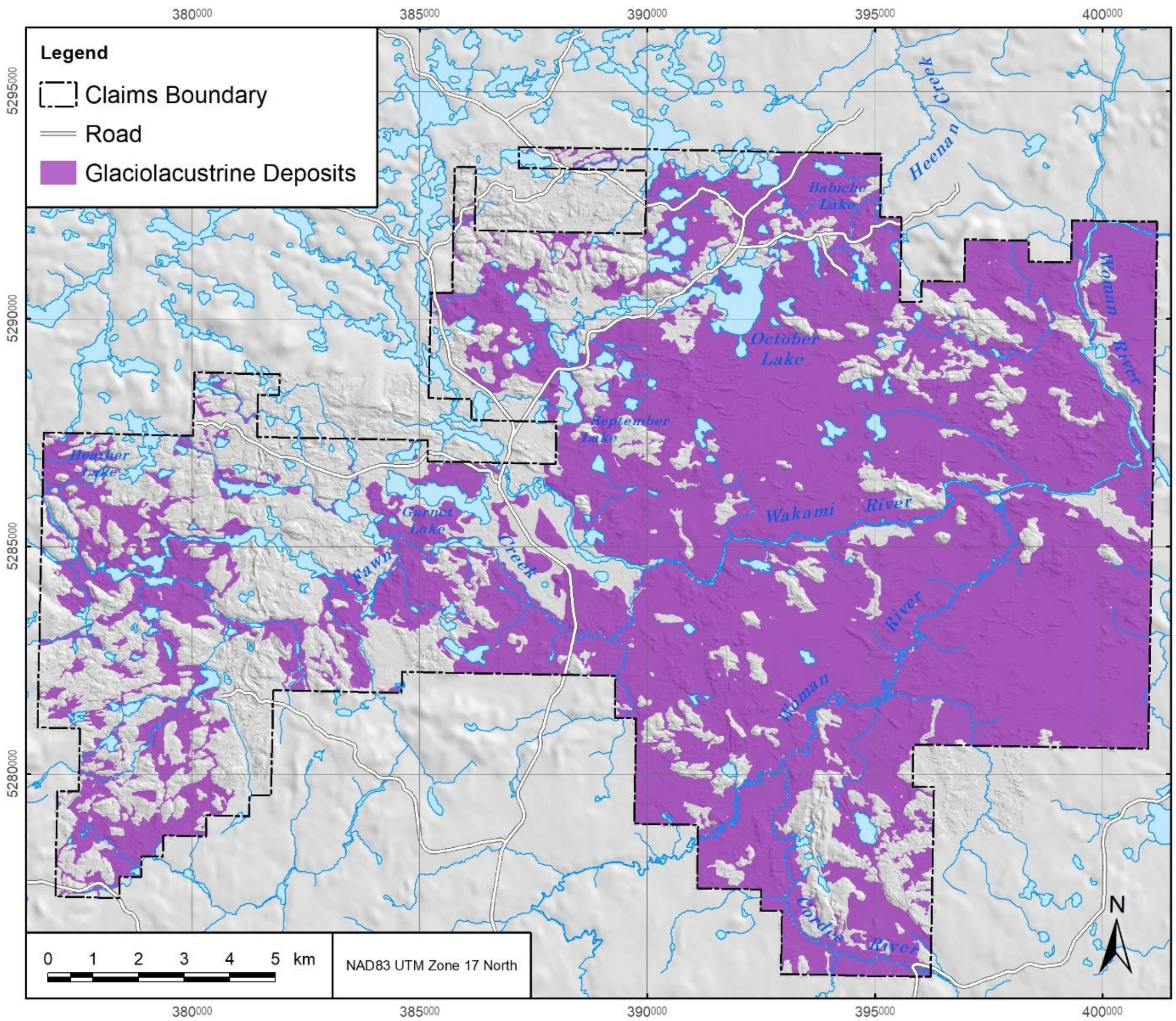

Figure 3. Glaciolacustrine deposits of the October Gold Property. Includes areas where glaciolacustrine material is inferred to be present beneath the surface materials (e.g., Ap.O)

Eolian material commonly overlies glaciolacustrine deposits in the eastern part of the Property and may occur even where not indicated by the map unit label. The sand present in the glaciofluvial and glaciolacustrine deposits provided abundant material for the formation of parabolic, star and longitudinal dunes, which are shown with line symbols on the surficial geology map series (Appendix A1, Table 4). Wind directions were mainly southeastward, but other wind directions were strong enough to produce irregular longitudinal and star-shaped dunes. The dunes consist of laminated to bedded fine and medium sand, which distinguishes them from the massive fine and very fine sand and occasional coarser material of the glaciolacustrine deposits. The dunes are a few metres in height and are easily identified both on the air photos and on the LiDAR hillshade image, especially between Wakami River and October Lake (Figure 2). Eolian sand also forms veneers or undulating mantles.

Eolian deposits generally overlie glaciolacustrine material, which is assumed to overlie till, and therefore, there is potential for the collection of till samples below eolian material with mechanical assistance. Eolian veneers are best suited to this purpose because thicker deposits will cave in during excavation or drilling. It is best to avoid eolian deposits when till sampling unless necessary.

Organic deposits also commonly overlie glaciolacustrine deposits and are typically associated with alluvial (fluvial) plains, but can overlie other materials if an area is poorly drained. The true extent of organic deposits is underrepresented due to the scale of mapping and the small size of many wetlands. Organic deposits are likely thickest where they overlie glaciolacustrine blankets or plains in the lowlands, which are in turn likely underlain by till. Although till is commonly present in the stratigraphy underlying organic deposits, drill-supported sampling in these locations is not recommended due to the potential for saturated conditions that complicate sampling efforts. If required, sampling should occur in winter to avoid damage to wetland ecosystems and to provide solid ground conditions for heavy equipment.

Alluvial (fluvial) deposits underlie and flank streams and may also be underrepresented due to the scale of mapping and the small size of some floodplains. Fluvial sediments comprise organic-rich beds of silt, medium to coarse sand and pebbles. They are commonly overlain by, or adjacent to, wetlands. Stream floodplains range from small (tens of metres) to large, the largest being those adjacent to major rivers. Smaller stream deposits are mapped as veneers. Fluvial deposits may overlie any other deposit, but mainly overlie the glaciolacustrine sediments that infill depressions and low elevation areas. Although these deposits may ultimately overlie till, they should generally be avoided for till sampling as they commonly contain sensitive ecosystems.

