

# GM 68562

ASSESSMENT REPORT ON THE 2014 EXPLORATION PROGRAMME, PEPPLER-LAMELEE PROPERTY

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Énergie et Ressources  
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Québec 

**Assessment Report on the 2014 Exploration Programme:  
Peppler-Lamêlée Property**

**PROVINCE OF QUEBEC**  
NTS MAP-SHEETS 23B05, 23B06, 23B11 & 23B12

for  
**CLIFFS NATURAL RESOURCES**



by  
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## 1.0 EXECUTIVE SUMMARY

This report summarizes the 2014 geophysical modelling and subsequent diamond-drilling programme supervised by Peter Banks (B.Sc., P.Geo.) of MRB & Associates ("MRB") on the Peppler-Lamêlée mining titles, Fermont, Québec (the "Property") owned by Cliffs Natural Resources ("Cliffs"). The drilling programme consisted of a total of 7 diamond-drill holes aggregating 1,987.4 m and was designed using 3-D geophysical-data models that were created from data collected during the 2011 airborne magnetic and gravimetric surveys.

The purpose of the programme was to assess the iron resource potential on the Property, which comprises 466 mining claims. Some of claims are registered to Quinto Mining Corporation ("Quinto"), a wholly-owned subsidiary of Cliffs, whereas others are registered to Cliffs Québec Mine de Fer Limitée.

The 3-D geophysical inversion and mineral-potential modelling was carried out by Mira Geoscience of Vancouver, BC using multi-component data collected at and around Cliffs Natural Resources' Lamêlée, Hobdad, and Peppler iron ore projects by Fugro in November and December of 2011. Results of the mineral-potential modelling work were used to optimize drill-target selection and surveying for Cliffs' 2014 drilling program.

The diamond-drilling programme, which commenced on June 7, 2014 and was completed on August 13, 2014, was carried out by Logan Drilling Group of Stewiacke, Nova Scotia.

The 2014 drill programme achieved its objective, having intersected over **264 metres of iron formation** with an **average composite grade of 31.8% Fe**, including 4 intervals of approximately 50 m in 4 separate holes. Selected "best" intervals include: **49.45 m grading 32.6% Fe** from Hole PL14-01; **45.6 m grading 33.4% Fe** from hole PL14-02; **46.85 m grading 34.7% Fe** in hole LJ14-01; **52.42 m of 27.35% Fe** encountered in hole FB14-01, and; **12.65 m grading 37.3% Fe** in hole FB14-01.

## 2.0 INTRODUCTION

This report summarizes the 2014 diamond-drilling campaign supervised by Peter Banks (B.Sc., P.Geo.) of MRB & Associates ("MRB") on the Peppler-Lamêlée Property (the "Property"), one of Cliffs Natural Resources' ("Cliffs") mining titles located southwest of Fermont, Québec (**Figure 1** and **Figure 2**).

The 2014 ground exploration programme comprised 7 diamond-drill holes, aggregating 1,987 m, that focussed on four known iron occurrences on the Peppler-Lamêlée Property: Lac Peppler and Peppler West; Hobdad; Lac Jean 1; and, Faber. The particular locations for the 2014 diamond drill-holes were finalized using 3-D geophysical models that were generated from the 2011 airborne geophysical survey data (GM66549).

3-D geophysical inversion and mineral-potential models generated by Mira Geoscience of Vancouver, BC were used to optimize drill-target selection and surveying for Cliffs' 2014 drilling program. The models were developed from gravity gradiometer and magnetometer survey data collected at and around the Peppler-Lamêlée Property by Fugro Airborne Surveys in November and December of 2011. The Mira Geoscience Report is included as **Appendix I** in this Report.

Logan Drilling Group of Stewiacke, Nova Scotia were contracted by Cliffs for the programme and provided drill crews, a single diamond-drill on skids, and a tractor for preparing drill sites and expediting drill moves. Drilling was carried out around the clock, with two drill-teams alternating on 12 hour shifts. Drill casings were left in place and capped (except PL14-02), and drilling sites were labelled. Drilling began on June 7, 2014 and was completed on August 13, 2014.

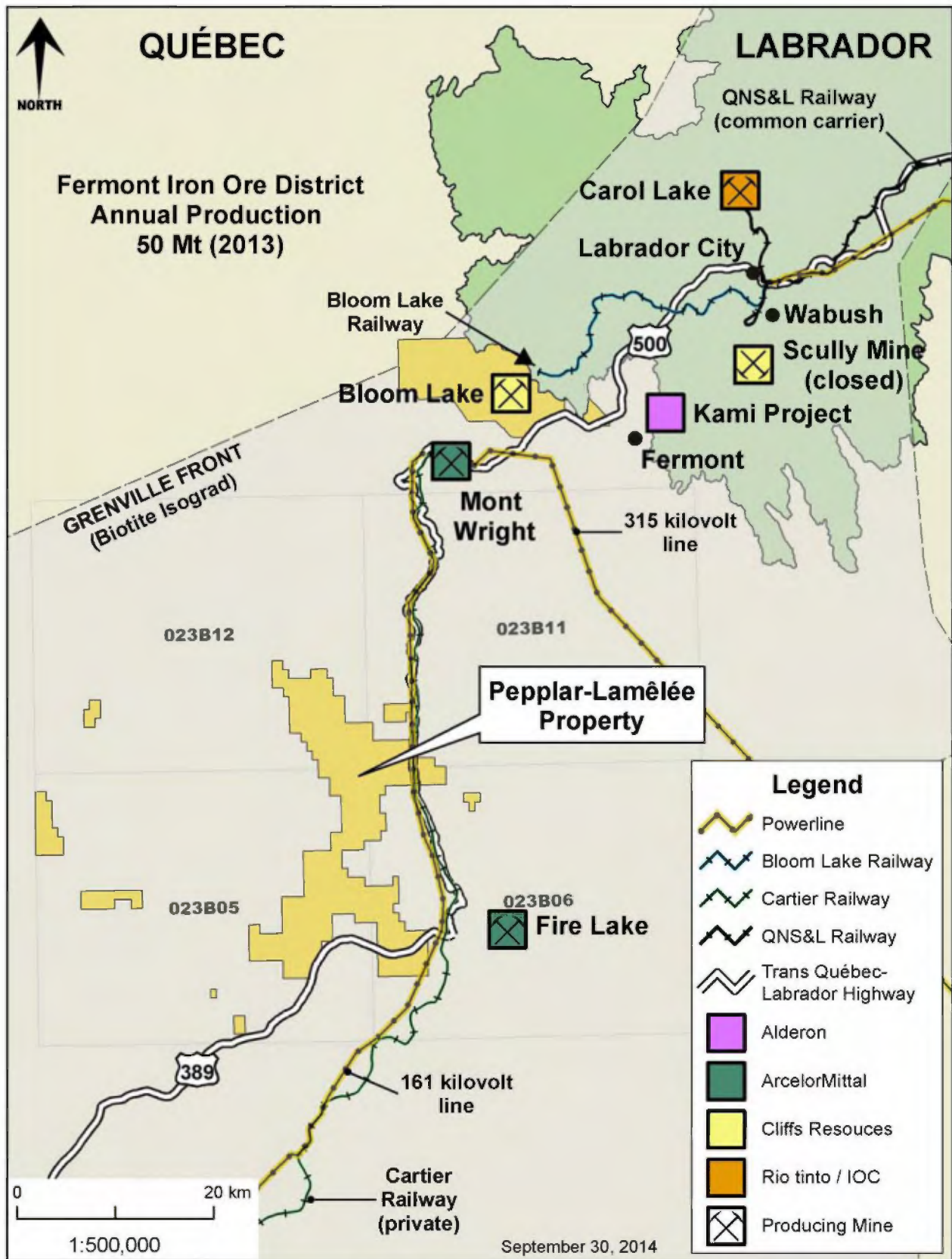
Hole PL14-01 (249 m) was drilled on the Lac Peppler Occurrence; Hole PL14-02 (281 m) was drilled at Peppler West; Hole HH14-01 (320 m) was drilled near the Hobdad Hill occurrence; Hole LJ14-01 (252 m) was drilled near the Lac Jean 1 occurrence; holes FB14-01 (350 m) and FB14-02 (293) were drilled near the Faber occurrence; and Hole FB14-03 (242 m) was drilled near the Claims J. Wax (i.e., Faber East) occurrence. The drilling on the Peppler West magnetic anomaly was the first drilling undertaken to assess this prospect. The Lac Peppler, Hobdad Hill, Lac Jean 1 and Faber occurrences have been drilled previously.

Explo-Logik Inc. of St-Hippolyte, QC was contracted by Cliffs to construct and manage the exploration camp, providing accommodation and catering for drillers and geotechnical crews, as well as core logging facilities. The 2014 exploration camp, known as the Lamêlée Camp, was located 9 kilometres from kilometre-marker 474, of Highway 398, along a previously constructed drill-road into the Lamêlée iron deposit.

The purpose of this report is to summarize the 2014 diamond drilling programme supervised by Peter Banks of MRB on behalf of Cliffs. This report is intended as an Assessment Work Report to be submitted to the Ministère des Ressources naturelles et de la Faune (MRNF) du Québec along with a Work Declaration Form for the purpose of filing work credits for mining claims registered to Quinto and Cliffs' Québec Mine de Fer Limitée.



**Figure 1: Regional location map of Peppler-Lamêlée Property in eastern Quebec**



**Figure 2: Location map of Cliffs' holdings in the southern Labrador Trough**

### 3.0 PROPERTY DESCRIPTION AND LOCATION

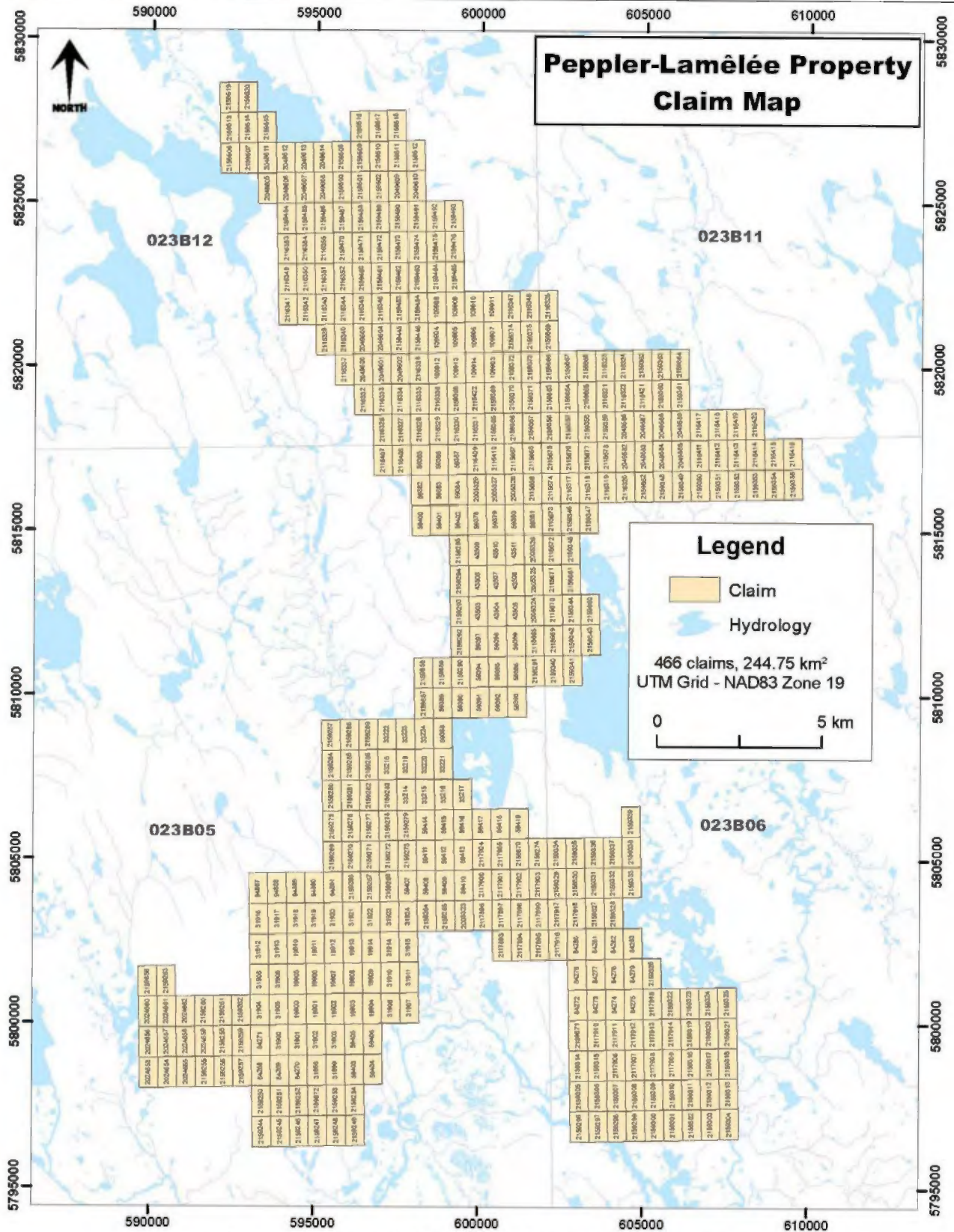
The Property is located in Malapart and Faber Townships in the Regional Municipality ("MRC") of Caniapiscau, Québec, Manicougan -Mont-Wright district, located approximately 240 km north of Port Cartier and Sept-Îles and 50 km southwest of Fermont (**Figure 1**).

The Property consists of a total of 466 map-designated claim units (**Figure 3**) covering a total area of approximately 24,475 hectares (ha) and spanning an area that extends about 20 km east-west and 40 km north-south in National Topographic System (NTS) Map sheets 23B/05, 23B/06, 23B/11 and 23B/12.

All claims comprising the Peppler-Lamêlée Property are in good standing. The renewal dates, rental fees, required minimum work, and excess credits, as at August 30<sup>th</sup>, 2014, are shown in **Appendix II**. Details regarding claim renewal, work credits, claim access rights, allowable exploration, development, mining works, and site rehabilitation are summarized in the Mining Act of Quebec available at [www2.publicationsduquebec.gouv.qc.ca](http://www2.publicationsduquebec.gouv.qc.ca).

A claim is a mineral right that gives its holder an exclusive right to explore a designated territory for any mineral substance that is part of the public domain except for loose surficial deposits of gravel, sand and clay. A claim does not bestow any surface rights.

The Project has not been legally surveyed. The boundary of each claim block was defined using the MRNFQ website at [www.mrnfp.gouv.qc.ca/mines/index.jsp](http://www.mrnfp.gouv.qc.ca/mines/index.jsp), and the GESTIM claim management system.



**Figure 3: Peppler-Lamêlée Property claim map**

## 4.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, PHYSIOGRAPHY

### 4.1 Accessibility

Provincial Highway 389 crosses the south and east parts of the Property (**Figure 4**) and provides access by vehicle and commercial truck service on a year-round basis from Baie-Comeau, Québec (467 km southwest) or from Labrador City/Wabush, Newfoundland (135 km northeast).

Wabush Airport (ICAO: CYWK), some 2 km northeast of Wabush (see **Figure 2**), is the main airport servicing the region. The airport is classified in the Regional/Local category according to the National Airports Policy. Local air service is also available from the Wabush Water Aerodrome (TC LID: CCX5) located near Wabush on Little Wabush Lake. Flights are offered from June until October. Car rentals are available at the airport.

Labrador City, the "sister city" of Wabush, is accessible by train via the Tshiuetin Rail Transportation Inc. railway. The railway tracks link Sept-Îles to Emeril Junction and Schefferville (see **Figure 1** and **Figure 2**). The passenger train does not travel directly to Labrador City, so passengers travelling to and from Labrador City must take Highway #500 to Emeril Junction, a 45-minute drive from Labrador City.

Quinto constructed an access road from Highway 389 to Lamêlée in 2005 (**Figure 4**). Consolidated Thompson Iron Mines Limited constructed an access road in late 2008 that passes over the crest of Hobdad to connect Highway 389 with Mont Lamêlée ("CT Road" in **Figure 4**). Lac Peppler is accessible by dirt road off Highway 389. Lac Jean, Peppler West and Faber were accessed by air for this project.