3.1.1.3 Glaciofluvial Deposits

Glaciofluvial deposits mainly form outwash plains formed by large meltwater rivers that formed in front of the retreating ice sheet or eskers and their associated ice-contact deposits. Eskers and meltwater channels in glaciofluvial deposits are indicated on the maps with line symbols (Appendix A1, Table 4). Ridged, terraced, hummocky, undulating, blanket and veneer deposits are all common. Glaciofluvial sediments are fairly common, covering 14.7% of the Property. They are more coarse-grained than the glaciolacustrine sediments; outwash generally consists of beds of poorly sorted sand and pebble gravel, whereas ice-contact deposits may include sandy boulder, cobble and pebble gravel.

Two dominant trends are present in the glaciofluvial landforms. A series of north-south-oriented esker and ice-contact glaciofluvial complexes occur throughout the Property, with the largest located in the west. Some of the smaller systems deviate from the southward orientation, suggesting deposition under stagnant ice conditions. The eskers are dissected by a series of outwash plains that more closely follow the natural slope of land. These deposits formed after ice retreated, unlike the eskers which were deposited during ice retreat. Glacial lakes were likely present during both glaciofluvial events as some glaciofluvial deposits form subaqueous fans. Differentiating glaciofluvial sand from glaciolacustrine sand can be difficult; however, glaciofluvial deposits tend to form eskers and terraces, are commonly kettled and have meltwater channel scars on their surface. In most instances, the map unit reflects the glaciofluvial landform as it has a larger impact on till sampling suitability. Some glaciofluvial deposits are overlain by glaciolacustrine material as indicated by the slight muting of terrace scarps by the mantle of glaciolacustrine material. This supports the hypothesis that the glacial lakes may have drained and refilled during deglaciation.

The glaciofluvial environment can be both erosive and depositional, so it is difficult to determine the preservation potential of till beneath these deposits. It is more likely that till was preserved below the proglacial deposits than the ice-contact deposits, but as a precaution, the TSS related to both is interpreted as being low.

3.1.1.4 Bedrock

Glacial and post-glacial deposits cover most of the Property, but exposed bedrock is found at various locations within the Property. Most bedrock outcrops have been mapped with point features on the surficial geology map series (Appendix A1;Table 4), which should aid with bedrock mapping efforts. A few areas are mapped as discrete bedrock units as well. These are extremely rare, present over a negligible percentage of the Property, and are usually associated with meltwater erosion. Grey and green metavolcanic rocks, including pillow basalts, were the main bedrock types visible at the various field sites, but a few granitoid rocks were evident as well. Beyond the thick glaciolacustrine deposits, much of the Property's topography is bedrock-controlled, with bedrock forming the base of oblong or irregularly shaped till-covered hills. Bedrock outcrops visited in the field were found to be jointed and fractured and to have either glacially smoothed or rugged surfaces.

Glacial striations were measured at 28 locations within the Property (Figure 4). A variation in orientation of approximately 10˚ was common among sets of striations, but only the dominant orientation was recorded.

Striations and grooves oriented between 180˚ to 210˚ were identified at 21 locations in the southern and central portions of the Property; the majority of these were between 180˚ and 190˚. Local streamlined macroforms parallel the striations (Figure 4). This was the dominant trend of ice flow indicators on the Property. Striation and groove sets of 158˚ to 175˚ were found west of Garnet Lake and in the south, surrounding of the junction of the Cordes and Woman Rivers. These are also mirrored by large-scale landforms, albeit less strongly in the south. Additionally, striation sets ranging from 130˚ to 147˚ were identified at two locations south and east of Heather Lake. Striations ranging from 223˚ to 232˚ were identified at two locations in the west, both north of Garnet Road, and at one location in the northeast, southeast of Babiche Lake. At the northeast site, a second set of striations was measured at 260˚. These indicator sets are not parallel to any nearby streamlined landforms; however, landforms oriented in this direction in the southeast part of the Property suggest that striations and landforms either represent early phase flow that has been only sporadically preserved, or late phase flow of thin ice. A relative chronology of ice flow was reliably determined from only one site where a set of grooves oriented at 170˚ was inferred to be older than much finer and more abundant striation sets at 158˚ and 187˚; however, the relationship of the latter two is unknown (Palmer, 2021).

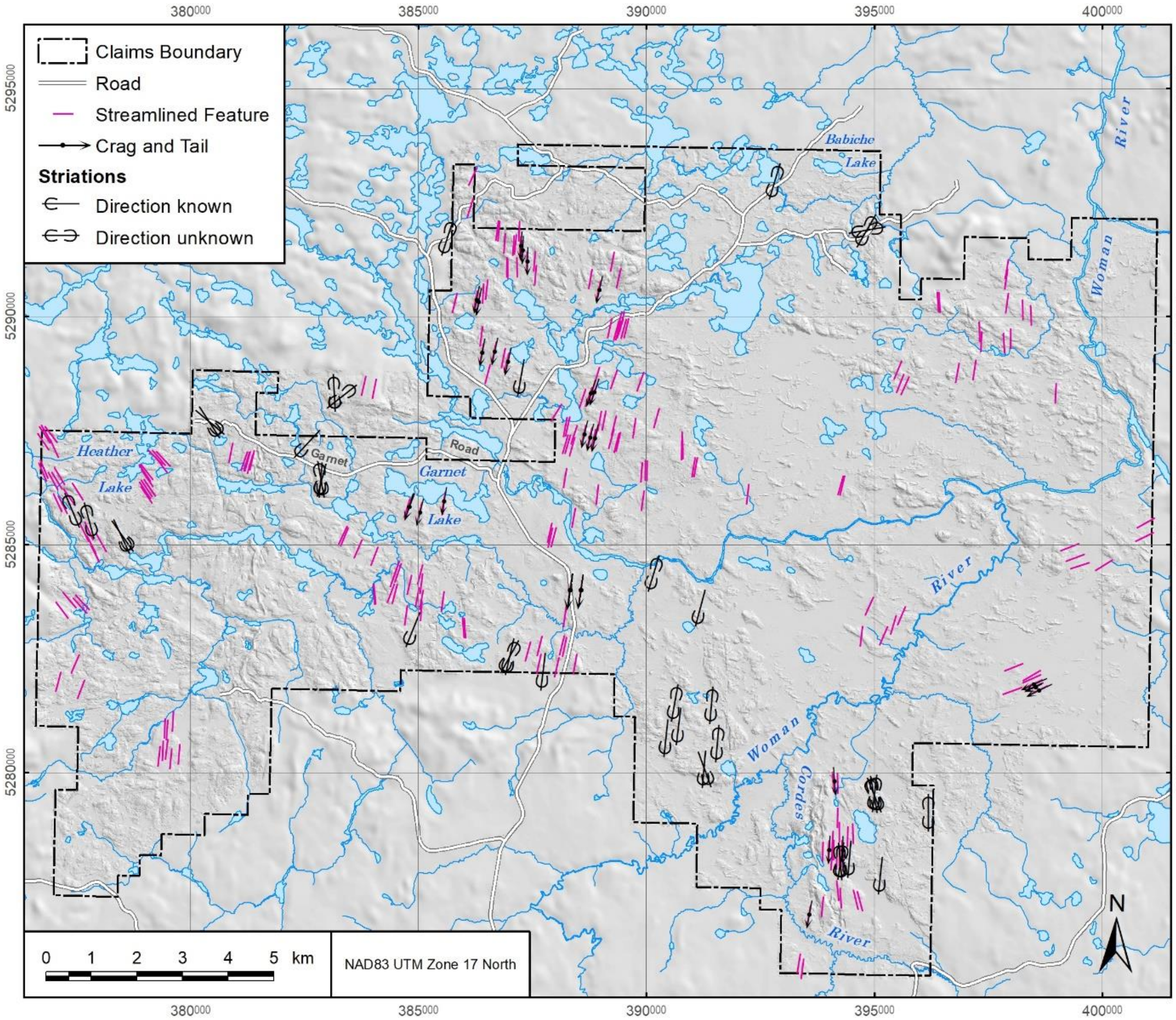

Figure 4. Ice flow indicators for the October Gold Property.

3.2 Landscape Evolution, Glacial History and Implications for Exploration

Sediments predating the last glaciation were not identified on the Property but may be preserved in the stratigraphic sequence. If subsurface till sampling yields samples from multiple till units, consideration for events from previous glaciations may need to be considered in the interpretation of the till geochemistry.

During the last glacial maximum, ice crossed the Property in a south-southwestward direction as indicated by the dominant orientation of streamlined landforms and striations (Figure 4). During this period, bedrock was eroded and redeposited as subglacial till, forming relatively thin deposits on uplands, and presumably thicker deposits in lowlands. The primary till transport direction follows this dominant southward ice flow event.

During deglaciation, ice-contact glaciofluvial complexes were deposited beneath the northward retreating ice. The generally consistent north-south orientation of these landforms indicates that the southward ice flow remained consistent during the early phases of deglaciation. Ablation till was observed at numerous locations in the field, but hummocky ablation till deposits and eskers that deviate from the dominant southward trend were only identified within localized areas. Together, these observations suggest that stagnating ice was also localized, and in general, ice continued to flow as it downwasted.

The distinction between downwasting active ice and stagnating ice is important because it affects the way ablation till was deposited and its potential suitability for exploration. In downwasting ice that was still flowing, a portion of the ablation till was deposited through melt-out directly from its englacial position, which is why mantles are formed. The material is typically not compact, and meltwater has removed some fines, but it is generally still a sandy diamict and has a predictable transport direction. In stagnant ice, sediments collect on the ice surface before they are lowered to the ground by the melting of ice. As a result, stagnant ice deposits tend to be hummocky and composed of material that is coarser and displays more organization by grain size. Although generally crude, this sorting indicates comparatively more modification during deposition. Although neither type of ablation till is particularly good for sampling to support mineral exploration, sand-sized mineral grains in mantles of ablation till deposited through downwasting have a more predictable transport history and better reflect bedrock composition than do those in hummocky deposits. As subglacial till that is optimal for sampling will be difficult to access on the Property, sampling ablation till deposited by downwasting, active ice may be a consideration.

As the ice retreated over the study area, glacial lakes formed against the ice margin in any closed basin where land sloped toward the ice. The size of these lakes was dependent on the size of the basin and the available spillways. In the western upland areas, these lakes were generally small and possibly short-lived. Where these lakes formed over till, the glaciolacustrine deposits may have protected any underlying till from subsequent weathering, making these small lake basins optimal targets for subsurface till sampling as compared to the thin and weathered surface till deposits that are generally present in the area.

At least two larger glacial lakes developed as ice continued to retreat from the Property. A regional glacial lake developed to a minimum surface elevation of about 400 m asl, inundating most of the central and eastern portion of the Property (Figure 3). Like Glacial Lake Sultan, the lake was likely impounded by ice impeding natural northern drainage through the watershed, which instead ponded to elevations controlled by spillways. A potential spillway to the adjacent Upper Mattagami watershed to the east occurs at roughly 395 m asl. The glaciolacustrine sediments above 395 m could be explained by the readvance or persistence of an ice lobe located east of the Property. The sparse southwest oriented streamlined landforms in the southeast support the presence of such an ice lobe (Figure 4). It is likely that both configurations of the lake occurred, but their relative chronology is unknown. Regardless, the late-stage southwestern ice flow in the southeastern part of the Property may have redistributed till, resulting in a second vector of sediment transport to consider in that area.

A second lake developed in the western uplands against the large north-south oriented esker system. This lake was also influenced by an ice lobe, which existed in the northwest corner of the Property. The extent of this ice lobe is roughly depicted by the southeast oriented streamlined landforms and striations (Figure 4), and the abundance of both suggest that this was a readvance into the Property, which likely redistributed till to the southeast. Meltwater from this ice lobe ponded against the esker system until spillways developed.

Eventually, the spillways dissected the esker system in at least three places, from which the large southeast-oriented outwash deposits developed. The relative chronology of these larger lakes is unknown; however, the occurrence of glaciolacustrine sediments overlying the southwestern oriented outwash suggests that the lakes may have occurred during roughly the same period.