### 4.2 Climate

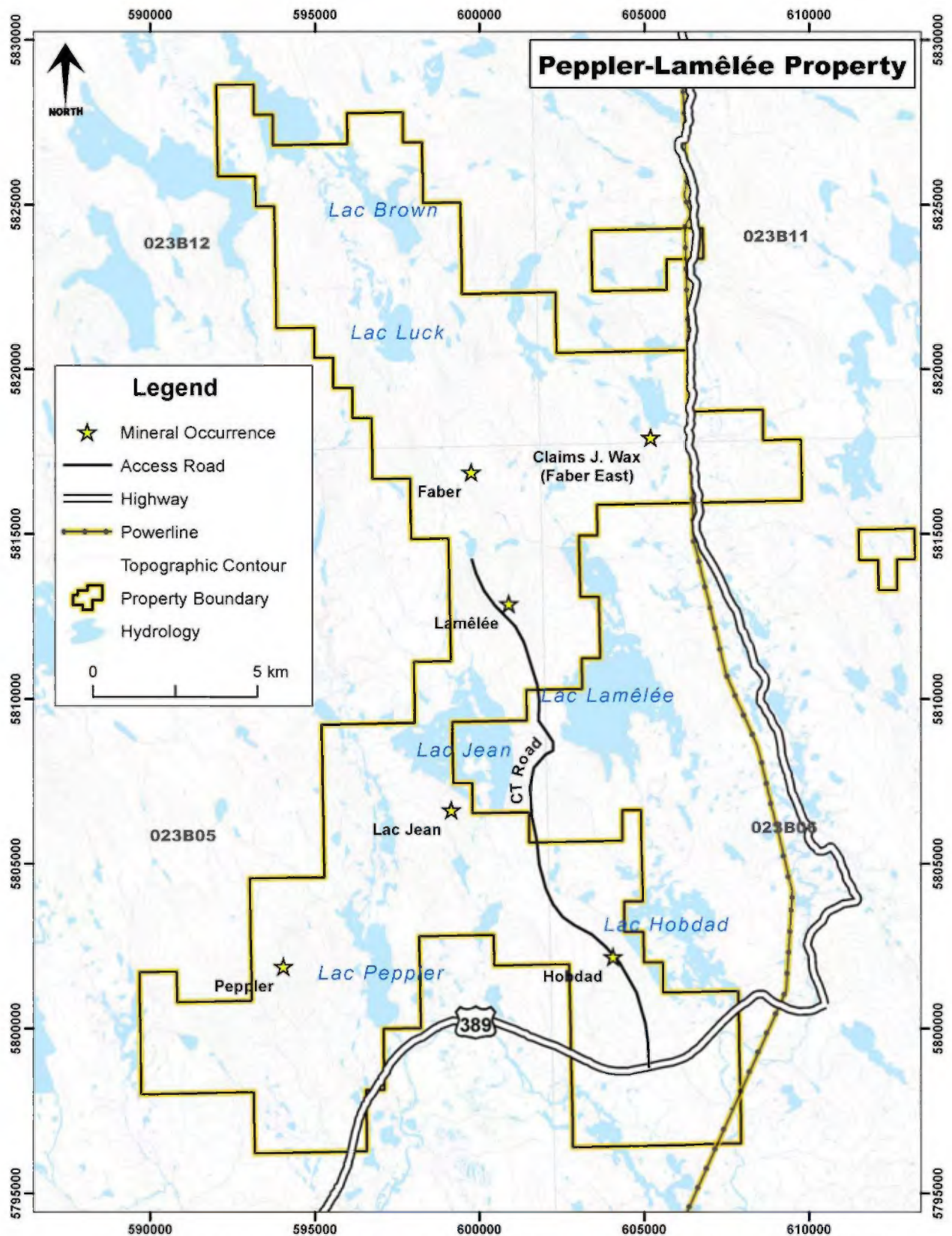
The Fermont area and vicinity has a sub-arctic, continental taiga climate with very severe winters, typical of north-central Quebec. Winter conditions last 6 to 7 months, with heavy snow from December through April. The prevailing winds blow from the west and average 14 km per hour, based on records at the Wabush Airport. Daily average temperatures exceed 0°C for only five months per year. Daily mean temperatures for Fermont average -24.1° and -22.6°C in January and February, respectively. Snowfall in November, December, and January generally exceeds 50 cm per month and the wettest summer month is July with an average rainfall of 106.8 mm. Mean daily average temperatures in July and August are respectively, 12.4° and 11.2°C. Because of its relatively high latitude, extended day-light enhances the summer work-day period. Although winter conditions are considered harsh, drilling operations can be carried out year-round.

### 4.3 Local Resources

Electric power for Fermont is supplied by Hydro-Québec from the Churchill (Labrador) generating plant and there is grid electricity available for additional mining operations in the area.

Several high-tension electrical transmission lines owned by Hydro-Québec follow the railroad and highway 389 rights-of-way east of the Property (**Figure 4**).

The private railroad, owned by ArcelorMittal, located about 15 km east of the Lamêlée Deposit, runs between the Mont-Wright Mine and Port Cartier, Québec. The Québec North Shore and Labrador Railroad ("QNS&L"), owned by Iron Ore Company of Canada ("IOCC"), runs from Wabush, Newfoundland to Sept-Îles, Québec, its shipping facility (see **Figure 1** and **Figure 2**). It carries public freight as an interprovincial carrier regulated by Transport Canada.

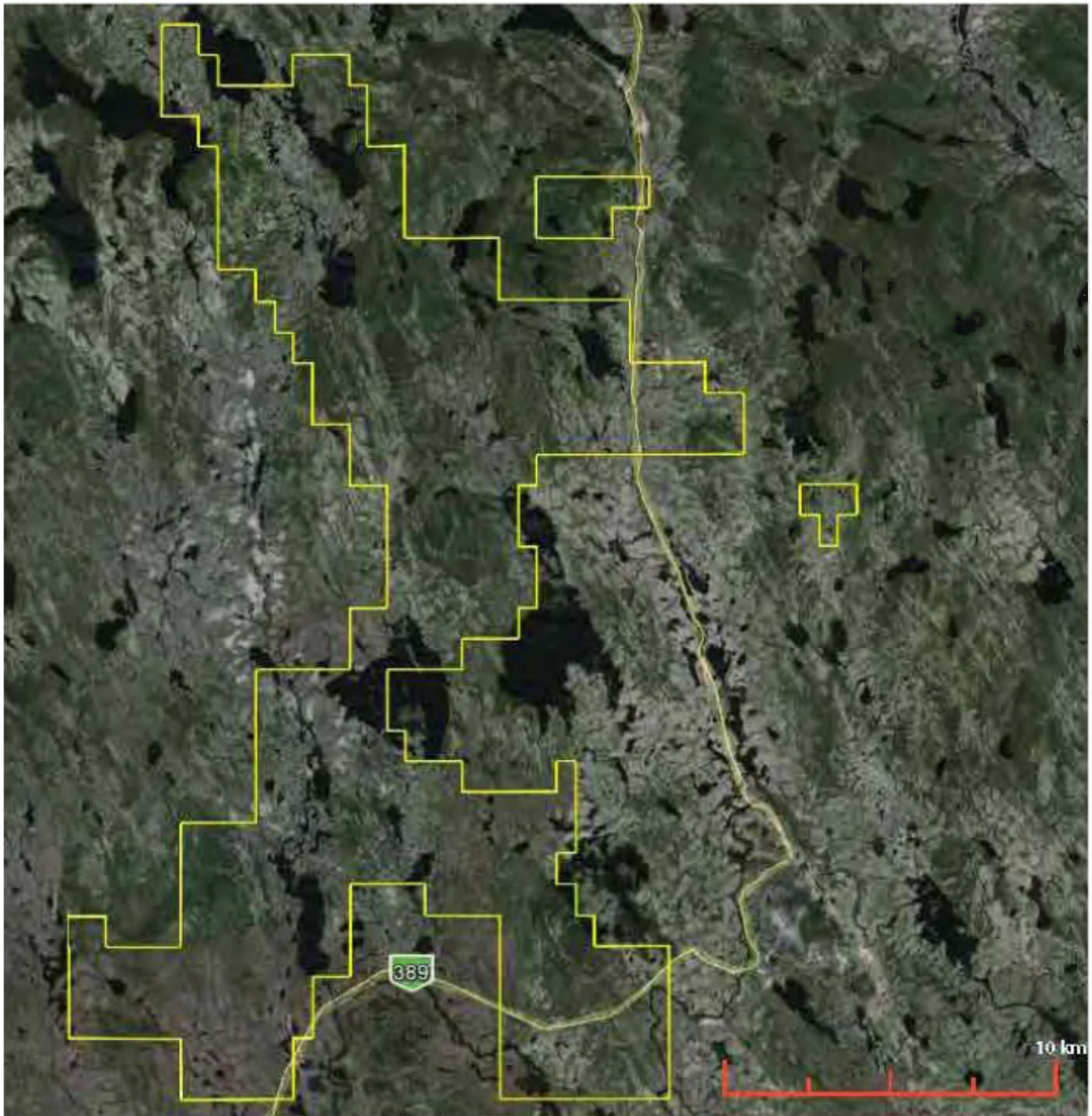


**Figure 4: Base map of Peppler-Lamêlée Property area (yellow=power line)**

#### 4.4 Physiography

The physiography around the Peppler-Lamêlée Property is largely attributed to the most recent glaciation event. Topography is typical low-relief, sub-arctic terrain with local elevations decreasing gradually from near 750 m in the northwest to 500 m in the southeast part of the Property. Mount Peppler, west of Lac Peppler reaches approximately 750 m. The elevation of La Peppler is approximately 530 m. Retreating glaciation left a veneer of moraine boulder till and eskers that cover much of the local bedrock and control the drainage. The local water system empties southward to the Gulf of St. Lawrence through the Manicouagan River system.

Most of the claim group is thinly forested with a typical mixture of fir (Black Spruce) and tamarack, with local stands of aspen and yellow birch. Ground cover is generally in the form of grasses, caribou moss, and shrubs; the latter typically comprising willow, arctic birch, alders and Labrador tea. Lakes, swamps and grassy meadows fill bedrock and drift depressions (**Figure 5**).



**Figure 5: Satellite image of the area around the Peppler-Lamêlée Property.**

## 5.0 EXPLORATION HISTORY

\*Note: The GESTIM and E-Sigeom sites allow on-line searching of the Province of Quebec's database of Provincial Assessment Reports or "Gestimes Minières" (GM's). The data are accessible online at <https://gestim.mines.gouv.qc.ca/> and <http://sigeom.mrnf.gouv.qc.ca/>.

### 5.1 Historic exploration and development work:

Initial exploration of the area was in the 1950s. Quebec Cartier Mining Co. (QCM) conducted an airborne exploration survey in 1954 delineating a number of magnetically anomalous areas underlain by iron formation (IF). By 1954-1957 QCM had identified and staked Lac Jeannine, Mont-Reed, Lac Peppler, Fire Lake and Mont-Wright iron deposits and numerous other prospects including Lac Jean, North Lamêlée Hill, Hobdad Hill, Lac Casse and Olga Lake.

The Lamêlée deposit was drilled-tested in 2007 and 2008 with 76 drill-holes (NQ size) totalling 15,137 m (Lyons et al., 2009). Drilling demonstrated that the deposit occupies a steep-sided fold-basin that is 1.7 by 1.2 km oriented NNW. The 2007 programme was under the auspices of Quinto, while the 2008 programme was under the auspices of Consolidated Thompson. The holes were inclined from vertical to moderate in order to cross the structural trends. The basic drill grid was 300 x 300 m. Neither of the two Lamêlée drilling programs was filed for assessment credit and Quinto and Consolidated Thompson paid in lieu of work. In 2012 Cliffs Natural Resources drilled 13 holes aggregating 2,876.3 m.

#### Lac Peppler

In 1954 QCM completed detailed geological mapping and a dip needle survey. In 1955-1956, 22 drill holes aggregating more than 1,960m was completed.

Quinto Technologies Inc., a predecessor of Quinto Mining Corp., acquired an interest in the Property in 2004. Its 2005 programme consisted mainly of ground geophysics on the Peppler deposit. In 2006 it conducted its first diamond drill program, also on the Peppler deposit. In 2007 it carried out an airborne magnetic and gradient gravity survey. The survey was planned and overseen by Intrepid Geophysics Ltd. of North Vancouver, B.C. and carried out by Bell Geospace Inc. of Houston Texas. A total of 1,565 line-kilometres of survey were completed.

#### Peppler West

No known work has been completed on the Peppler West area. A magnetic anomaly approximately 2,000m x 500m in size situated about 4 km west of the Lac Peppler occurrence.

#### Hobdad Hill

Mapped by Clark (1967) in his regional mapping with scattered outcrops around the north and west sides of the crest. Access road construction in 2008 by Quinto exposed banded quartzite with minor magnetite near the crest. In 2012, 18 drill holes aggregating 6,460.6m was completed by Cliffs Natural Resources.

#### Lac Jean

QCM conducted geological mapping, a magnetometer survey, and drilled 5 AX drill holes inclined to the North east on the NW extension of the zone from the principal outcrop area along Lac Jean 1 (QCM, 1959a, 1959b). In 2007 Quinto drilled 4 vertical holes along the deposit south east and south of the QCM section over a four-kilometre length.

**Faber**

Quebec Cartier mining conducted a programme of mapping and ground magnetic surveys in 1956-1957 as described by Phillips (1958). In 1961 trenching and 10 drill holes were completed near the Claims J. Wax occurrence located near highway 389 on east Faber. In 2007 Quinto completed 4 drill holes over a widely spaced area along the south flank of the Faber syncline.

**GM58496**

In 2000, Quebec Cartier Mining Co. completed helicopter-borne magnetic and electromagnetic surveys over the Mont-Reed, Peppler and Lac Jean properties. The report includes Total Magnetic, Vertical Gradient Magnetic, Residual Magnetic, Electromagnetic Resistivity, and Digital Topographic maps of the Peppler-Lamêlée Property area.

**GM66549**

In November 2011, Cliffs contracted Fugro Airborne Surveys Pty Ltd. of Ottawa to fly an airborne gravity gradiometer and magnetometer survey over the Property. Peterson, Grant and Watson Ltd. was contracted to review the survey results and to produce enhanced /processed maps that would facilitate further interpretation of data. This work was filed for assessment credit.

## 6.0 GEOLOGICAL SETTING

### 6.1 Regional Geology

The Gagnon Terrane comprises the southern domain of the Paleo-Proterozoic fold and thrust belt known as the Labrador Trough, which hosts an extensive iron formation. The Labrador Trough, part of the New Quebec Orogen or Labrador-Quebec Fold Belt, extends for more than 1,100 km along the eastern margin of the Superior craton from Ungava Bay to the Manicouagan impact crater, Quebec. The fold and thrust belt is about 100 km wide in its central part and narrows considerably to the north and south (**Figure 6**). It marks the collision between the Archean Superior Province and the Rae Province during the Hudsonian Orogeny (circa 1.82 Ga to 1.79 Ga). Rocks of the Rae Province were transported westward over the Archean Superior Province basement creating a foreland fold and thrust belt.

The Labrador Trough is divided into three geological domains. The Southern Domain (Gagnon Terrane) is defined by the northern limit of the Grenville Orogenic Belt at approximately 53°24'00" North latitude, represented by the biotite metamorphic isograd. The Southern Domain encompasses Labrador Trough rocks that were metamorphosed during the Grenville Orogeny, (circa 1.16 Ga to 1.13 Ga), which involved northward thrusting, northeast-southwest folding, abundant gabbro, anorthosite and pegmatite intrusions, and high-grade metamorphism (**Figure 7**). The metamorphism was responsible for the recrystallization of primary iron formations, producing coarse-grained sugary quartz, magnetite, and specular hematite schists that are amenable to concentration and beneficiation (Klein, 1978). The Gagnon Terrane is underlain chiefly by Archean basement complex rocks that host infolded, metamorphosed sedimentary rocks that formed the western, miogeosyncline part of the proto-Labrador Trough (Clarke, 1977; Jordan et al., 2006).

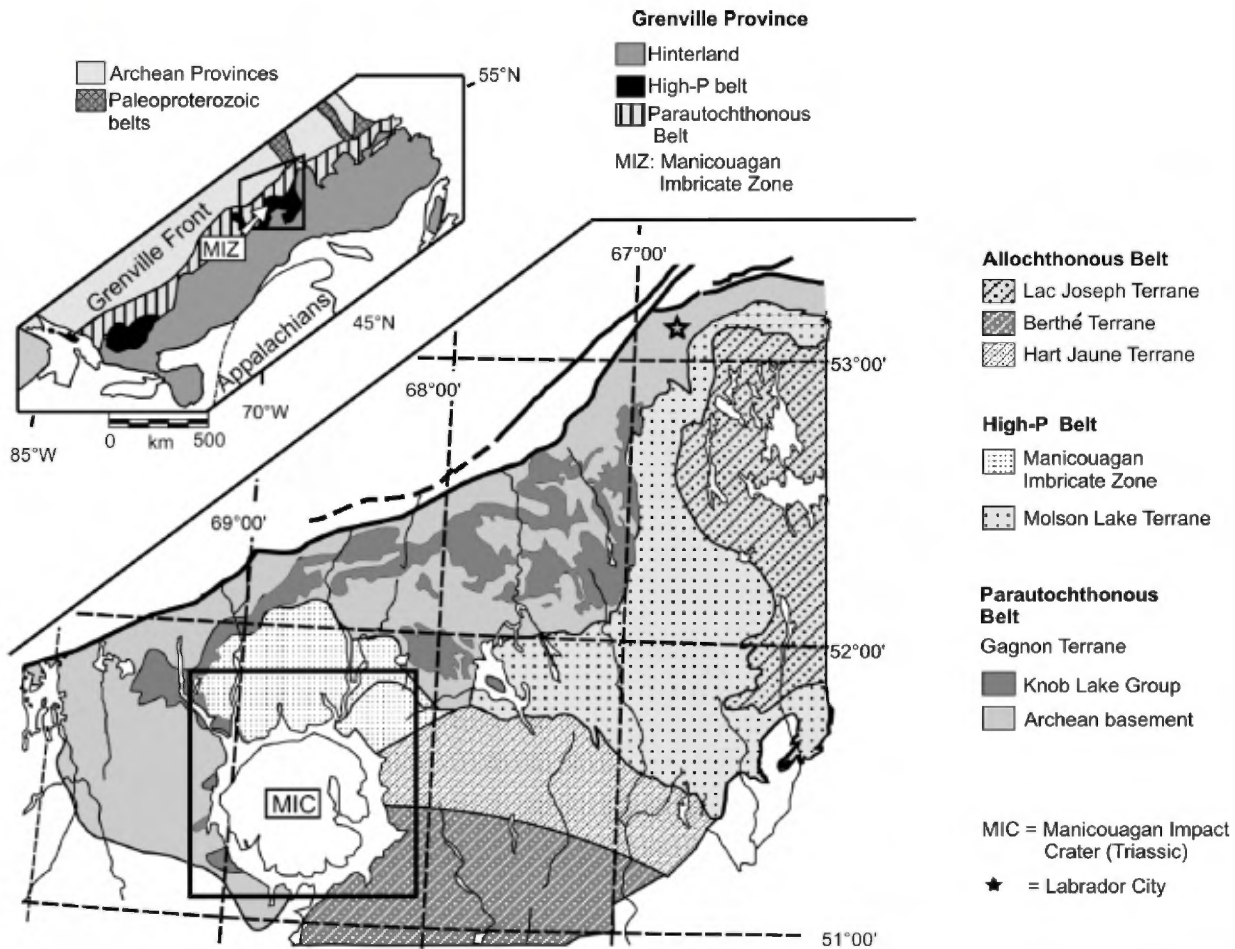
The Central Domain hosts regionally metamorphosed (greenschist metamorphic facies) iron-formation deposits comprising Achaean, mainly sedimentary, rocks including iron formations, volcanic rocks and mafic intrusions (the Kaniapiskau Supergroup). The Kaniapiskau Supergroup is sub-divided into the Knob Lake and Doublet groups. Rocks in the Southern Domain are recognized as the metamorphosed equivalents of the Central Domain's Knob Lake Group.

The Northern Domain, north of the Leaf Bay area (58°30'00" North latitude), comprises regionally metamorphosed rocks (lower amphibolite facies), much like those of the Southern Domain.

It is believed that only one iron-formation assemblage is present throughout the region. This formation varies in thickness and appears to have underlain the greater part of the original Labrador geosyncline. The economically important succession of quartzite-slate-iron formation, and their metamorphosed equivalents, persists throughout the three Domains.



**Figure 6: Map showing the Location of the Labrador Trough.**



**Figure 7: Simplified geological map of central Grenville Province showing location of Gagnon Terrane (from Jordan et al., 2006).**

## 6.2 Structural Geology

Three stages of deformation are recognized in the Southern Domain. The first stage, associated with the New Qu  bec Orogeny, produced linear belts that trend northwest in the Central Domain. The second stage, developed during the Grenville Orogeny, reoriented the northwest trending linear belts to the east and northeast. Thrust faults associated with these two transpressional events are common. Bedding planes are generally recognizable in the quartzite, dolomite and IF.

Asymmetrical, overturned and recumbent folds are common throughout the Gagnon Terrane. The complex interference patterns evident on geological maps of the area indicate that a third phase of deformation has affected this domain. Stratigraphic-reversals, -truncations, and -repeats that thicken the iron formation are common due to folding and structural transposition. Late, brittle faults have redistributed the sequences only slightly compared with the influence of the ductile deformation.

### 6.3 Local Geology

Cliffs mineral concessions in the southern Labrador Trough are underlain by the litho-tectonic Gagnon Terrane (Brown et al., 1992) within the Grenville Province of Western Labrador (see **Figure 7**). Archean granitic and granodioritic gneisses and migmatites of the Ashuanipi Basement /Metamorphic Complex form the basement to most of the terrane and comprise white to grey, coarse-grained hornblende-epidote-biotite granitic and tonalitic gneisses. Garnetiferous amphibolites are inter-layered with the gneisses in the basement sequence.

Unconformably overlying and infolded with the basement gneisses are the metamorphosed equivalents of the Lower Proterozoic Knob Lake Group, including crystalline limestone (siliceous dolomite), glassy quartzite, silicate-carbonate quartzite, magnetite-quartz iron formation, specularite-quartz iron formation, silicate-magnetite iron formation, garnet-biotite gneiss and garnet-mica schist. Quartzo-feldspathic and graphite-biotite gneisses overlie the metamorphosed iron formation sequence.

The Knob Lake Group is a continental-margin metasedimentary sequence, consisting of pelitic schist, iron formations, quartzite, dolomitic marble, semi-pelitic gneiss and subordinate, local mafic volcanic rocks. The Knob Lake Group was deformed and subjected to metamorphism ranging from greenschist to upper amphibolite facies within a northwest-verging ductile fold and thrust belt, during the Grenville Orogeny (Brown et al., 1992; van Gool et al., 2008). The sequence is best exposed in the region west of Wabush Lake, extending southeast into the province of Quebec, and northeast beyond the north end of Shabogamo Lake. The equivalent rock successions of the Southern and Central domains are shown in the comparative list of Formations in **Table 1**. Intrusive rocks include pegmatites and aplite dykes, granodiorite plutons, amphibolites, gabbros and peridotite bodies.

### 6.4 Stratigraphy

In the Gagnon Terrane, the Knob Lake Group is represented by six formations (in ascending order); the Attikamagen, Denault, Wishart, Sokoman, Menihek and Shabogamo. The stratigraphic and lithologic classifications used by Cliffs for geological and drill-log descriptions are compiled in **Table 1**.

#### 6.4.1 Attikamagen Formation

The Attikamagen Formation is the oldest stratigraphic sequence within the Knob Lake Group. The Formation, which can reach 300 m in thickness, unconformably overlies the Archean Ashuanipi Basement Complex, and predominantly consists of brownish to creamy, banded, medium- to coarse-grained, quartz-feldspar-biotite-muscovite schist and lesser gneiss. Accessory minerals include chlorite, garnet, kyanite and calcite. The Attikamagen Formation is best preserved east of Wabush and Shabogamo Lakes. In the extreme northwest, the Formation tapers and disappears, leaving upper units of the Knob Lake stratigraphy in contact with the Archean basement (Gross, 1968).

**Table 1: Equivalent Rock Successions in the Central and Southern Domains of the Labrador Trough (modified from Gross, 1968).**

MESOPROTEROZOIC ( <b>Helikian</b> ) Shabogamo Group (gabbro, diabase, amphibolite, gneiss)			
----- Intrusive Contact -----			
PALEOPROTEROZOIC ( <b>Aphebian</b> ) Kaniapiskau Supergroup			
<i>Stratigraphic Units</i>		<b>Churchill (Rae) Province</b>	<b>Grenville Province</b>
<i>Previous</i>	<i>New</i>	<i>Labrador Trough Northern and Central domains (Low-Grade Metamorphism)</i>	<i>Labrador Trough Southern domain (Gagnon Terrane) (High-Grade Metamorphism)</i>
<b>KNOB LAKE GROUP</b>	<b>Menihok Formation</b>	<b>Menihok Formation</b> Black shale, siltstone	<b>Nault Formation</b> Graphitic, chloritic, micaceous schist
	<b>FERRIMAN GROUP</b>	<b>Sokoman Formation</b> Cherty iron formation	<b>Wabush Formation</b> Quartz magnetite-hematite (specularite)-silicate-carbonate iron formation
		<b>Wishart Formation</b> Quartzite, siltstone	<b>Carol Formation</b> Quartzite; quartz-muscovite-gamet-kyanite schist
		<b>Denault Formation</b> Dolomite, calcareous siltstone	<b>Duley Formation</b> Dolomite; calcite and quartz with minor calc-silicate
	<b>ATTIKAMAGEN GROUP</b>	<b>Attikamagen Formation</b> Gray shale, siltstone	<b>Katsao Formation</b> Quartz-biotite-feldspar and gneiss
----- Unconformity -----			
NEOARCHEAN ( <b>Archean</b> ) Ashuanipi Basement Complex (Mafic, intermediate and felsic migmatitic orthogneiss and paragneiss)			

### 6.4.2 Denault Formation

Conformably overlying the Attikamagen Formation is the Denault Formation. This Formation consists of coarse-grained, banded, dolomitic and calcitic marble up to 75 m thick with minor tremolite, quartz, diopside and phlogopite as accessory minerals. In the Wabush Lake area the Denault Formation has only been identified east and south of the Lake, and represents a transition between the shallow and deeper parts of the continental shelf. Stromatolites have been described to the south of Wabush Mine. Locally, the Formation can be sub-divided into three sub-units consisting of the lower siliceous horizon, the middle low silica (<5% SiO<sub>2</sub>) horizon and the upper siliceous horizon. Low-silica dolomite is mined and added to the iron pellets, and acts as a flux in the smelting process.

### 6.4.3 Mackay Formation

Overlying the Denault Formation is the Mackay River Formation. It consists of aqueous meta-tuffaceous sediments and conglomerate units. This sequence is not present in the Fermont area and occurs mainly northeast of Shabogamo Lake, northeast of Labrador City.

### 6.4.4 Wishart Formation

The Wishart Formation conformably overlies the Denault Formation and locally unconformably overlies the Attikamagen Formation. It consists of a 60 m to 90 m thick sequence of white, massive to foliated quartzite, which is typically resistant to weathering and erosion, forming prominent hills in the Wabush Lake region. This Formation appears to pinch out to the north and has not been mapped north of Shabogamo Lake. The Wishart Formation can be subdivided into the Lower, Middle and the Upper members based on variation in composition and texture. The Lower Member consists of white to reddish brown, quartz-muscovite schist with varying percentages of garnet and kyanite. The Middle Member is a coarsely crystalline orthoquartzite that is generally massive to banded. Accessory minerals include carbonates, amphiboles (varying from tremolite and/or anthophyllite to grunerite and/or cummingtonite), garnets, micas (muscovite, sericite and biotite) and chlorite. Bands of iron-rich carbonates or their weathered products, limonite and goethite, may also occur. The Upper Member exhibits a gradational contact with the overlying Sokoman Formation, and generally consists of bands of carbonate alternating with bands of quartzite. The presence of thin layers of muscovite and biotite schist (pelitic layers) is common. Accessory minerals include grunerite, garnets, kyanite and staurolite.

Parts of the Middle Member containing very low concentrations of impurities are locally mined for silica. Shabogamo Mining is currently actively mining silica on their property immediately south of Iron Ore Company of Canada's Luce Deposit located 10 km north of Labrador City.

### 6.4.5 Sokoman Formation

The Sokoman Formation (**Table 1**), also known as the Wabush Iron Formation, is the ore-bearing unit in the Gagnon Terrane and is subdivided into Lower, Middle and Upper members. The Sokoman Formation conformably overlies the Wishart Formation, but also locally shares its basal contact with the Denault, Mackay, and Attikamagen formations, and the Ashuanipi Metamorphic Complex.

The Lower Member (LIF) consists of a 0 m to 50 m thick sequence of fine- to coarse-grained, banded quartz carbonate, and/or quartz carbonate magnetite, and/or quartz carbonate (i.e., siderite, ankerite and ferro-dolomite), silicate (i.e., grunerite, cummingtonite, actinolite, garnets), and/or quartz carbonate silicate magnetite, and/or quartz magnetite specularite sequences. This member generally contains an oxide band up to 10 m thick near the upper part.

The Middle Member (MIF), which forms the principal iron ore sequence, consists of a 45 m to 110 m thick sequence of quartz magnetite, and/or quartz specularite magnetite, and/or quartz specularite magnetite carbonate, and/or quartz specularite magnetite anthophyllite gneiss and schist sequence. Actinolite and grunerite rich bands may be present in this member, although they are generally attributed to in-folding of the upper member. A vertical zonation is typically present with finer-grained quartz magnetite dominated iron formation forming the basal section. Manganese content (rhodochrosite and pyrolucite) ranging from 0.4% to 1.0% Mn is associated with this sequence. Martite may also occur in weathered zones via supergene alteration of magnetite (Wabush Mines, Canning prospect and D'Aigle Bay area). The upper part of the MIF horizon is predominantly comprised of coarser-grained quartz specular hematite iron formation.

The Upper Member (UIF) consists of a 45 m to 75 m thick sequence, similar in composition to the LIF, and can generally be differentiated through contact relationships with the overlying and underlying formations and the presence of increased grunerite or actinolite content. A magnetite-rich zone may be present in the lower part of this Member.

Hydrous iron oxides (limonite and goethite) have been observed in all members of the Sokoman Formation. Limonite and/or goethite are present in weathered and fractured zones and are derived primarily from alteration of carbonates (Muwais, 1974). Pyrolusite (a manganese oxide) may occur in a distinct zone at the base of the MIF but has also been observed in all members of the Sokoman Formation typically associated with surficial or supergene enrichment, extending to depth along and adjacent to structural discontinuities, such as fault and fracture zones.

#### **6.4.6 Menihok Formation**

The Menihok Formation consists of a 15 m to 75 m thick sequence of pelitic sediments. The Formation is commonly fine-grained, foliated and variably comprised of a quartz-feldspar-mica (biotite-muscovite)-graphite schist. Garnets, epidote, chlorite and carbonates are accessory minerals. This unit is well preserved, adjacent to the craton in the southern region and within broad synclinal regions in the north.

#### **6.4.7 Shabogamo Intrusive Suite**

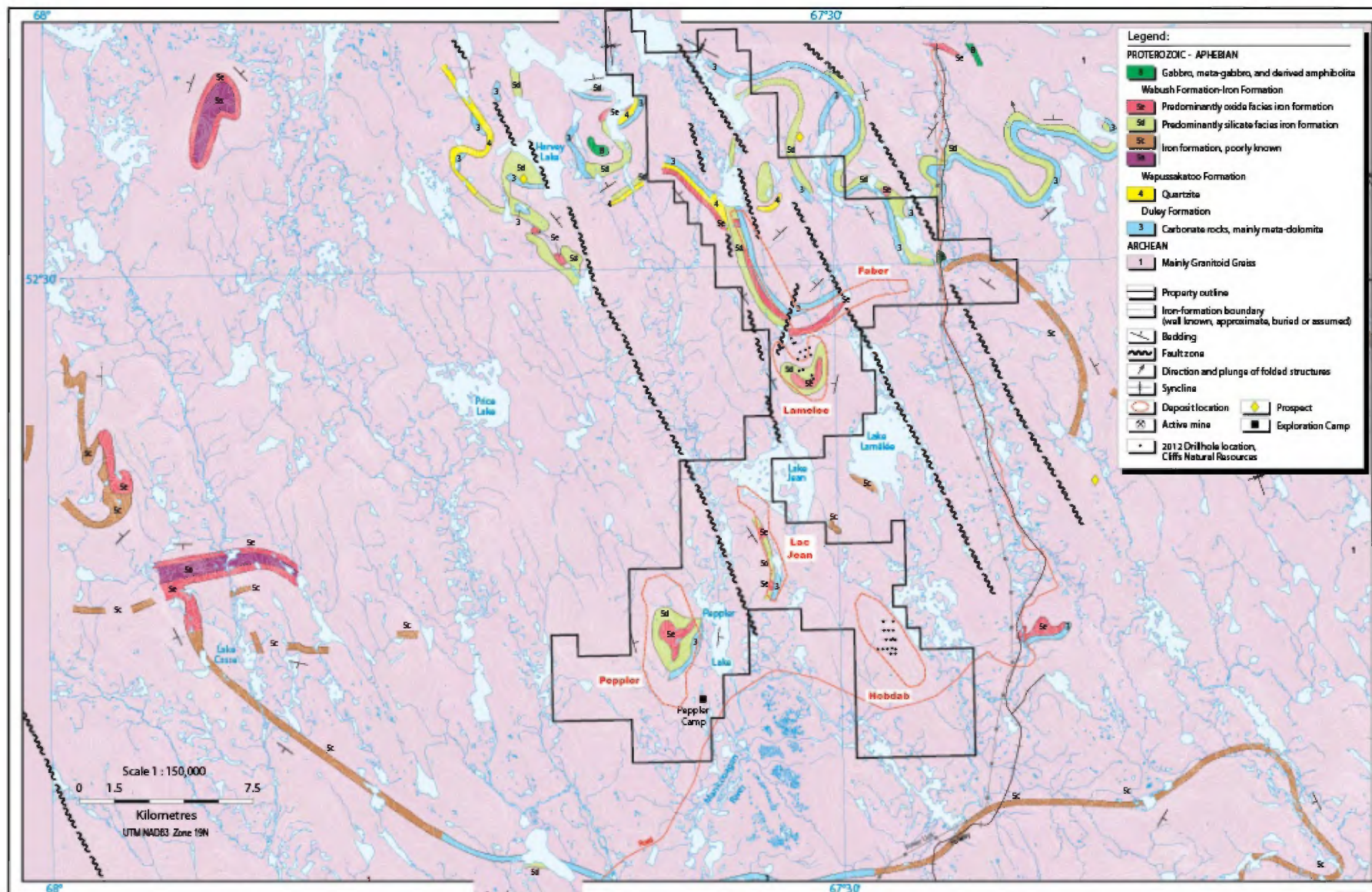
The Shabogamo Intrusive Suite comprises the youngest Precambrian rocks in the Wabush Lake area. It consists of massive, medium- to coarse-grained mafic intrusions (gabbro, olivine gabbro and amphibolites), non-magnetic, sill-like bodies with ophitic to sub-ophitic textures. These sills may be locally discordant and have a tendency to be schistose near the contact with other rock formations. Most of the gabbro sills are composed of plagioclase, pyroxene, olivine and minor amounts of magnetite and ilmenite. The amphibolite equivalents commonly consist of hornblende, biotite, garnets and chlorite. Pyrite, muscovite, and feldspar are accessory minerals.