After the area become ice and lake free, sand was remobilized by wind from the extensive glaciolacustrine and glaciofluvial deposits and formed numerous dune fields throughout the central and eastern parts of the Property. Although several blowout features were observed, the eolian activity was generally not erosive and the deposits conformably overlie glaciolacustrine and till deposits as a rule. Modern drainage systems developed, although it appears that minimal downcutting occurred. Instead, streams meandered over wide flood plains, over which thick organic deposits developed.

The modern landscape is complex and hinders many standard approaches to exploration. Till suitable for sampling is rare at surface due to the abundance of glaciolacustrine and ablation till mantles, expansive glaciofluvial outwash systems and weathering of upland thin till deposits. As a result, subsurface till sampling must be considered. Select ablation till deposits may provide somewhat reliable data, but likely only mineralogical data will be useful as their geochemical composition was likely modified during and after deposition. The glaciolacustrine, eolian and organic deposits limit the utility of soil sampling that depends on direct detection principles; however, this approach may be useful where thin weathered till veneers occur provided consistent soil horizons can be sampled. There will likely still be an element of clastic transport to consider in the interpretation of the data, but where the deposits are thin, this transport is likely limited to tens or hundreds of metres. The thickness of surficial deposits also limits the efficacy of stream sediment sampling as most samples will simply contain remobilized glaciolacustrine material. In upland areas, however, stream sediments may provide an indication of bedrock composition. Few surficial exploration methods can be completed independent of sediment type, so it is likely that several methods will need to be applied to determine the prospectivity of the Property.

3.3 Till Sampling Suitability

Till sampling suitability class definitions, their implications for exploration and the proportions of the Property classifications are provided in Table 3. From a surface sampling perspective, the TSS of the Property is quite low. Even where till occurs at surface, reworking and mantles of ablation till necessitate mechanical assistance to reach the likely required sampling depths of at least 2 m. This and the glaciolacustrine cover require the TSS classifications to consider subsurface sampling methods. From a subsurface sampling perspective, the TSS is moderate to good (Appendix A2; Figure 5). It is only considered moderate, and not higher, because of the depths that are required to sample till, not the likelihood of till occuring at depth. Sampling depths of 3-4 m can consistently be achieved with Palmer's Talon drilling system. Sampling depths of up to 10 m are possible with Palmer's Shock-auger drilling system. Sampling depths greater than 10 metres will require a larger drill, preferably a small sonic drilling system.

Till is inferred to exist below most glaciolacustrine deposits. Some units infer the presence of till even when not indicated in the map unit. For example, till is still assumed to occur beneath the glaciolacustrine material in a unit described as a glaciolacustrine plain with lesser amounts of organics (GLp.O). Similarly, glaciolacustrine sediments, and thus till, are inferred beneath an alluvial plain with extensive organic accumulations (O/Ap). A low TSS rating does not necessarily mean that suitable till does not exist in a particular polygon, nor does a high rating ensure that all material from that polygon is suitable for sampling.

Planning for subsurface surveys targeting subglacial till is recommended from areas interpreted as TSS Class 1, 2 or 3. Sample collection may be attempted in areas assigned TSS Class 4, but predicting the location of suitable till at depth will be difficult. Sampling in Class 4 areas should only be considered during follow-up programs when higher sampling densities may be required. Sampling is not recommended for either Class 5 or 6, but it may possible in Class 5 areas, if sample sites are carefully selected. Class 6 zones are unlikely to contain till, or the effort required to obtain a sample would be too great.

A high TSS rating (Class 1) is assigned to units where thick subglacial till is interpreted to occur at surface, although likely beneath a mantle of ablation till. Till in these areas can be sampled throughout most of the map units using a pick and shovel at sufficiently deep road cut exposures, or with a Talon drill or excavator where such exposures are not available. Sampling depths of less than two metres may be sufficient where ablation till mantles are thin or absent. Areas with a TSS Class of 1 are rare, comprising approximately only 1.8% of the Property. They occur sporadically in the western and northern parts of the Property.

Moderately high TSS ratings (Class 2) are assigned where thick subglacial till is interpreted to occur continuously beneath a thin or discontinuous cover of another material or where thick till occurs at surface with lesser amounts of another material. Suitable till for sampling can likely be located throughout most Class 2 units at depths less than 3 m and accessed with a Talon drill or excavator. These units occupy 7.2% of the Property and typically occur around TSS Class 1 units in the west and north, and sporadically on high ground in the southern and central portions of the Property.

A moderate TSS rating (Class 3) is assigned where thick subglacial till is interpreted to occur relatively continuously beneath a thick mantle of glaciolacustrine material. Sampling can be achieved in most areas with a Shock-auger drill, but some deposits, notably glaciolacustrine plains, may require a larger drill. It is recommended that representative landform assemblages be investigated with rapid geophysics to better understand the subsurface stratigraphy before planning an extensive sampling program in these areas. Although subglacial till is interpreted to occur at depth throughout most Class 3 units, the effort required to collect the samples reduces the suitability to moderate. TSS Class 3 also includes units mapped as till veneer or units where till veneer is interpreted to occur beneath glaciolacustrine material. These units are considered moderate because only a portion of the area is likely to contain suitable till for sampling. Site selection will be critical in these areas. Typically, bedrock hollows where sediment accumulations are thickest should be targeted and sampling can be completed with a Talon drill. Class 3 units comprise 43.5% of the Property.

A moderately low TSS rating (Class 4) is assigned to units where till suitable for sampling is likely only available in less than 25% of a mapped polygon due reworking or weathering (*e.g.,* Tv.GLv, Tv.R), or to polygons where till likely occurs beneath a thick mantle of another material that is difficult to drill through (*i.e.,* Th, O). TSS Class 4 units comprise 14.9% of the Property and generally occur in upland areas or at the periphery of glaciolacustrine and glaciofluvial deposits. Sampling may be possible in these areas, but careful site selection will be required.

Table 3. Till sampling suitability (TSS) classifications for the October Gold Property.