### **6.5 Property Geology**

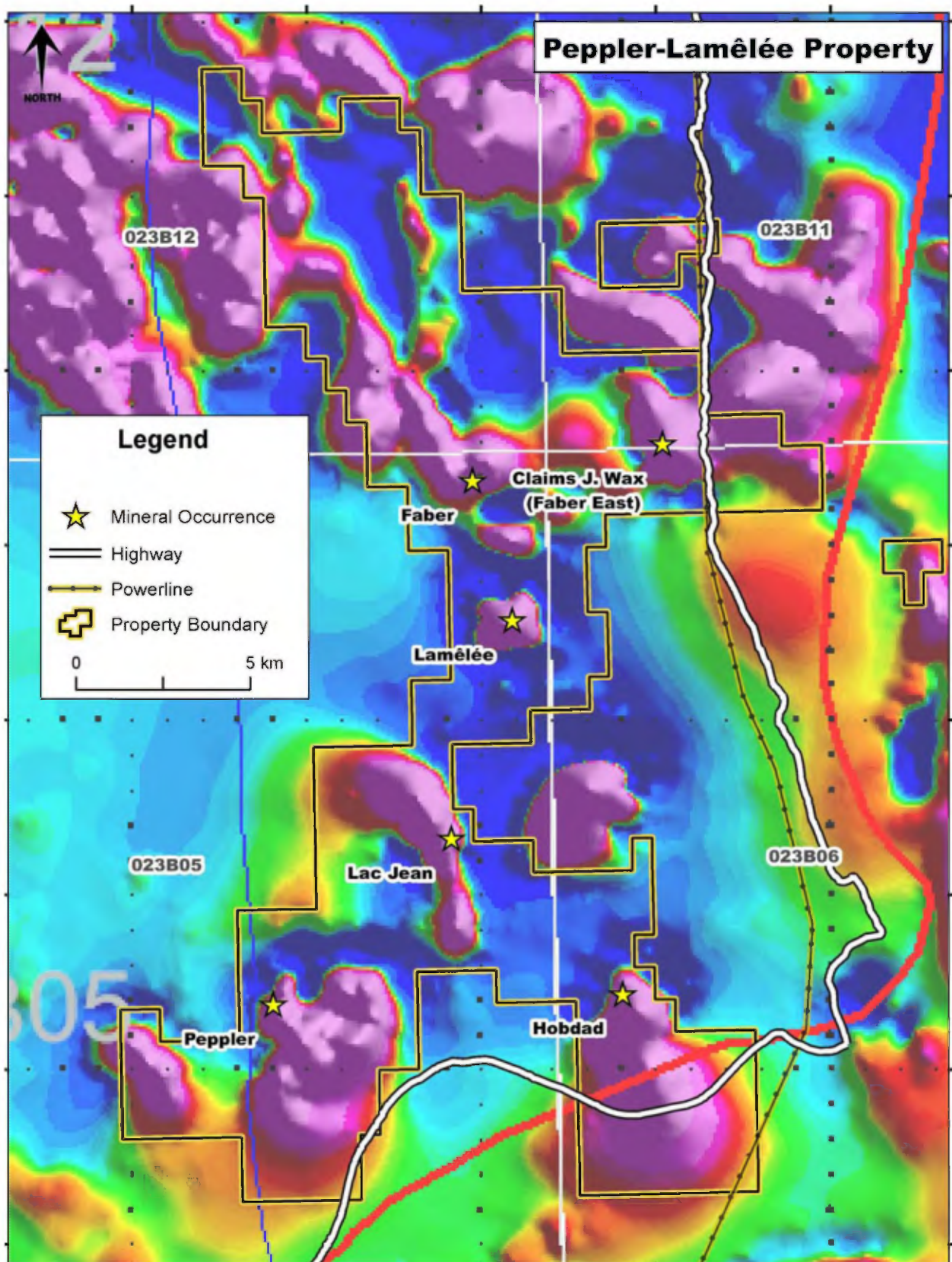
The Property is primarily underlain by gneiss of the Ashuanipi Basement Complex. Highly metamorphosed sedimentary rocks and iron formation of the Denault and Sokoman formations are infolded into the basement in complex fold interference patterns (**Figure 7** and **Figure 8**).

The rock formations underlying the Peppler-Lam  lee Property area form part of the crystalline sequence of metamorphosed Precambrian sediments identified in other parts of the southern Labrador Trough. Like their counterparts they underwent minor alteration following primary deposition and subsequent high-grade regional metamorphism during the Grenville Orogeny.

The area around the Property as a whole is characterized by open to tight, upright and overturned folds that refold early recumbent folds. Dips of bedding and schistosity are rarely a guide to stratigraphic sequence, and many of the units disappear by attenuation rather than faulting. The magnetic signatures of the formations, which are typically well outlined on geophysical surveys (**Figure 8**), can also be misleading as the anomalies disappear where the host rocks are non-magnetic (e.g., hematite-rich). Tectonic thickening of rock units is common and this is the most important structural factor economically as it is the thickened, near-surface, synclinal hinges that are most favourable for open pit mining.



**Figure 8: Simplified geology map of the Peppler-Lamêlée Project area.**



**Figure 9: Total-field magnetic response map of Peppler-Lamêlée Property area.**

The iron formations underlying the Property are hosted by the Wabush Formation and are classified as Lake Superior-type, but are more specifically a metamorphosed equivalent of the Sokoman (iron) Formation, which consists of a banded sedimentary unit composed principally of bands of iron oxides, magnetite and hematite within quartz (chert)-rich rock with variable amounts of silicate, carbonate and sulphide lithofacies. Metamorphic grade ranges from greenschist facies near the Grenville Front to amphibolite-granulite facies farther south. As a result of the tectono-metamorphism, the iron formation is structurally thickened in fold hinges, the mineralization is coarsely recrystallized, and the mineral assemblage of the principal iron ores is martite-magnetite-quartz and specular hematite-quartz.

Such iron formations are the principal sources of iron throughout the world (Gross, 1996). In order for the sedimentary rock sequences to be classified as iron formation they must have over 15% Fe content, whereas in order to be classified as ore, the iron content must generally be at least 25% Fe.

The Lake Superior iron formations are subdivided into taconite and meta-taconite. Taconite is a bedded, iron-bearing sedimentary rock composed of fine magnetite and hematite alternating with silica-rich beds (chert, jasper). Metamorphism and surface alteration are very little developed. In the Labrador Trough, the deposits range from tabular to structurally complex, show great lateral continuity, and have primary total iron content typically between 25%-35%.

Lake Superior iron formations that have been highly metamorphosed are called meta-taconites. They are mainly composed of magnetite and specularite. Metamorphism and folding has resulted in mineralogical changes, a concentration of the ferriferous bands, and coarser texture, as in the folded, medium to coarse-grained specularite-quartz deposits of the Gagnon Terrane.

## **6.6 Principal Iron Occurrences**

A search of the MRNF on-line database (<http://sigeom.mrnf.gouv.qc.ca>) returned results for four (4) iron occurrences on the Property: Lac Peppler; Colline Hobdad Hill (Hobdad); Lac Jean 1; and, Claims J. Wax (Faber East). Two additional showings, Faber and Lam  lee, are recognized by Cliffs and described in the literature (see **Figure 4** and **Figure 7**).

### Lac Peppler:

The Peppler deposit is interpreted by Risto et al. (2008) as a shallow fold-basin with the basal contacts eroded on the north, west and parts of the east sides. The South Extension appears displaced horizontally from the Main Zone by about 220 m. The southern end is truncated by a northeast-trending fault with probable vertical movement up to 100 m on the southeastern block. The deposit has a strong and distinctive magnetic pattern (Quebec Cartier Mining, 2000) with nine magnetic ridges aligned NNW parallel to the D<sub>3</sub> deformation.

The oxide facies is interpreted as an open shallow basin with the oxide IF covering 2,000 x 1,200 m in the Main Zone and 1,000 by 400 m aligned north-south on the South Extension. The third East Zone is a half ellipse about 1,100 m east by 1,100 m north. In the drilled zones, the oxide IF forms two levels with hematite cores and more magnetite-rich margins. Compared with the Lam  lee deposit, Lac Peppler appears thinner and glacial erosion may have cut deeper into the stratigraphy. The geological model developed for the 43-101-compliant resource estimation report (Risto et al., 2008) shows the two continuous oxide zones separated by a relatively thin magnetite-rich interval. Magnetite-rich silicate iron formation lies beneath the lower lens and may have some economic potential as well.

### Hobdad

The Hobdad deposit underlies the teardrop-shaped Hobdad Hill. The deposit is a tightly folded overturned synform that is dipping to the east and striking north-northwest. A late compression has refolded this structure into open folds dipping to the west and the entire structure is plunging to the south.

The oxide IF is exposed at surface over an area of 1.4 km by 600 m in plan. The two major regional folding events have concentrated the Hobdad mineralized zone with the oxide IF up to 300 m across.

### Lac Jean 1

The Lac Jean 1 deposit lies along the southwest shore of Lac Jean. It is a tightly folded sub-vertical syncline on the south-west shore of Lac Jean hosting Wabush Formation about 320 m wide. It can be traced for about 7-km in scattered outcrop and extended northwest another kilometre, based on a somewhat weaker magnetic anomaly (Québec Cartier Mining, 2000). Drilling in 2007 confirmed steep to moderate dips of the syncline with the depth of the OIF over 147 vertical metres. The southern end appears to end abruptly under glacial cover.

### Claims J. Wax (Faber East)

This occurrence comprises 3 U-shaped horizons of oxide iron formation south of Gull Lake. Mineralization consists of magnetite-quartz rich IF sandwiched in silicate-carbonate. Iron mineralization is present as both massive and disseminated magnetite and hematite. The occurrence was discovered in 1958 and explored from 1958-1961 by trenching and diamond-drilling.

### Lamêlée

The Lamêlée deposit underlies the horseshoe-shaped Mont Lamêlée and forms an elongate steep-sided fold basin oriented NNW with steep flanks on the east, south, and west sides and open to the north, where it appears to connect with the Faber syncline belt.

The oxide IF extends approximately 1.7 by 1.1 km in plan with the vertical thickness ranging from 30 m in the north-northwest to 350 m across the south part. The Lamêlée deposit has been concentrated by the two major regional folding events. The later D<sub>3</sub> compression from the east-northeast folded the margins of the deposit abruptly to sub-vertical NNW-trending folds.

### Faber

Starting at the south shore of Lac Luck, the Faber zone is part of a 26-km long syncline belt with a moderate to steep-dipping asymmetrically folded syncline. Four widely spaced drill-holes by Quinto in 2007 on the south flank of the syncline showed that the dips are moderate to sub-horizontal.

The Faber prospect is an elongate asymmetrical steep-dipping syncline with oxide facies in the centre. Geological mapping has shown that most of the stratigraphy exposed is non-oxide facies. The width of the Wabush Formation at the occurrence is 200-400 m, and is in contact with Duley Formation (marble) along the northern footwall contact.

## 7.0 SUMMARY OF WORK

### 7.1 GENERAL

The 2014 ground exploration programme comprised 7 diamond-drill holes, aggregating 1,987 m, that focussed on four known iron occurrences on the Peppler-Lamêlée Property: Lac Peppler and Peppler West; Hobdad; Lac Jean 1; and, Faber. The particular locations for the 2014 diamond drill-holes were finalized using 3-D geophysical models that were generated from the 2011 airborne geophysical survey data (GM66549).

3-D geophysical inversion and mineral-potential models generated by Mira Geoscience of Vancouver, BC were used to optimize drill-target selection and surveying for Cliffs' 2014 drilling program. The models were developed from gravity gradiometer and magnetometer survey data collected at and around the Peppler-Lamêlée Property by Fugro Airborne Surveys in November and December of 2011. The Mira Geoscience Report is included as **Appendix I** in this Report.

Logan Drilling Group of Stewiacke, Nova Scotia were contracted by Cliffs for the programme and provided drill crews, a single diamond-drill on skids, and a tractor for preparing drill sites and expediting drill moves. Drilling was carried out around the clock, with two drill-teams alternating on 12 hour shifts. Drill casings were left in place and capped (except PL14-02), and drilling sites were labelled. Drilling began on June 7, 2014 and was completed on August 13, 2014.

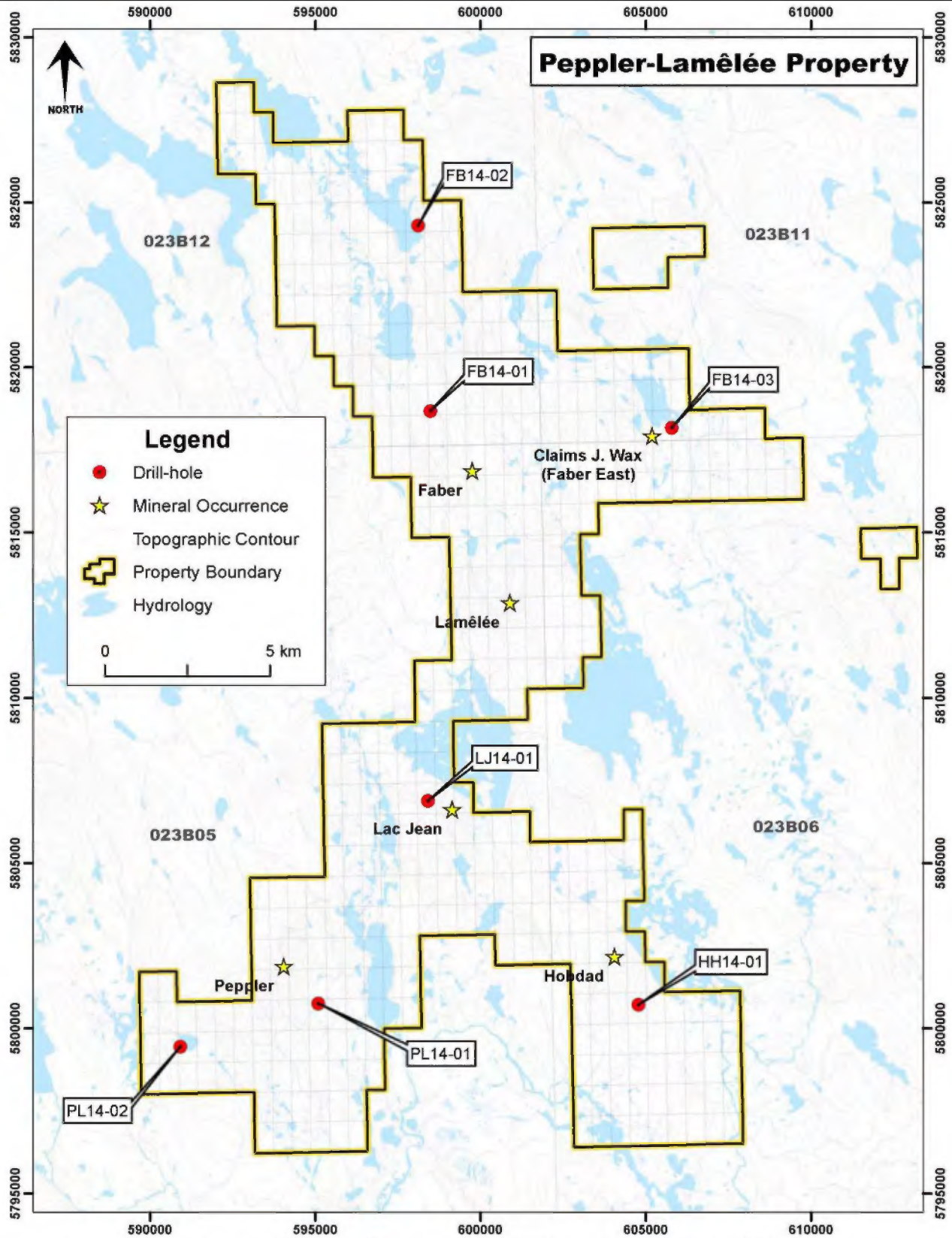
Explo-Logik Inc. of St-Hippolyte, QC was contracted by Cliffs to construct and manage the exploration camp, providing accommodation and catering for drillers and geotechnical crews, as well as core logging facilities. The 2014 exploration camp, known as the Lamêlée Camp, was located 9 kilometres from kilometre-marker 474, of Highway 398, along a previously constructed drill-road into the Lamêlée iron deposit.

### 7.2 DRILLING

The drilling programme commenced with land-hauling the drill by trail to the Lac Peppler deposit for the first drill hole (PL14-01). Upon completion of this hole, the drill was converted to a 'fly rig' and was transported to the remaining six hole locations by helicopter. **Table 2** summarizes the drilling programme, which are shown on **Figure 10**.

**Table 2: Summary of 2014 Diamond-Drilling Campaign: Peppler-Lamêlée Property**

Hole #	Claim #	UTM NAD83, ZONE 19		Final Length (m)	Azimuth <sup>o</sup> (True)	Dip <sup>o</sup>	# of Samples
		Easting	Northing				
PL14-01	19901	595097	5800748	249.0	270	-75	23
PL14-02	2024658	590926	5799447	281.0	360	-70	19
HH14-01	84275	604787	5800710	320.0	270	-70	0
LJ14-01	33215	598421	5806888	252.0	270	-75	28
FB14-01	2116336	598495	5818690	350.0	270	-75	30
FB14-02	2159491	598123	5824307	293.0	270	-80	14
FB14-03	2049589	605799	5818186	242.4	180	-75	6
<b>Totals:</b>				<b>1987.4</b>			<b>120</b>



**Figure 10: Location of 2014 diamond-drill holes - Peppler-Lamêlée Property**

Hole PL14-01 (249 m) was drilled on the Lac Peppler Occurrence; Hole PL14-02 (281 m) was drilled at Peppler West; Hole HH14-01 (320 m) was drilled near the Hobdad Hill occurrence; Hole LJ14-01 (252 m) was drilled near the Lac Jean 1 occurrence; holes FB14-01 (350 m) and FB14-02 (293 m) were drilled near the Faber occurrence; and Hole FB14-03 (242 m) was drilled near the Claims J. Wax (i.e., Faber East) occurrence. The drilling on the Peppler West magnetic anomaly was the first drilling undertaken to assess this prospect. The Lac Peppler, Hobdad Hill, Lac Jean 1 and Faber occurrences have been drilled previously.

#### Lac Peppler

Hole PL14-01 was located on the eastern edge of the magnetic-high and north of the NE-SW trending fault. The hole collared in marble and intersected magnetite iron formation (MIF) at 80 m to 95 m, magnetite-hematite IF from 95 m to 118 m and MIF again to 129 m. Minor silicate iron formation (SIF) was encountered lower in the hole around 165 m and 240 m.

#### Peppler West

PL14-02 was located on the south east edge of a 2,300 m x 450 m magnetic high. The hole was drilled to the north and encountered very deep overburden with casing to 57 m. The hole intersected very weathered Gneiss to 115 m where the first of four faults was intersected. MIF was intersected from 235 m to 250 m. Rods got stuck in the hole at 250 m and the hole was abandoned.

#### Hobdad

HH14-01 was located on Line 5800/700N at the south end of the Hobdad deposit. Iron formation was not intersected in the hole and it was terminated at 320 m in gneiss.

#### Lac Jean 1

Hole LJ14-01, located 750 m south of Lac Jean, collared in gneiss and intersected MIF from 137 m to 140 m. Hematite-magnetite iron formation (HMIF) was intersected from 140 m to 210 m, with minor quartz veins locally. From 210 m to 249 m the hole encountered a mix of quartz rock, silicate and magnetite iron formation. Hole LJ14-01 ended at 252 m in gneiss.

#### Faber

Three holes were drilled on the Faber prospect, two on the western part of the zone and one on the east end of the zone near Hwy 389 where the stratigraphy is flat lying.

FB14-01 collared in marble and quartz rock to 191.5 m. SIF was intersected from 191.5 m to 197 m followed by MIF to 219 m. Another SIF unit to 240 m followed the MIF. Minor MIF was encountered from 288.8 m to 292 m and the hole ended at 350 m in mica schist.

FB14-02 was collared, and remained, in marble to 214.5 m. Magnetite-silicate IF was intersected from 214.5 m to 259 m. The hole was ended at 293 m in Quartz-Mica-Schist.

FB14-03 collared and ended in quartz-carbonate-silicate IF. Two minor zones of MIF were intersected from 195.15 m to 196.46 m and from 197.5 m to 199 m. The hole ended at 242.5 m.

A list of composite intervals of iron formation intersections from the 2014 drill programme is shown in **Table 3**. Logs and cross sections of the 2014 drill-holes are respectively provided in **Appendix III** and **Appendix IV**.

**Table 3: Composite Iron Formation Intervals - 2014 Diamond-Drilling Campaign**

Hole #	From (m)	To (m)	Interval (m)	Fe%	# of Samples
PL14-01	79.80	129.25	49.45	32.62	9
PL14-02	235.40	281.00	45.60	33.43	9
LJ14-01	137.00	169.50	32.50	29.76	6
LJ14-01	171.45	218.30	46.85	34.74	9
LJ14-01	221.60	236.40	14.80	31.03	3
LJ14-01	246.20	249.80	3.60	25.20	1
FB14-01	197.53	249.95	52.42	27.35	10
FB14-01	256.45	269.10	12.65	37.34	2
FB14-01	288.80	292.05	3.25	30.70	1
FB14-03	195.15	196.46	1.31	37.50	1
FB14-03	197.53	199.00	1.47	45.20	1
		<b>Totals:</b>	<b>263.90</b>	<b>31.84</b>	<b>52</b>

### 7.3 SURVEYING

Drill-holes were spotted in the field by geological crew members using a hand-held GPS (Global Positioning System) unit. Drill-hole azimuths were also established using hand-held GPS units rather than compasses as the underlying iron formation significantly affects compass readings: foresights were erected for visual alignment of the drill-rig prior to collaring the holes. A down-hole survey was completed on all but one drill hole using a DeviFlex Gyro to provide azimuth and inclination (dip) data.

### 7.4 LOGGING AND CORE HANDLING

Peter Banks logged all core, marked core for sampling and provided supervision of the drilling. Andy Rochette of Explo-Logik was the geo-tech responsible for sampling core and measuring core boxes (**Table 4**).

**Table 4: Project Geotechnical Crew**

Project Geotechnical Crew		
Myles Johnson	Manager Exploration Services	Cliffs
Peter Banks	Geologist/Field Supervisor	MRB
Andy Rochette	Geo-technician	Explo-Logik

Geological logging included both descriptive and geotechnical logging. Geotechnical logging included core recovery estimates and rock quality designation (RQD) records. Logging included a core tray inventory of metreage interval per tray, photography of the dry core, and magnetic susceptibility measurements of the core every 2 m, using a hand-held magnetic susceptibility instrument. Drill-log data was entered directly into an acQuire® database system. Core trays were labelled with aluminium labels and were securely housed in covered core racks at Cliffs' Peppler exploration camp.

## 7.5 SAMPLING

The demarcation of sampling boundaries was made generally on a geological basis as selected by Mr. Banks during logging. The sampling guidelines required minimum sample lengths of 1-2 m, with maximum lengths of approximately 6 m. This scheme was closely followed for the most part. In total, 120 samples, including QA/QC samples, were collected (see **Table 2**). No samples were collected from hole HH14-01, as no significant IF was intersected.

All core estimated to contain at least 15% iron in the form of oxide was sampled. In addition, one sample on either side of all IF intervals were collected in order to bracket the IF sequences. Some samples include more than one rock type because of the minimum sample length stipulation. This situation most often occurs in sequences of IF alternating with narrow, less than 1 m intervals of amphibolites and hornblende-biotite-gneiss. In such cases, individual samples may include both amphibolite and IF. The sampling process, in addition to the collection of core samples, included the sampling of quarter core Duplicates, and the insertion of Blanks and Standards into the sampling sequence. This component is described in **Section 7.7**.

Sample intervals were marked out by the drill geologist with a china marker during descriptive logging. Three-part sample tickets, from sample books with unique sequential ticket numbers, were used to number and label core intervals and bagged samples. Sample numbers and intervals were recorded in the acQuire drill-hole database.

One part of the 3-part sample ticket remained in the sample book. One part was placed and stapled under the first few centimetres of core in the sample interval in the core tray. The third part was inserted by the core splitter/sampler into a polyweave sample bag with the split core sample. The sample-tag number was also written on the sample bag.

Core samples were split using a hydraulic core splitter and half of the core was returned to the core tray in their original order and fitted back together as much as possible. Core trays were then placed on core racks located on-site. Sample bags were stored in 205-litre barrels, which were shipped by truck to the laboratory.

## 7.6 SAMPLE PREPARATION AND ASSAYING

### General

Samples were sent to Actlabs Assay Laboratory, Ancaster, Ontario. Actlabs is accredited by the Standards Council of Canada ("SCC"), which requires on-site assessment of the laboratory and also requires continued participation in proficiency testing programs like CANMET's PTP-MAL.

Actlabs' Quality System is accredited to international quality standards through the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) 17025 (ISO/IEC 17025 includes ISO 9001 and ISO 9002 specifications) with CAN-P-1758 (Forensics), CAN-P-1579 (Mineral Analysis) and CAN-P-1585 (Environmental) for specific registered tests by the SCC.

Sample preparation at Actlabs included dry crush to 90% -10 mesh followed by a riffle split. Approximately 250 g of rock was pulverized to 95%, -200 mesh. Cleaner sand was used between each sample pulverized.

Analysis at Actlabs included determination of major elements by XRF on lithium metaborate and lithium tetraborate with lithium bromide glass discs, (Code 4C XRF Fusion (11+) Whole Rock Analysis XRF).

To minimize the matrix effects of the samples, the heavy absorber fusion technique of Norrish and Hutton (1969), are used for major element (oxide) analysis. Prior to fusion, the loss on ignition (LOI), which includes H<sub>2</sub>O<sup>+</sup>, CO<sub>2</sub>, S and other volatiles, can be determined from the weight loss after roasting the sample at 1050 C for 2 hours. The fusion disk is made by mixing a 0.5 g equivalent of the roasted sample with 6.5 g of a combination of lithium metaborate and lithium tetraborate with lithium bromide as a releasing agent. Samples are fused in Pt crucibles using an automated crucible fluxer and automatically poured into Pt moulds for casting. Samples are analyzed on a Panalytical Axios Advanced wavelength dispersive XRF. The intensities are then measured and the concentrations are calculated against the standard G-16 provided by Dr. K. Norrish of CSIRO, Australia. Matrix corrections were done by using the oxide alpha - influence coefficients provided also by K. Norrish. In general, the limit of detection is about 0.01 wt.% for most of the elements.

## **7.7 QA/QC**

Sampling and assaying QA/QC included procedures operated by the geotechnical field personnel (In-Field QA/QC) and procedures operated in each of the Primary analytical laboratories (In-Lab QA/QC).

### In-Field QA/QC

The in-field sampling/assaying, QA/QC protocol involved the insertion of Blanks, quarter core Duplicates and Standards into the sample stream.

The material used for Field Blanks ("FBLK") for the programme was intervals of amphibolite drill core from Cliffs' Bloom Lake Mine ("Bloom"). Amphibolite at Bloom is a coarse-grained, massive to cryptically bedded rock comprised of hornblende, plagioclase and biotite. The material was obtained from drill core from historic and recent drilling from Cliffs' core farm. This rock is low in magnetite and low in hematite but does contain 9 to 12 percent Fe.

The sampling protocol called for insertion of Blanks into the sample stream at a frequency of one per 20 routine samples. When a Blank was required, split amphibolite core, representing a sample length of 3 m to 6 m, was placed into a regular sample bag and given a regular sample identifier in sequence with the Routine samples.

One Standard was used throughout the drilling program. The Standard comprised rock from Cliffs Bloom Lake Mine and was labelled "Bloom Lake Lot#1". Standards, were inserted into the sample stream at a frequency of approximately one per 20 Routine samples.

Quarter-core Duplicates were collected at a frequency of 1 per 40 Routine samples. As their name implies, quarter-core Duplicate samples were obtained by splitting the remaining half of previously sampled core intervals.

### In-Laboratory QA/QC

Actlabs follows internal QA/QC programs as part of their own quality assurance protocols.

These programs include insertion of Blanks, Certified Reference Standards and assay of Duplicates along with samples they receive from clients.

At the lab, Certified Reference Standards were assayed along with samples from the field. In addition, Actlabs prepared and assayed Preparation Duplicates, which it refers to as "Splits".

Preparation Duplicates are Duplicates, created at the crushing stage, that proceed through the remainder of the assaying protocol as two distinct samples.

Actlabs apparently did not use Preparation Blanks. Preparation Blanks are samples inserted into the preparation protocol at onset, that are crushed and pulverized and continue through the remainder of the assay protocol like regular samples.

At Actlabs the frequency of use of quality control materials varies depending on batch size. **Table 5** provides a summary of the Quality Control Materials used for the 1 batch of samples completed at Actlabs (one batch contained all of the Lamêlée and Hobdad samples processed by Actlabs).

**Table 5: Summary of In-Lab Quality Control Samples at ActLabs**

<b>Sample Classification</b>	<b>Number of Instances</b>	<b>Analytical method</b>
Routine Samples	120 (Cert#14-05722)	XRF-Whole Rock
Analytical Duplicates	10	XRF-Whole Rock
Lab Standards	7	XRF-Whole Rock

## 8.0 DISCUSSION

Seven (7), NQ-diameter diamond-drill holes, totalling 1,987.4 metres were completed at the Project between June 7<sup>th</sup>, 2014 and August 13<sup>th</sup>, 2014. The objective of the programme was to intersect magnetite/ hematite-rich iron formation, coincident with strong magnetic-response anomalies in the area of known and catalogued Lac Peppler, Hobdad, Lac Jean 1, Lamêlée, Faber and Claims J. Wax iron occurrence (see <http://sigeom.mrnf.gouv.qc.ca/>).

The Lac Peppler deposit has NI 43-101 Inferred mineral resources of 327 Mt grading 27.9% Fe, and Indicated Resources of 327 Mt grading 27.95% Fe (Wahl, 2013-1). The Lac Lamêlée deposit hosts 653 Mt of Inferred Resources grading 30.45% Fe and 272 Mt of Indicated Resources grading 29.43% Fe (Wahl, 2013-2) in accordance with NI 43-101.

The 2014 drill programme achieved its objective, having intersected over **264 metres of iron formation** with an **average composite grade of 31.8% Fe**, (see **Table 3**) including 4 intervals of approximately 50 m in 4 separate holes. Selected "best" intervals include: **49.45 m grading 32.6% Fe** from Hole PL14-01; **45.6 m grading 33.4% Fe** from hole PL14-02; **46.85 m grading 34.7% Fe** in hole LJ14-01; **52.42 m of 27.35% Fe** encountered in hole FB14-01, and; **12.65 m grading 37.3% Fe** in hole FB14-01.

## 9.0 CONCLUSIONS AND RECOMMENDATIONS

The 2014 drill programme achieved its objective, having intersected 264 metres of iron formation grading, on average, 31.8% Fe.

The 2014 drilling programme is deemed to have been a success. To advance the Project, the following work is recommended:

- metallurgical sampling and analysis of selected composite core-samples - SATMAGAN (saturated magnetic analysis), specific gravity determinations of the main rock formations/members, Davis Tube and HLS (heavy liquid separation) tests of various mesh-sized fractions to determine optimal iron-recovery properties;
- additional drilling to better define mineralized zones.

Respectfully submitted,



Peter Banks, P.Ge. Ordre des Géologues du Québec no. 1712, Senior Associate Geologist

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**CERTIFICATE OF QUALIFICATION**

**PETER BANKS**

I, **Peter Banks, B.Sc., P. Geo.**, currently residing in Saint John, New Brunswick do hereby certify that:

1. I graduated from the University of New Brunswick in 1993 with a B.Sc. in Geology and I have practised my profession continuously since that time;
2. I am currently living in New Brunswick and I am a Professional Geologist currently licensed the Association of Professional Engineers and Geoscientists of New Brunswick (Licence No. M7250).
3. I have worked as a geologist for 21 years. I have knowledge and experience with regard to a number of mineral deposit types and with the procedures involved in the preparation of technical studies;
4. I have prepared and authored this report.
5. To the best of my knowledge, I am not aware of any material fact or material change with respect to the subject matter of the Report that is not reflected in the Report, the omission of which would make the Report misleading;

DATED this 30<sup>th</sup> Day of October, 2014

**MRB & Associates**



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**(Signed) Peter Banks, B.Sc., P. Geo.**

**APPENDIX I**

**3-D Geophysical Modelling Report of 2011 Fugro Geophysical Data:  
Pepler-Lam  e Property**



**Mira Geoscience**  
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## **3D magnetic and gravity inversion, and 3D Iron Ore Targeting for Cliffs Natural Resources' Lamelee, Hobdad, and Pepler Projects in Eastern Quebec**

For Cliffs Natural Resources

Mira Geoscience Ltd. Project #4214

September 19<sup>th</sup>, 2014

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## **1. Introduction**

This report provides details on 3D geophysical inversion and mineral potential modelling using multi-component data collected at and around Cliffs Natural Resources' Lamelee, Hobdad, and Pepler iron ore projects in eastern Quebec, Canada. Results of the mineral potential modelling work are used to optimize drill target selection and surveying for Cliffs' 2014 drilling program.