TSS Class	Description	Surficial Map Unit Example	Implications for Exploration	Areal Percentage of Property[3]
High (1)	Thick (>2 m) till at surface; subglacial till commonly overlain by veneer of ablation till.	Tb; Ts	May be possible to sample subglacial till with hand tools where existing exposures occur (e.g., road cut, borrow pit), but most areas will likely require a small drill[1] or excavator to reach the required ~ 2 m sampling depths.	1.8
Moderately high (2)	Single unit of another material passively deposited over thick (>2 m) or streamlined till, or dominantly till at surface discontinuously overlain by another material; upper 2 m of till may be ablation till.	Ev/Ts; Tb.GL1v; Av/Tb	Suitable till for sampling likely occurs beneath a veneer of another material; Sampling depths of at least 3 m will generally be required if there is ablation till present. Suitable till can likely be accessed using a small drill[1] or excavator, but some areas may require a medium drill to reach suitable till for sampling.	7.2
Moderate (3)	Thicker material (>3 m) consisting of one or more passively deposited units overlying thick or streamlined till, or consistent till veneer with thicker sections suitable for sampling; upper ~2 m of till may be ablation till.	Ap/GLp; Tv; GLp/Tb	Suitable till for sampling likely occurs beneath a thick mantle of other material(s). Sampling depths of greater than 5 m will likely be required to access suitable till for sampling. Medium drill[1] recommended[2]. Where till veneer is at surface, thicker deposits infilling bedrock depressions should be targeted and can likely be sampled using a small drill[1].	43.5
Moderately Low (4)	Ablation till or thin till that is weathered and/or reworked to the depth of bedrock.	R.Tv; Th; Tv.Ap	Suitable till for sampling likely occurs beneath ablation till and will require at least a medium drill[1] and casing system[2] for sampling. Suitable thin till for sampling is relatively rare and sampling opportunities are likely limited to localized depressions in bedrock that have been infilled by thicker till deposits.	14.6
Low (5)	Veneer of another material overlying ablation till or thin and weathered till that is unsuitable for sampling.	GFv/Tv; Er/Th; Ev/Tv	Subglacial till may be present in some areas; however, it is overlain by permeable material that would not protect it from weathering. Unlikely to find suitable till for sampling except where depressions in bedrock have been infilled by thicker till deposits. Sampling depths of at least 3 m are likely required. Small or medium drills may be required depending on site-specific conditions.	11.4
Very Low (6)	Till is unlikely to be present or is overlain by material that inhibits access (e.g., wetlands).	GFr; O.Ap	Till sampling should not be attempted.	15.3

[1] *Small drill operating range <5 m; medium drill operating range <10 m; large drill operating range > 10 m.*

[2] *Drilling may require a casing system for areas with loosely consolidated surface deposits*

[3] *Remaining area comprises lakes.*

TSS rating (Class 5) is assigned where the occurrence of subglacial till is possible but unknown, such as below glaciofluvial deposits, where thin till is likely reworked (*e.g.,* Tv.GFv), or where thin subglacial till is overlain by material that would not protect it from weathering (*e.g.,* Er/Tv). Subglacial till may occur in TSS Class 5 units, but it will likely be weathered or its locations will be very difficult to predict. TSS Class 5 units comprise 11.4% of the property.

A very low rating (Class 6) encompasses areas where till is not interpreted to be present. Sampling is not recommended for the 15.3% of the Property considered to be TSS Class 6, which is generally found within and around the large glaciofluvial corridors and modern drainages.