### **1.1. Project Scope**

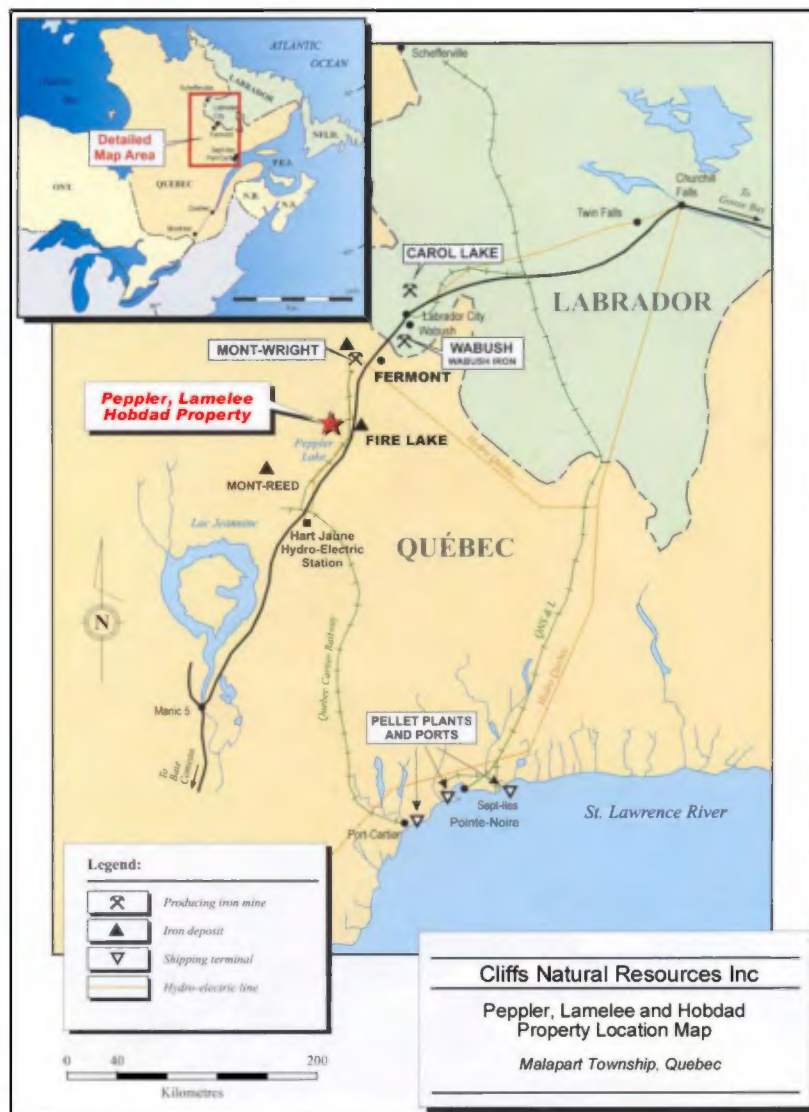
The project scope encompasses the following tasks:

1. Evaluation of available physical rock property data to determine typical ranges of magnetic susceptibility and density associated with ore and host rocks on the Lamelee, Hobdad, and Pepler exploration properties, to provide inversion constraints, and to develop mineral potential targeting criteria.
2. Inversion of airborne magnetic and gravity gradiometry data. Inversion was constrained by the available petrophysical data: borehole rock property logs recorded at the three exploration sites, plus inferred rock properties assigned to outcrop samples according to lithology.
3. Iron ore targeting using a knowledge-driven approach to identify clusters of model cells satisfying exploration criteria that were developed based on relationships between various multi-disciplinary data (geophysics, geology, structure, geochemistry) and known occurrences of iron ore.

### **1.2. Geologic Setting and Exploration Claims**

Cliffs Natural Resources' Lamelee, Hobdad, and Pepler projects are located approximately 50 km southwest of Fremont, Quebec, proximal to the border between

Quebec and Newfoundland and Labrador. The properties are situated within the southern Labrador Trough, a belt of Proterozoic sedimentary, volcanic and intrusive rocks extending for over 1000 km along the eastern margin of the Superior Craton. The Labrador Trough is host to significant iron ore deposits in Labrador and Quebec.



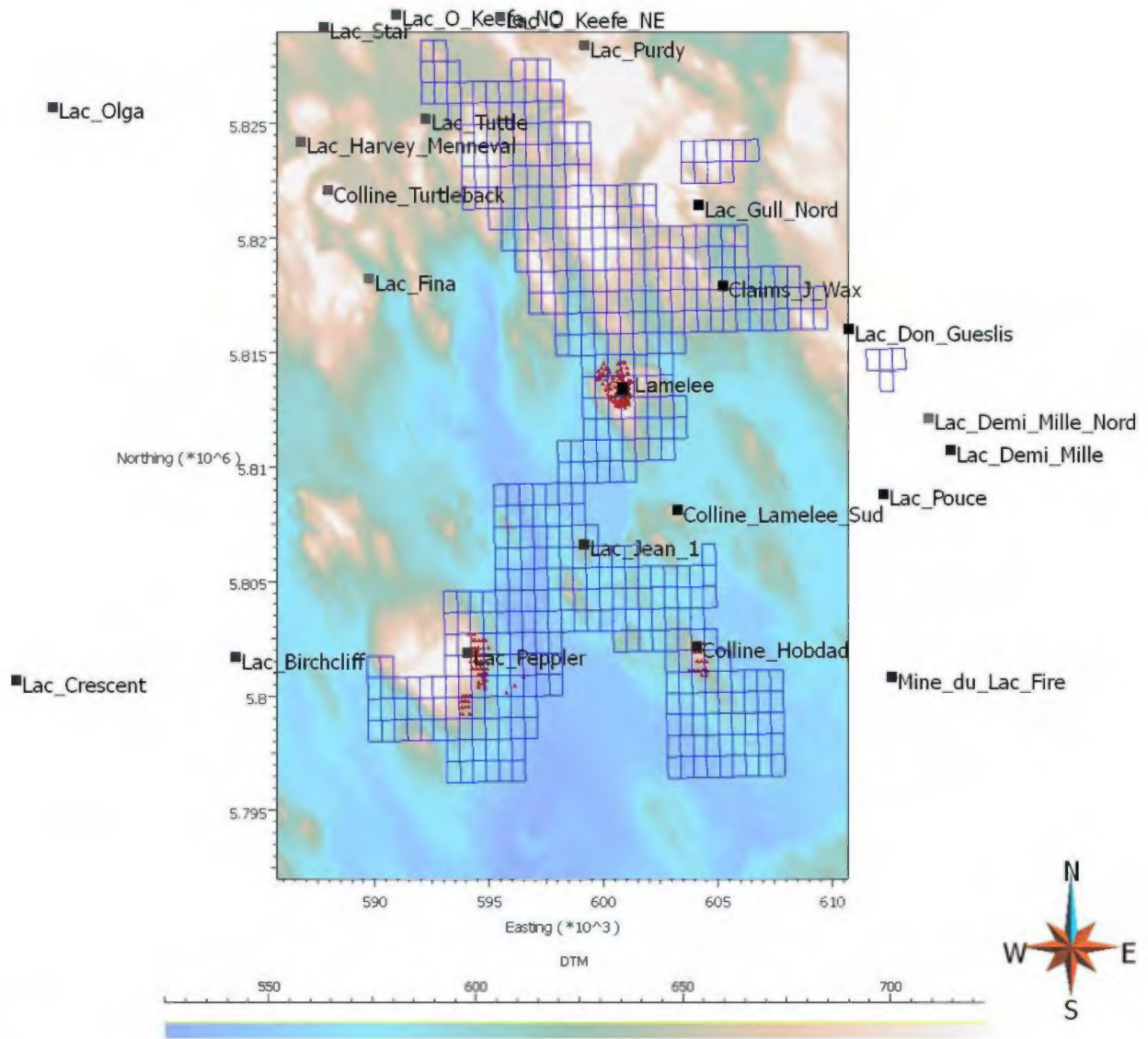
**Figure 1.** Location of the Pepler, Lamelee, and Hobdad iron ore properties in eastern Quebec, Canada. Image from Mineral Resource Technical Report, Lamelee Project, February, 2013 (Wahl, 2013).

Basement rock in the project area is thought to be dominated by gneiss and migmatite. The overlying stratigraphy is made up of a sequence of limestone, quartzite, iron formation, gneiss and schist. Intrusive units span felsic to mafic compositions. Stratigraphy is extensively folded.

Iron formation can be subdivided at the local scale into several types: magnetite iron formation (MIF in drill databases), hematite iron formation (HIF), magnetite-dominated iron formation with lesser hematite (MHIF), hematite-dominated iron formation with lesser magnetite (HMIF), and silica-dominated iron formation (SIF).

Cliffs Natural Resources mineral claims are shown in Figure 2. There are four sites where exploration has been primarily focused. Their geologic settings are as follows (Campbell, 2009):

- Lamelee occurs roughly within the center of the claims area. Magnetite and specularite iron formation is folded with quartzite and schist into a synclinal formation. A second band of iron formation follows a broader synclinal feature and is composed of dolomitic marble, quartzite, and magnetite-rich iron formation.
- Lac Jean occurs south of Lamelee. Iron formation sits above quartzo-feldspathic gneiss basement. Magnetite-rich iron formation is mapped here layered with schist, quartzite, and marble.
- Hobdad is located southeast of Lamelee. Mineralization is hosted in magnetite-rich iron formation that is tightly folded in an overturned syncline.
- At Pepler, the folded iron formation complex is characterized by a sequence of hematite-rich, magnetite-rich, and silica iron formation. Ore is hosted at various levels within the sequence.



**Figure 2.** Cliffs Natural Resources' claims overlain on digital terrain model, with locations of mineral occurrences and deposits. Drilling indicated by red tetrahedra.

### 1.3. Data

#### Geological data

Various regional scale and property scale geological maps were used for interpretation of geophysical data and models.

Property maps were extracted from a report from Intrepid Geophysics for Quinto Technology Inc., Pepler Lake Interpretation report (Campbell, 2009). Maps of Lamelee, Pepler, and Lac Jean geology were included in this report.

Regional 1:50,000 geological maps were downloaded from Ministère de l'Énergie et des Ressources Naturelles, Quebec. The four NTS map sheets referred to include 23B005, 23B006, 23B011, and 23B012 (SIGÉOM - Système d'informations géominières - database, 2010).

#### Drilling data

Drilling data were provided by Cliffs Natural Resources. Downhole logs include geology, plus limited geochemical data. Geological codes were simplified and standardized between each of the three mineralized sites to facilitate analysis of rock property data at a scale relevant to geophysical modelling.

#### Physical property data

DGI Geoscience acquired borehole rock property data from a series of holes from each of the Lamelee, Hobdad, and Pepler properties. This data included density, magnetic susceptibility, natural gamma, resistivity, Poisson's ratio, P-wave velocity, S-wave velocity, shear modulus, bulk modulus, and Young's modulus. Density and magnetic susceptibility data had direct implications for this project as input for constrained geophysical inversion and for development of criteria for exploration target characterization and selection.

Hand held magnetic susceptibility meter data were also recorded on core samples at each of these sites.

#### Magnetic data

Aeromagnetic data over the Lamelee, Hobdad, and Pepler properties was acquired by Fugro during a FALCON survey in November and December, 2011 (Fugro Airborne Surveys, 2011). Magnetic data covering Cliffs Natural Resources mineral claims north of Lamelee was also acquired by Fugro during a separate FALCON survey for Champion Iron Ltd. and were purchased for use in this project (Figure 3).

#### Gravity gradient data

FALCON gravity gradiometry data were collected in the two surveys by Fugro (Figure 4).

#### Topography

The topography used for this project was the digital terrain model (DTM) from the Fugro FALCON surveys.

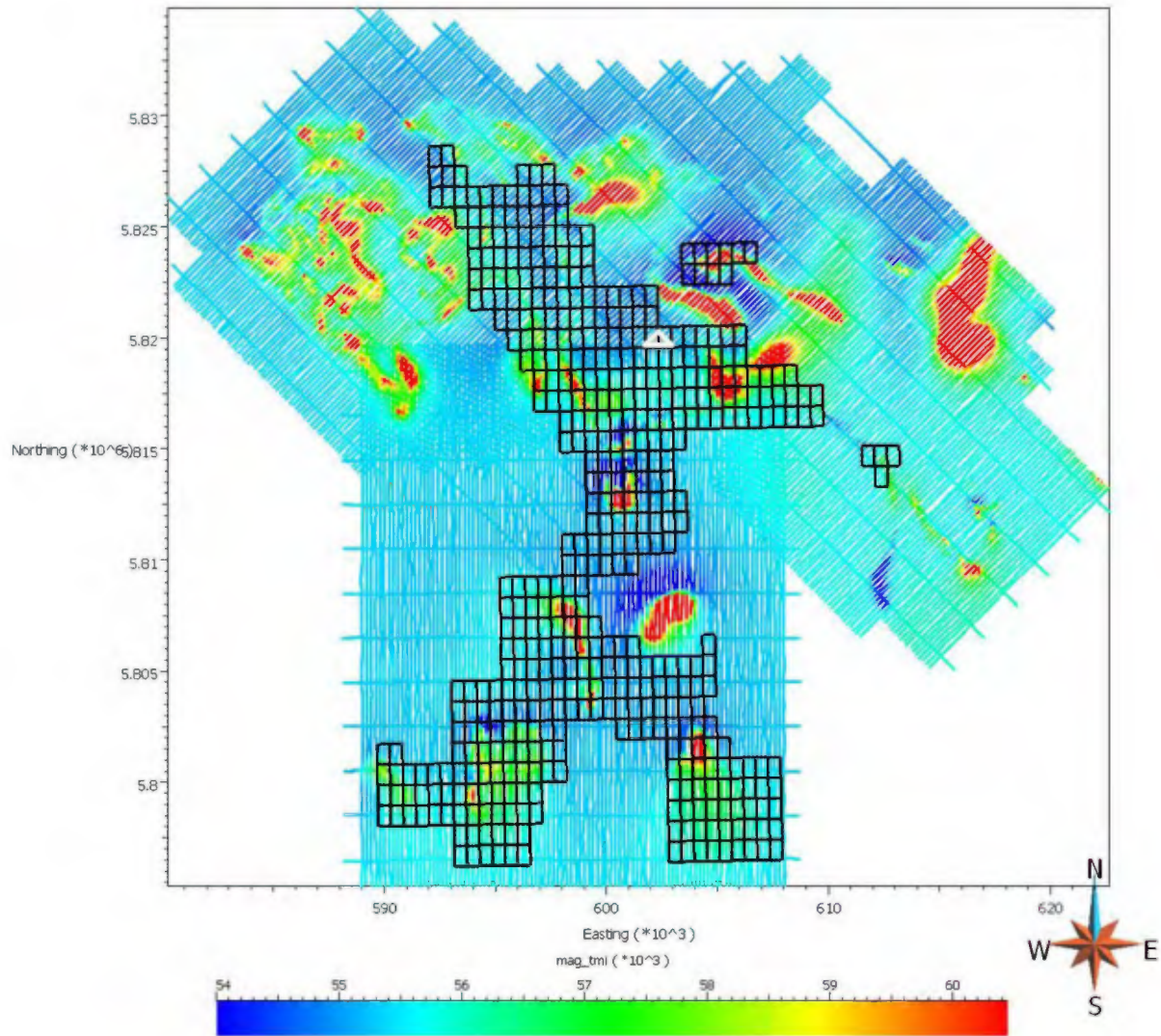
#### Supplementary data

Lake sediment geochemical data, and drainage data including lake outlines (required for gravity inversion constraints) were sourced from the Ministère de l'Énergie et des Ressources Naturelles.

Fire Lake SIGHEM data (frequency domain airborne electromagnetics), acquired by SIAL Géosciences Inc. in June 2000, was originally flown for Compagnie Minière Québec Cartier, and eventually open-filed.



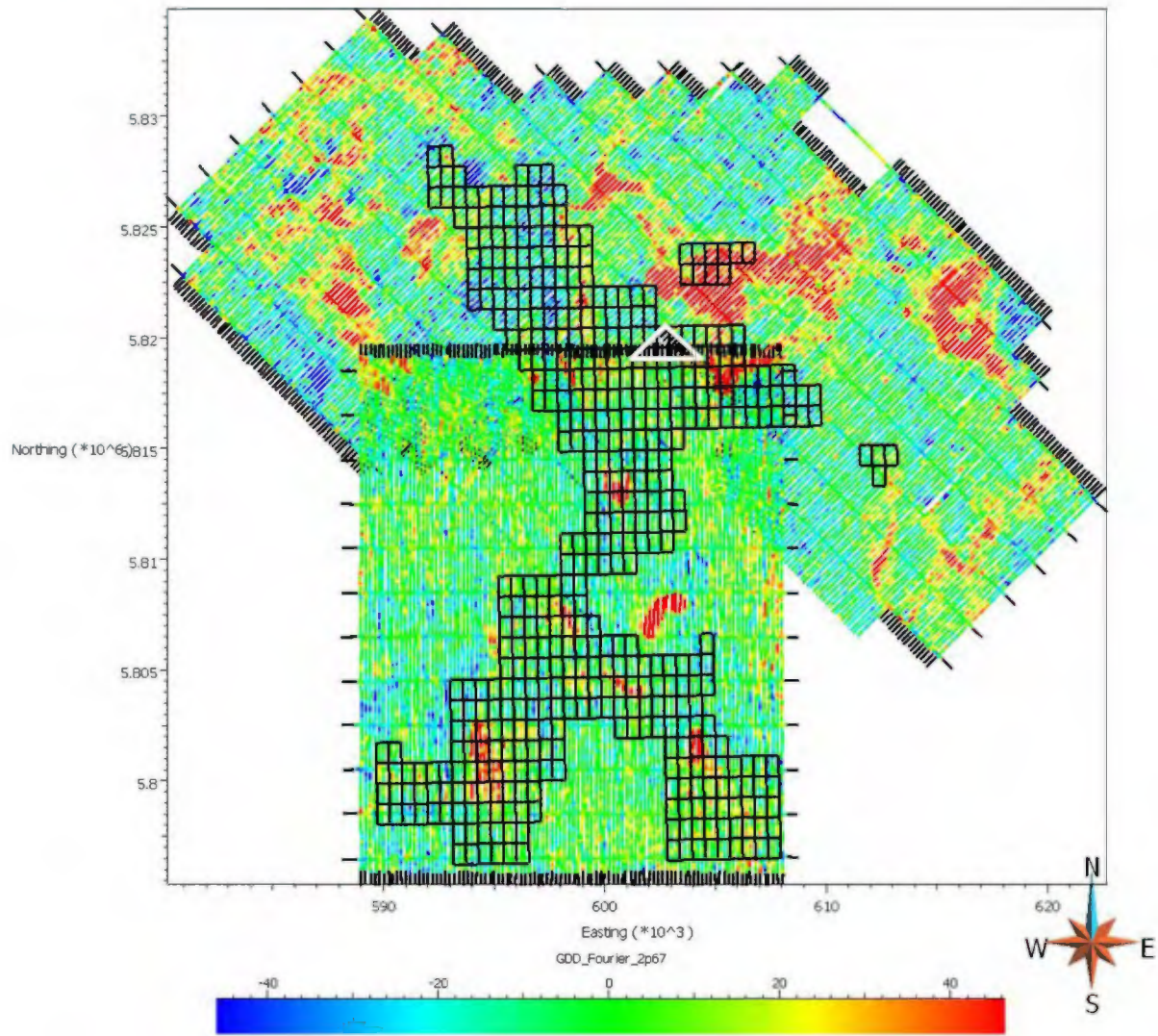
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**Figure 3.** Flight lines from Fugro FALCON surveys, showing Total Magnetic Intensity data. Cliffs Natural Resources claim blocks are overlain. White triangle indicates area where no data was collected.



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**Figure 4.** Flight lines from Fugro FALCON surveys, showing gravity gradient data (GDD Fourier data, corrected at  $2.67 \text{ g/cm}^3$ ). Cliffs Natural Resources claim blocks are overlain. White triangle indicates area where no data was collected.

## **2. Physical Property Data Analysis**

Borehole magnetic susceptibility and density data were collected by DGI Geoscience at the Lamelee, Hobdad, and Peppler project sites. At Lamelee 47 boreholes were probed, yielding a total of 10182.6 m. At Hobdad 14 boreholes were probed yielding 5183.2 m of data, and at Peppler 11 boreholes were probed yielding 1470.2 m of data. Borehole data was collected at 10 cm and 20 cm intervals during the Lamelee survey, and at 20 cm intervals during the Hobdad surveys and Peppler borehole surveys. Hand held magnetic susceptibility data on drill core supplements the borehole data.

The petrophysical data were compiled and analyzed with two goals:

1. To determine whether the existing iron ore deposits had unique density and magnetic susceptibility characteristics which would allow specific ore types to be characterized by geophysical data and modelling;
2. To provide constraints for magnetic and gravity inversion.

To analyze the data, the magnetic susceptibility and density measurements were split out based on a simplified rock classification that includes the various iron formation types discussed in section 1.2 and the principal background rock types. Results are summarised in Table 1. Analysis of the magnetic susceptibility data reveals that in general, hand-held and borehole susceptibilities are consistent.

Although MIF and MHIF have the highest susceptibilities, MIF, MHIF, HMIF, and HIF are all high susceptibility units, averaging from  $500\text{-}1100 \times 10^{-3}$  SI, compared to background gneiss (GN), quartzite (QZ), schist (SCH), and marble (MB) which have susceptibilities averaging 1 to  $90 \times 10^{-3}$  SI. A large range of magnetic susceptibility values for the various iron formation types means that a unique identification on the basis of magnetic susceptibility only is very unlikely. A possible exception is SIF which does contrast with the magnetite- and hematite-rich iron formation in that it tends to have lower susceptibilities, similar to background rocks.

MHIF, HMIF, MIF, and SIF have similar high densities of  $\sim 3.4 \text{ g/cm}^3$ , in contrast to background rocks with densities typically less than  $3 \text{ g/cm}^3$ . Thus the subtypes of iron formation are not likely distinguishable based on density, yet should be readily distinguishable from background rocks.

The results of this analysis guide targeting work. A single ore type will be targeted for: generalized iron formation, which is both magnetic and dense.

**Table 1.** Summary of typical density and magnetic susceptibility values and ranges for rocks in the project area.

Rock Type	Typical Densities ( $\text{g/cm}^3$ )	Typical Magnetic Susceptibilities ( $\times 10^{-3} \text{ SI}$ )	
		Range	Average
MHIF (magnetite>hematite IF)	3.45	700-1500	1100
MIF (magnetite IF)	3.38	500-1000	800
HMIF (hematite>magnetite IF)	3.49	200-1000	550
SIF (silica IF)	3.4	10-200	90
RX (various igneous, primarily mafic, rocks)	3	1-200	80
GN (gneiss - Hobdad only)	2.8	0-50	10
QZ (quartzite)	2.85	0-10	5
MB (marble)	2.75	0-10	2
SCH (schist)	2.75	0-10	1

### 3. Magnetic and Gravity Data Processing and Inversion

#### 3.1. Magnetic and Gravity Data Processing

Total Magnetic Intensity (TMI) data, and gravity gradient data, terrane corrected at  $2.67 \text{ g/cm}^3$ , were used for modelling. Line data were gridded using minimum curvature (radius 1.5 km) to obtain an optimum data distribution of 1 data point per inversion cell. Tie lines were discarded to avoid gridding inconsistencies at intersections with traverse lines. The sensor elevation was also gridded as to provide an elevation for each gridded magnetic and gradiometry data point.

A suite of 2D magnetic and gravity derivative maps were generated for each of three inversion blocks, Lamelee, Hobdad-Pepler, and Northern Claims.

Magnetic grids (generated from reduced-to-pole Total Magnetic Intensity (TMI) data):

- 1<sup>st</sup> vertical derivative
- 2<sup>nd</sup> vertical derivative
- Analytic signal
- Horizontal derivative (East-West)
- Horizontal derivative (North-South)
- Total horizontal derivative
- Tilt derivative

Gravity grids (created for both equivalent source-derived vertical gravity data and Fourier-derived vertical gravity data):

- 1<sup>st</sup> vertical derivative
- 2<sup>nd</sup> vertical derivative
- Analytic signal
- Horizontal derivative (East-West)
- Horizontal derivative (North-South)

- Total horizontal derivative

The listed grids have been provided to Cliffs Natural Resources as grid objects within the Lamelee-Hobdad-Pepler and Northern Claims GOCAD projects.

In addition to 2D derivative maps, apparent magnetic susceptibility and density maps were generated for each block (figures 5-7). Apparent property modelling calculates a lateral distribution of magnetic susceptibility or density that will effectively predict the observed geophysical data. Each cell in the model consists of a vertical prism delimited by the topography at the top of the model and extending infinitely to depth. The result is essentially a 2D map of laterally varying susceptibility or density. Although a full 3D inversion allowing magnetic susceptibility to vary in 3D provides a better fit to the geophysical data, the 2D apparent susceptibility model is useful for gaining an initial understanding of typical magnetic susceptibility and density ranges associated with geologic units and structures present in the area of interest. For this project, apparent magnetic susceptibility and density models were used to estimate physical property values to be used in starting models for full 3D inversion modelling.



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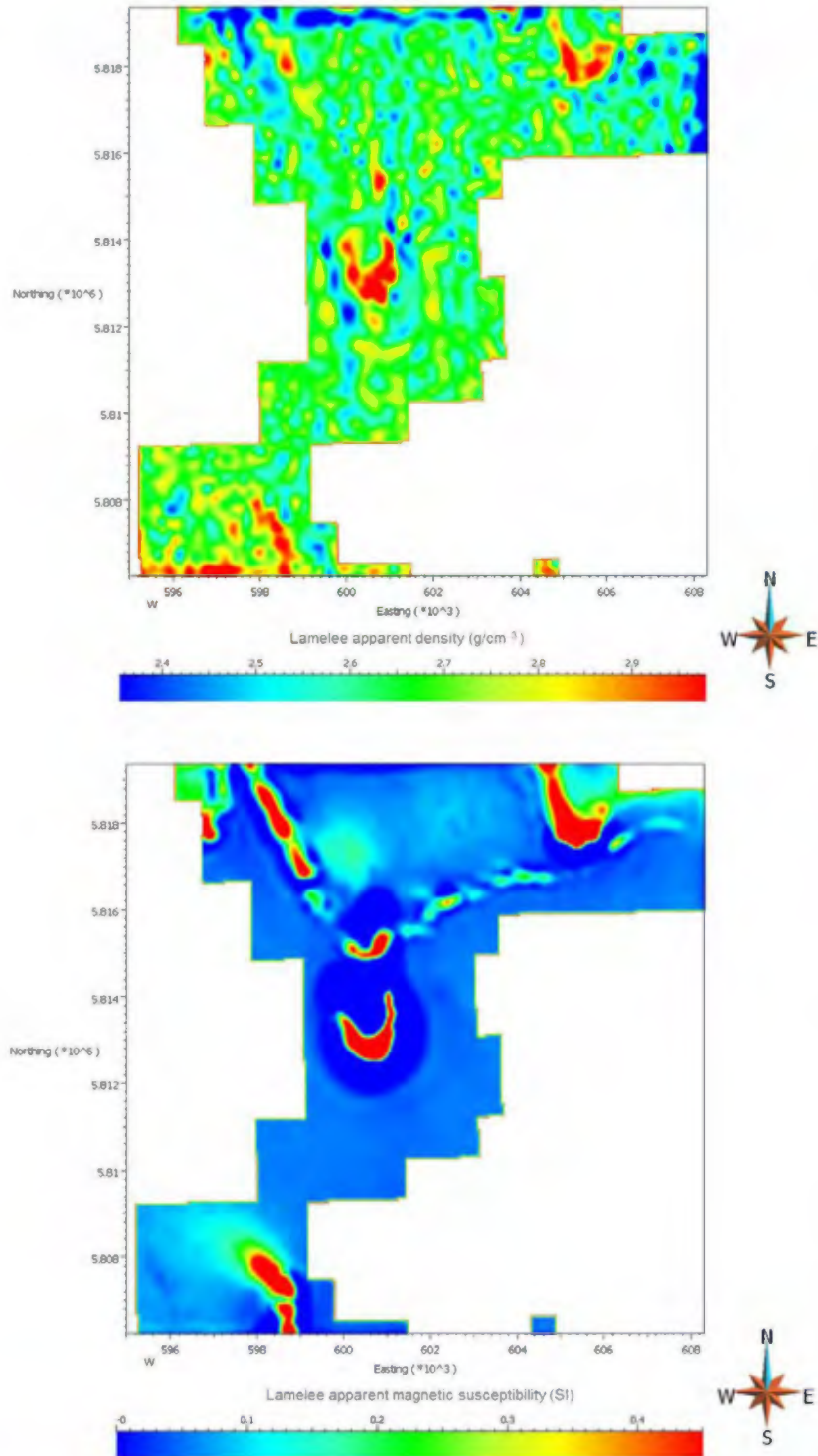


Figure 5. Apparent density and magnetic susceptibility models for the Lamelee block.



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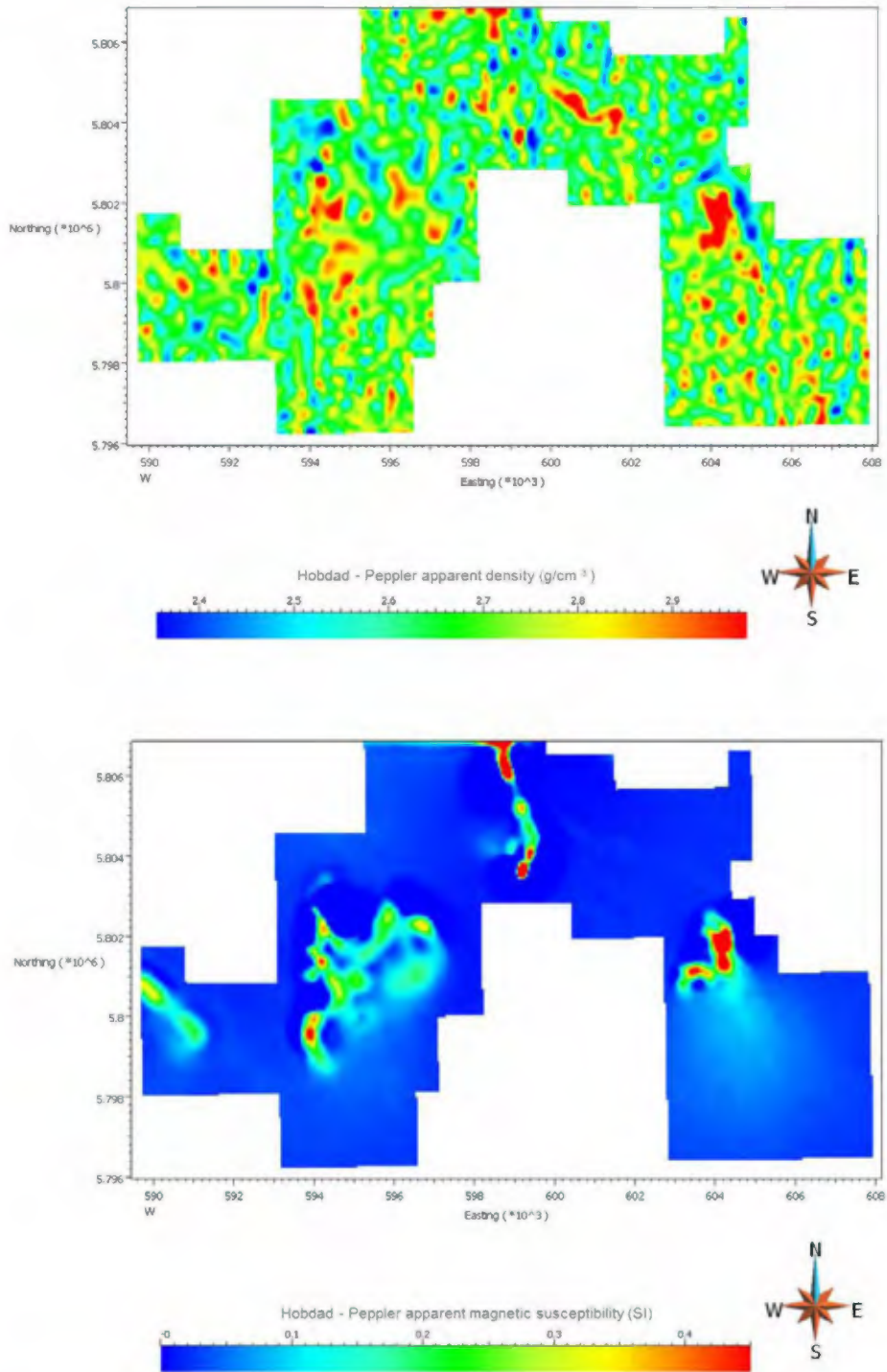
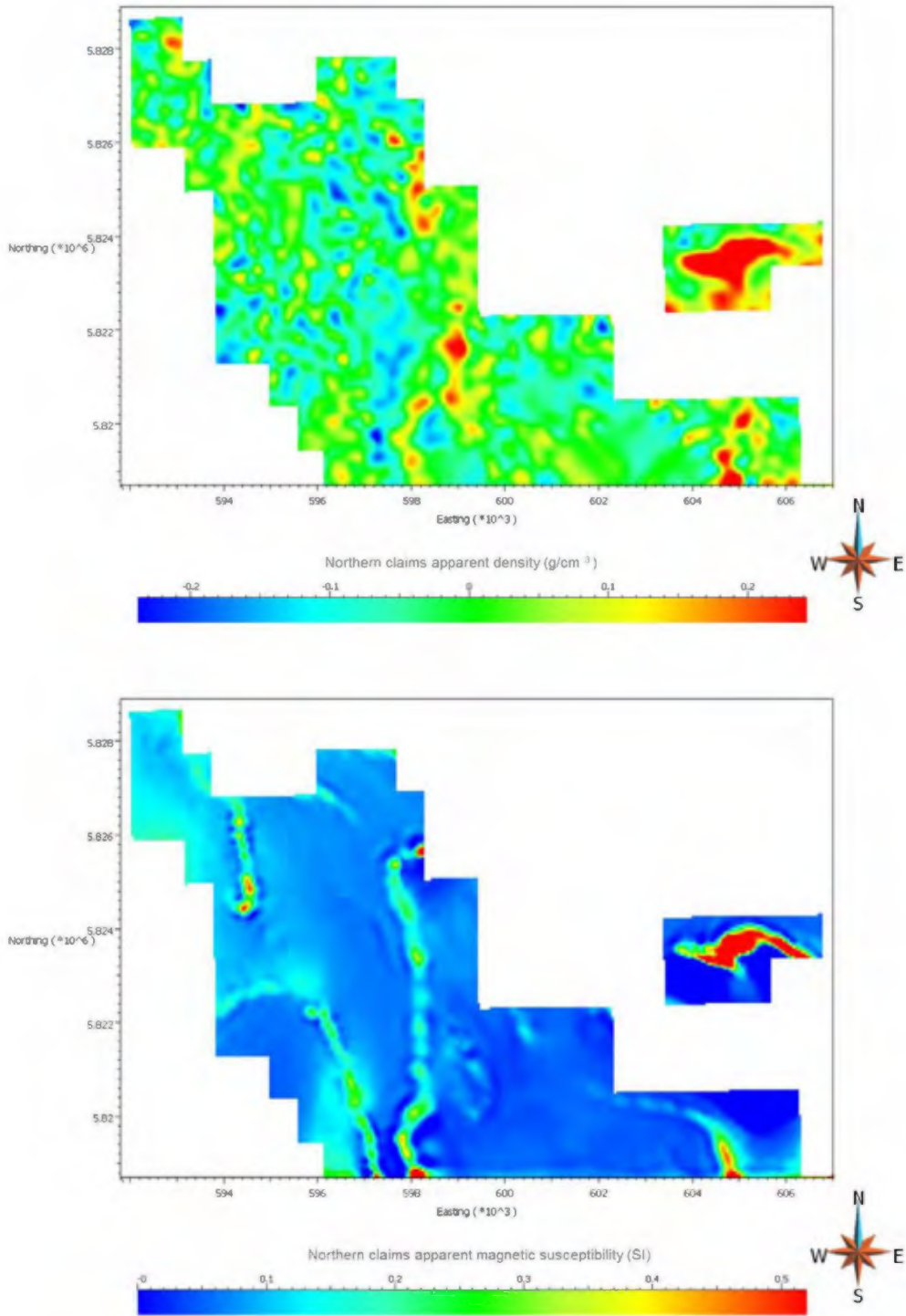