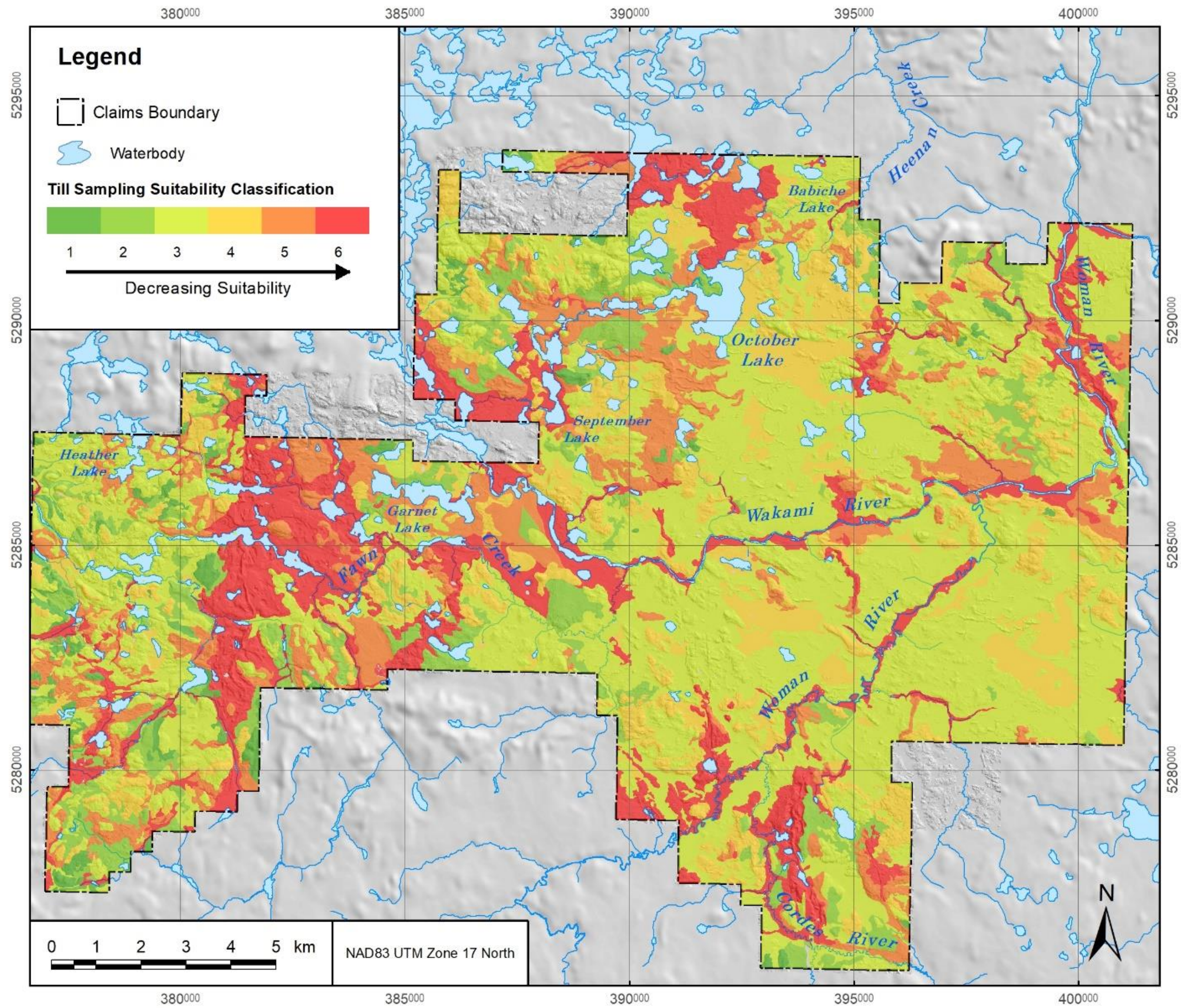

Figure 5. Till sampling suitability (TSS) of the October Gold Property.

3.4 Drift Thickness

Surficial geology map units were classified into five relative drift thickness classes based on the interpreted depth to bedrock (Appendix A3, Table 4). Stratigraphic sequences are assumed where depositional environments were non-erosional and pre-existing materials are likely preserved (*e.g.*, beneath glaciolacustrine sediments and ablation till). Drift thickness classes 1 to 3 are the most accurate because indications of bedrock depth can be observed in the surface expression. Classes 4 and 5 represent sediments that are thick enough to obscure variations in the bedrock topography. These classifications are based on typical landform genesis relationships and not all exceptions can be identified or included in the drift thickness determination algorithm. Additional evaluations of drift thickness should be considered in classes 4 and 5 if knowledge of the maximum potential drift thickness is required. The results of the relative drift thickness mapping predictably indicate thinner drift on topographic highs and in the west as compared to the lowlands in the east (Appendix A3; Figure 6). Nearly all topographic highs are attributed with Class 1 or 2 with adjacent class 3 deposits.

Drift thickness Class 1 is assigned to areas where outcrop is expected at or close to surface throughout most of the polygon. These areas comprise less than 0.1% of the Property and have bedrock as the dominant surface material. Drift thickness Class 2 is assigned where bedrock outcrop is present but less common. It comprises 8.4% of the Property, generally in the west. Bedrock may be included as a secondary material in the map unit or the map unit contains two veneers that are likely discontinuous due to erosive processes (*e.g.,* GFv.Tv). Classes 1 and 2 are excellent targets for geological prospecting with hand tools or trenching, although deeper excavations may be required in depressions or low-lying areas. Drift thickness Class 3 includes areas where continuous veneers cover bedrock and outcrops are sporadic. Outcrop may be exposed on topographic highs, but hand-dug pits or an excavator are likely required to access bedrock in most of the 25.3% of the Property attributed to Class 3.

Drift thickness Class 4 applies to locations where bedrock is overlain by a continuous blanket of material that is likely several metres thick. An excavator may or drill is required to access bedrock in the 13.9% of the Property attributed to Class 4. Many of these units include thick glaciofluvial sediments that can be difficult to excavate or drill through. Class 5 represents the thickest deposits, typically identified in glaciolacustrine settings where multiple sediment units are expected to comprise the subsurface stratigraphy. Class 5 units cover 46.5% of the Property. Bedrock is very unlikely to occur at surface in drift thickness Classes 4 or 5 and a drill will likely be required to access it; however, some small topographic highs that are apparent on the LiDAR image could not be delineated at this scale of mapping and may provide opportunities to access bedrock through thinner sediment cover.

The drift thickness information should be used in concert with the TSS data to design sampling programs with respect to the types of tools or equipment required to access the deposits. Thin deposits can be sampled by hand only in roadcut exposures where subglacial till at depth may be exposed. The need for sampling at depths of 2 m to more than 5 m necessitates the use of shallow drills or excavators. If depths of greater than 10 m are required, a larger drill is necessary. The abundance of sand deposits of various types means that casing may be required for drilling in many locations, which will increase the time and cost of sample acquisition.

Table 4. Drift thickness classifications for the October Gold Property

Drift Thickness Class	Description	Surficial Map Unit Examples	Implications for Exploration	Areal Percentage of Study Area[1]
1	Bedrock occurs at surface throughout the majority of the map unit, and discontinuous veneers of sediment may be present.	R; R.GFv; R.Tv	Bedrock is easily accessible throughout the map unit; optimal target for bedrock mapping and sampling programs.	0.03
2	Thin veneers of sediment are dominant, with lesser amounts of exposed bedrock at surface.	Tv.R; GFv.R; GL1v.R	Bedrock is at surface in less than half of the map unit area. Bedrock can typically be accessed in hand-dug pits on topographic highs where deposits are thinner, but deeper excavations are likely required in depressions and low-lying areas.	8.4
3	A continuous veneer of sediment up to 2 m thick overlies bedrock, with sporadic outcrops.	Tv.GL1v; GFv; Av.O	Bedrock is rare, typically occurring on topographic highs and where materials have been eroded by glacial or modern fluvial processes. It may be accessed in hand-dug pits on topographic highs, or with an excavator or drill where deposits are thicker.	25.2
4	Bedrock is overlain by a continuous blanket of material that is likely greater than 2 m thick.	Tb.GL1p; Ap/Tv; Eu/GFb	Bedrock is not exposed except where glacial or modern fluvial processes have eroded the sediment. It may be accessed with an excavator or drill, depending on thickness.	12.9
5	Bedrock is overlain by a stratigraphic sequence of sediments that are likely greater than 5 m thick in most areas.	Er.GLp; GFr; O/GLp	Bedrock is not exposed; surficial material thicknesses necessitate drilling to reach bedrock.	47.7

[1] *Remaining area comprises lakes.*

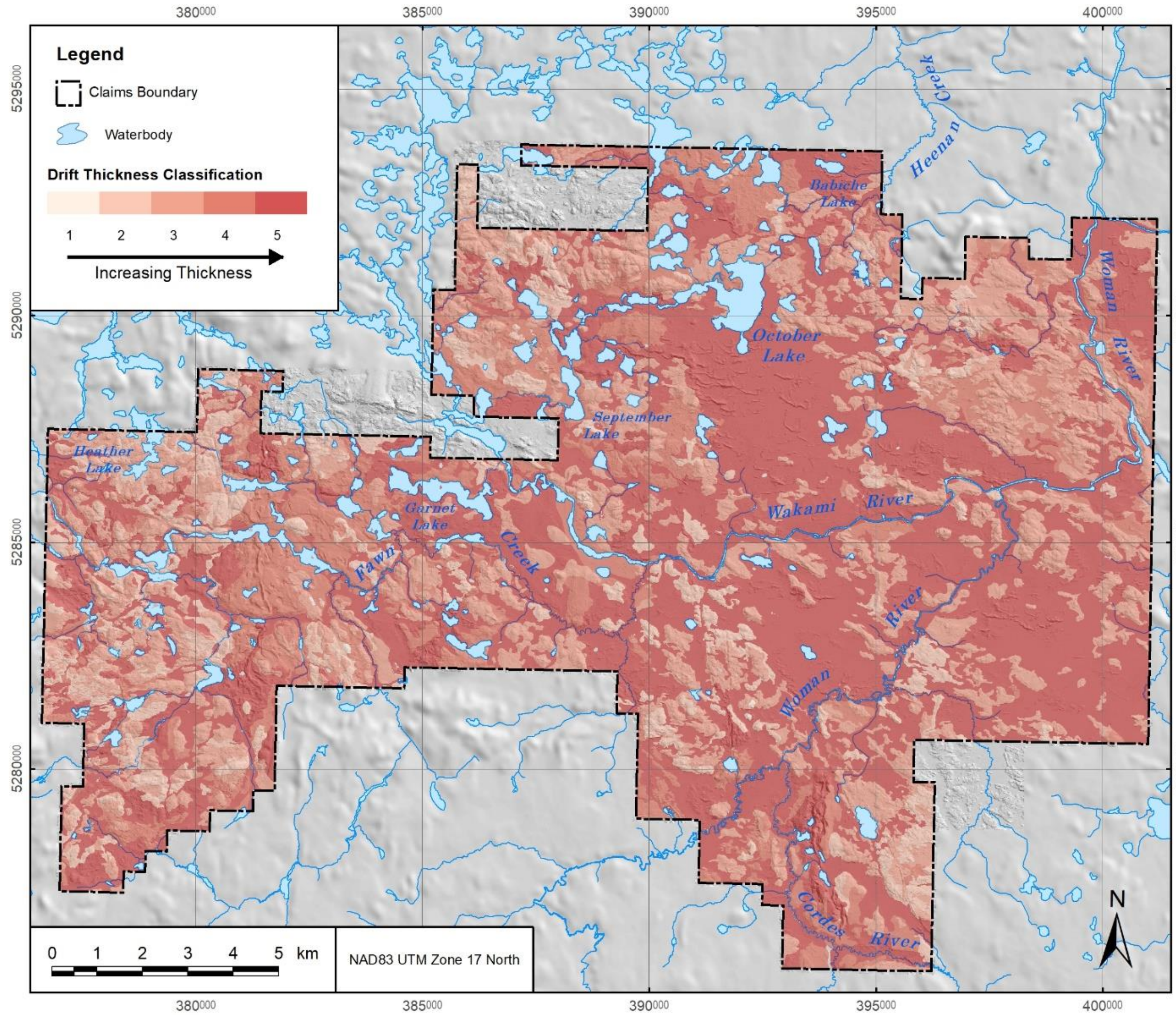

Figure 6. Relative drift thickness of the October Gold Property.

4. Conclusions and Recommendations

The purpose of this project was to provide a surficial framework to determine optimal surficial exploration methods for the October Gold Property and to provide a resource that can be used to guide exploration programs. Subglacial till is widely considered an optimal sample medium and overall, the Property is moderately-well suited to till sampling and the prospectivity of most of the Property can be determined using till data. Till transport directions should be relatively consistent and are expected to be dominantly south-southwestward, except in the northwest where secondary southeastward dispersal may have occurred and in the southeast where secondary southwestward dispersal may have occurred.

The surficial mapping and field work have revealed that suitable subglacial till for sampling rarely occurs at surface and subsurface sampling will be required if till sampling is to be undertaken. Till does occur at surface as veneers in uplands and thicker deposits are present; however, veneers are commonly weathered to bedrock or reworked, while thicker units are observed with mantles of ablation till over the target subglacial till. Both environments will require sampling depths of at least 2 m and targeting depressions where till accumulations are thicker will be critical when sampling areas mapped as till veneer. Thick till is interpreted to occur more extensively beneath the vast glaciolacustrine deposits in the east; however, deeper sampling strategies will be required.

It is likely that methodologies to collect till samples from three depth ranges will be required to complete a till survey on the Property. In general, TSS Classes 1, 2 and some Class 3 polygons can be sampled using an excavator or a small drill, such as the Talon, that can effectively sample to depths up to 3-4 m. The advantage of the Talon drill is that it is portable by UTV and hand and can be used in areas that an excavator cannot access. It also requires no permitting due to its small size and the negligible disturbance it causes. During the snow-free seasons, the Talon is best suited to UTV-supported work and short (*i.e., <250 m)* foot traverses, to ensure efficient sampling rates. For winter programs, trails can be cleared through the forest and equipment can be more easily transported many kilometres by foot in toboggans or behind snowmobiles, significantly increasing the range of sampling.

For most TSS Class 3 areas, a slightly larger, but still lightweight, drill such as the Shock-auger will be suitable for the collection of till samples up to depths of about 10 m in optimal conditions. This drill is tracked and can be moved under its own power down narrow trails via remote control. Like the Talon drill, it is easier to move in the winter and can be moved even more quickly if towed on a sled behind a snowmobile or tracked UTV. Smaller drill rigs such as these are easier to move and can collect samples considerably more quickly than their larger counterparts (*e.g.,* a reverse circulation Hornet drill); however, the achievable depth of penetration is lower than that of larger rigs. There is potential for some deposits to exceed the 10 m limit of the lightweight drills. It is recommended that representative landform assemblages from drift thickness Class 4 and 5 units be surveyed using geophysics prior to designing any drill programs in these areas. Electrical resistivity tomography (ERT) or ground penetrating radar (GPR) can provide rapid assessments of deposit thickness and basic stratigraphy, which can be invaluable for design of the till sampling programs.

The TSS and drift thickness maps can be used together to plan an appropriate sampling program that targets areas of TSS Classes 1 to 3. Class 4 is not ideal and sampling within it should be attempted only if preliminary sampling or other data suggests it is necessary. TSS classes 5 and 6 are not recommended for sampling. The Drift Thickness map can be used to select the most appropriate drill for each sample.

Optimizing the use of the drill rigs by consulting the drift thickness maps will result in faster surveys and reduced costs.

Parts of the Property are not suitable for till sampling. These areas are commonly typified by thin, weathered till (*i.e.,* Drift Thickness Classes 1 and 2), which are excellent candidate areas for bedrock mapping and sampling programs. Drift Thickness Classes 1-3 may also be suitable for soil surveys. It is, however, strongly recommended that the surficial geology mapping is referenced to ensure the material on which the soil has developed has been considered in the survey design and evaluation of analytical results. Stream sediment sampling may also be useful in drift thickness Classes 1-3, assuming there are suitably configured catchments. Both soil and stream sediment surveys will likely be less useful in drift thickness Classes 4 and 5, where thick glaciolacustrine deposits inhibit upward mobility of elements and limit watercourse access to bedrock for entrainment into the stream sediment.

Although it is typically not advisable to sample ablation till, the efforts that are required to reliable sample subglacial till necessitate its consideration. The thin ablation till deposits observed mantling the subglacial till are interpreted to have melted out of the ice with relatively less modification than the hummocky ablation tills, and therefore, may provide some indication of prospectivity. Geochemical analysis is not recommended for this material as much of the fine-grained sediment fraction will have been winnowed and there may be significant alteration to the geochemical concentrations due to the higher permeability of the sediment, but large samples for mineralogical analysis may be useful. The data would not be comparable to subglacial till samples, and would be less reliable, but the sampling would require fewer resources. A field person familiar with glacial sedimentology would be required to ensure the appropriate facies of ablation till is sampled, if this path is chosen.

The surficial geology is complex and many of the interpretations that will inform the surveys are of subsurface materials that cannot be observed at surface. As such, it is strongly recommended that any survey methodologies be tested through pilot programs. Such pilot programs would ideally be conducted in areas that encompass some of the geochemical anomaly zones identified by Bernier et al. (1995) and shown on Figure 3. For a till pilot program, an excavator would optimally be used to verify the occurrence of till in the subsurface, to sample it, and to provide direct observations of the subsurface stratigraphy and composition. The information so acquired would inform decisions about protocols such as drill selection, drill tooling and sampling methodologies. The composition of the ablation till could be observed and sampling this material down ice from the anomaly zones could validate the use of ablation till as an additional layer of data to support exploration decisions. Alongside the excavator investigation, reconnaissance-level till samples should be acquired using the Talon drill beneath ablation till and glaciolacustrine veneers. Geophysical surveys such as ERT or GPR in areas of deeper drift could be completed concurrently with these programs.

If useful new data is obtained, and the methods are successful in demonstrating geochemical anomalies, the pilot program would significantly lower risk for the expansion of the till sampling program to cover the rest of the Property, which would likely require the use of larger equipment and more site and access preparation. The goal of this larger survey would be to obtain base data at intervals suitable for determining the prospectivity of the Property. From these data, decisions to maintain, drop or acquire clams can be made, and areas worthy of further exploration can be identified.

4.1 Recommendations

The results of this study support the following strategies for the next stages of exploration on the Property:

- Use the drift thickness mapping to design and execute bedrock mapping and sampling programs.
- Complete a pilot till sampling program to verify the subsurface interpretations and sampling methods.
  - Use the TSS and drift thickness maps with reference to the anomaly areas to identify optimal pilot program sites and sampling locations;
  - Include excavator- and Talon drill-supported sampling to characterize materials and test applicability of equipment in this setting;
  - Test specific ablation till facies as sample media; and
  - Complete ERT or GPR analyses to characterize subsurface stratigraphy in representative environments and extrapolate the data to similar settings to determine what sampling protocols are appropriate.
- If the pilot program is successful, use the mapping products to plan a larger survey with respect to where till sampling can be completed and what equipment is required to collect the samples.
- Continue testing soil and biogeochemical sampling strategies with consideration for the surficial geology for sample planning and data evaluation; evaluate the catchment basins to determine if stream sediment sampling is plausible in some areas characterized by thin drift. These methods may be required to determine prospectivity of certain parts of the Property or to refine targets where high-resolution till sampling is not an option.

The diversity of the surficial environment throughout the Property necessitates the use of several exploration methods. The mapping completed for this program provides a basis to determine optimal strategies for different regions. The mapping combined with site-specific observations will be critical in defining a data-driven approach to generate reliable targets for ground-based geophysics and drilling. Palmer is available to support Genesis in executing one or more of the recommendations listed above.

5. Certification

This report was prepared and reviewed by the undersigned:

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6. References

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Appendix A

October Gold Property
Surficial Geology Mapping

Provided separately as:
OctoberGold_SurficialGeology_Mapping_Palmer_01Mar2022_AppendixA.zip

Includes:
A1_OctoberGoldSurficialGeology_Palmer_01Mar2022.pdf
A2_OctoberGoldTillSamplingSuitability_Palmer_01Mar2022.pdf
A3_OctoberGoldDriftThicknessModel_Palmer_01Mar2022.pdf
A4_OctoberGoldSurficialGeology_SpatialData_Palmer_01Mar2022.zip

Palmer™

Appendix B

October Gold Property Field Data

Provided separately as OctoberGold_SurficialGeology_FieldData_Appendix_B_Palmer_01Mar2022.zip

Includes:
B1_OctoberGold_FieldObservations_Palmer_01Mar2022.xlsx
B2_OctoberGold_FieldPhotos_Palmer_01Mar2022.zip
B3_OctoberGold_FieldTracklog_Palmer_01Mar2022.zip