Figure 6. Apparent density and magnetic susceptibility models for the Hobdad-Pepler block.



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**Figure 7.** Apparent density and magnetic susceptibility models for the Northern Claims block.

### 3.2. 3D Magnetic Inversion

VPmg inversion software by Fullagar Geophysics (Fullagar et al., 2000, 2004, 2007, 2008) was used to invert airborne magnetic and gravity gradiometry data. The software was chosen for inversion on this project for several reasons. The VPmg algorithm has functionality to invert gravity gradiometry data in 3D. It also accounts for self-demagnetization as part of magnetic inversion process, a requirement for this project due to the likelihood of very high susceptibilities occurring in the project area. Outputs of inversion are 3D magnetic susceptibility models (from magnetic inversion) and 3D density models (from gravity inversion).

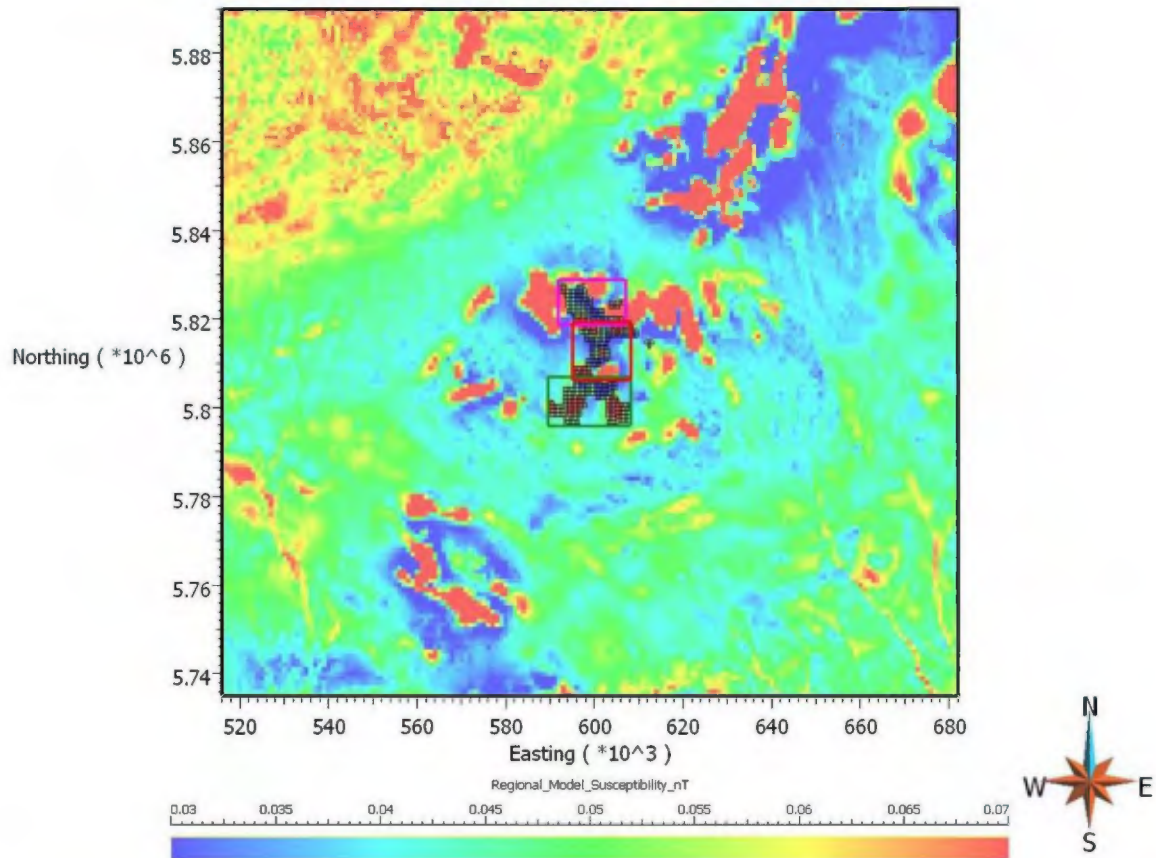
Magnetic susceptibility and density models were generated separately for three blocks, a southern Hobdad-Peppler block, a central Lamelee block, and a northern block encompassing claims north of the Lamelee deposit.

Various constraints were applied depending on data available. These constraints included observed DGI borehole rock properties data, handheld magnetic susceptibility meter data, and surface sample and drill hole lithology, for which physical property values were estimated. Due to the primarily local constraints available, models are most refined near mineralized zones at Lamelee, Hobdad, Lac Jean, and Peppler.

#### 3.2.1. *Regional Magnetic Modelling*

Regional magnetic anomalies were taken into account using publicly available, Natural Resources Canada magnetic data surrounding the project area. The regional models consider an area extending at least 60 km away from the borders of the three local inversion blocks.

Regional magnetic data were inverted to produce a regional apparent susceptibility model (lateral variations only, Figure 8), and the response of the regional model was taken into account during magnetic inversion at the project scale.



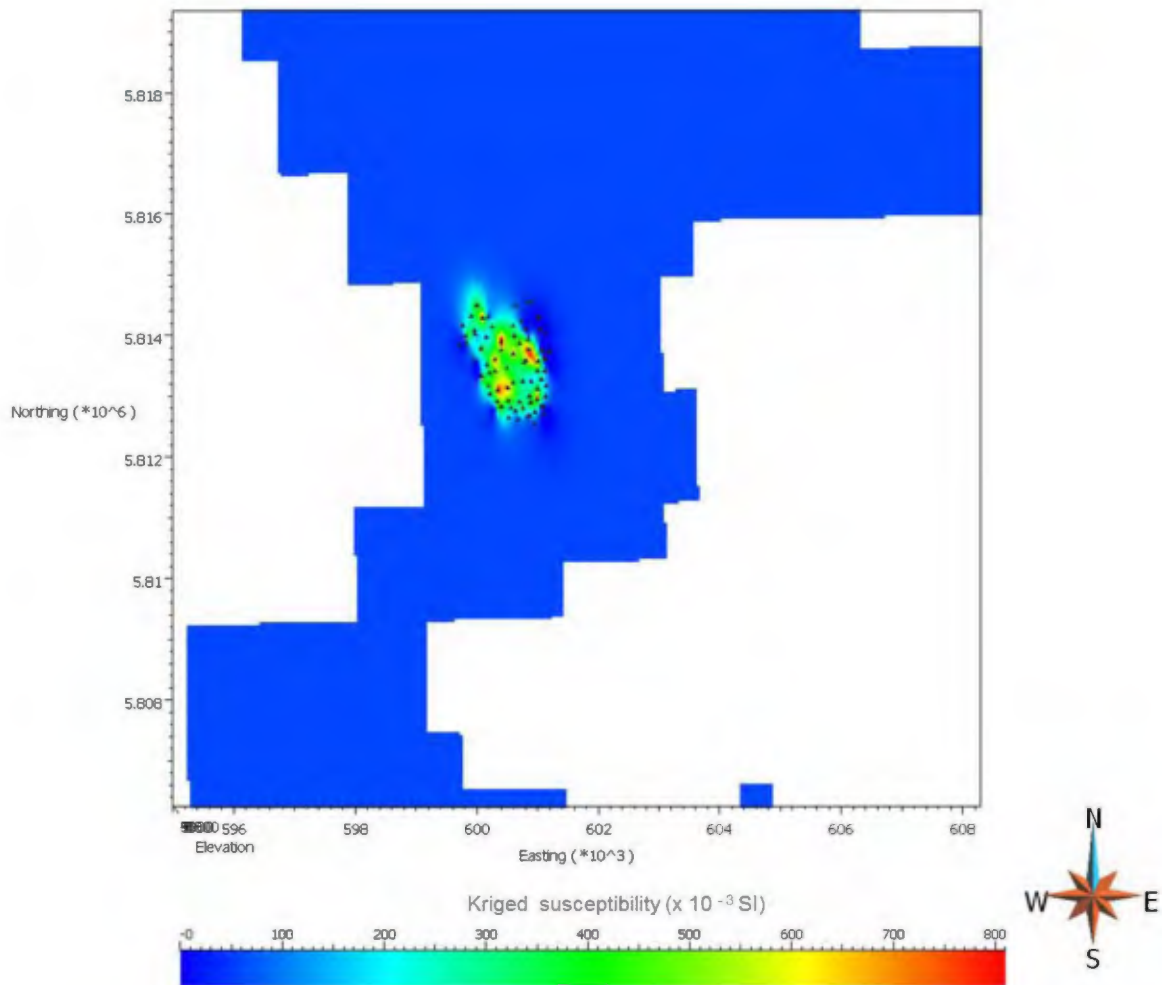
**Figure 8.** Regional scale apparent magnetic susceptibility model calculated from Natural Resources Canada magnetic data.

### 3.2.2. *Lamellee Block Magnetic Inversion*

The Lamellee block contains the Lamellee deposit at its center. The approximate extents of the model are 13 km x 13 km x 1 km. Cell sizes are 50 m<sup>3</sup>.

Inversion constraints for magnetic inversion within the Lamellee block are derived from down-hole physical property data. Borehole magnetic susceptibility data and susceptibility data collected from hand held meters were interpolated onto the inversion grid using kriging methods (Figure 9). Beyond the extent of observed and locally

interpolated data, the model attains a global mean representative of typical background susceptibilities.



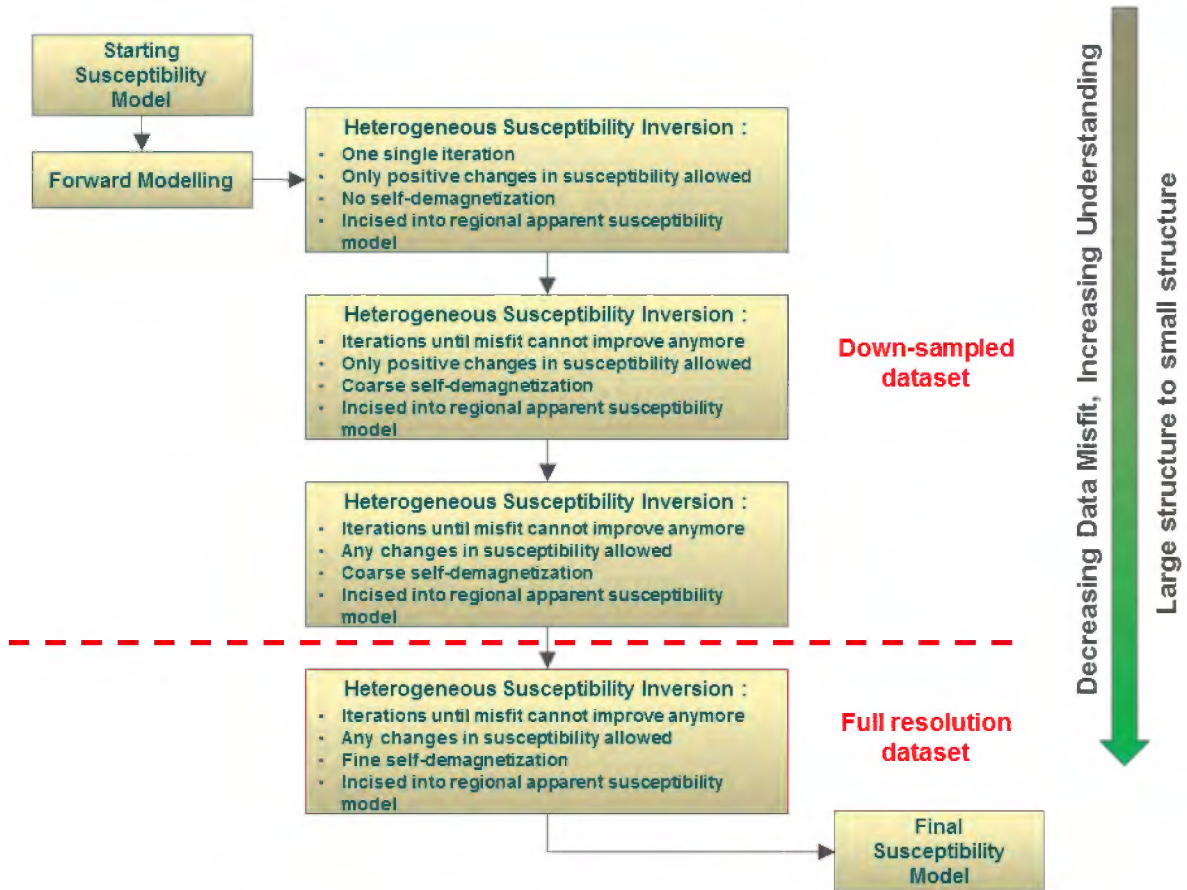
**Figure 9.** Kriged magnetic susceptibility data from Lamelee borehole surveys. Global mean determined from apparent susceptibility modelling.

Apparent susceptibility modelling (section 3.1) was used to determine a suitable starting background susceptibility value for inversion. This was done by identifying a region within the apparent susceptibility model that was free of anomalous high susceptibility features and finding the average susceptibility within that region. The starting background susceptibility value was determined to be 0.058 SI ( $58 \times 10^{-3}$  SI).

During inversion, the cells directly intersected by drillholes are required to honor the constraining data while surrounding cells are allowed some freedom to vary in order to best fit observed magnetic data. Adherence to the starting model is defined by weightings which are applied based on proximity to constraining data (in this case distance to drillholes). A depth weighting is also applied, which decreases with increasing depth in the model.

The VPmg inversion workflow used for all magnetic inversions for this project is outlined in Figure 10. The inversion process begins with a laterally varying basement inversion which is completed to model deep or more regional magnetic sources (the regional apparent susceptibility inversion from section 3.2.1.). After this, a 3D heterogeneous susceptibility model is sought which honors constraining information and suitably predicts the observed magnetic data. The inversion process is iterative with inversion parameters allowing specific changes to the model which are updated at intervals gradually reducing the misfit between predicted and observed magnetic data. The data predicted by the final Lamelee magnetic inversion model versus the observed data are shown in Figure 11. The magnetic data predicted by the inversion appears to agree well with the observed magnetic data, however in detail, a review of the residual data shows that the magnetic susceptibilities of the high susceptibility source bodies were not accurately modelled. Magnetic remanence is thought to be the reason for this high data misfit. Although the inversion models are deemed acceptable for purposes of mineral potential modelling, more advanced inversion modelling is required to resolve remanence issues. This is discussed further in section 3.4.

The 3D magnetic inversion results for the Lamelee block are shown in figures 12 and 13.



**Figure 10.** VPmg magnetic inversion workflow.



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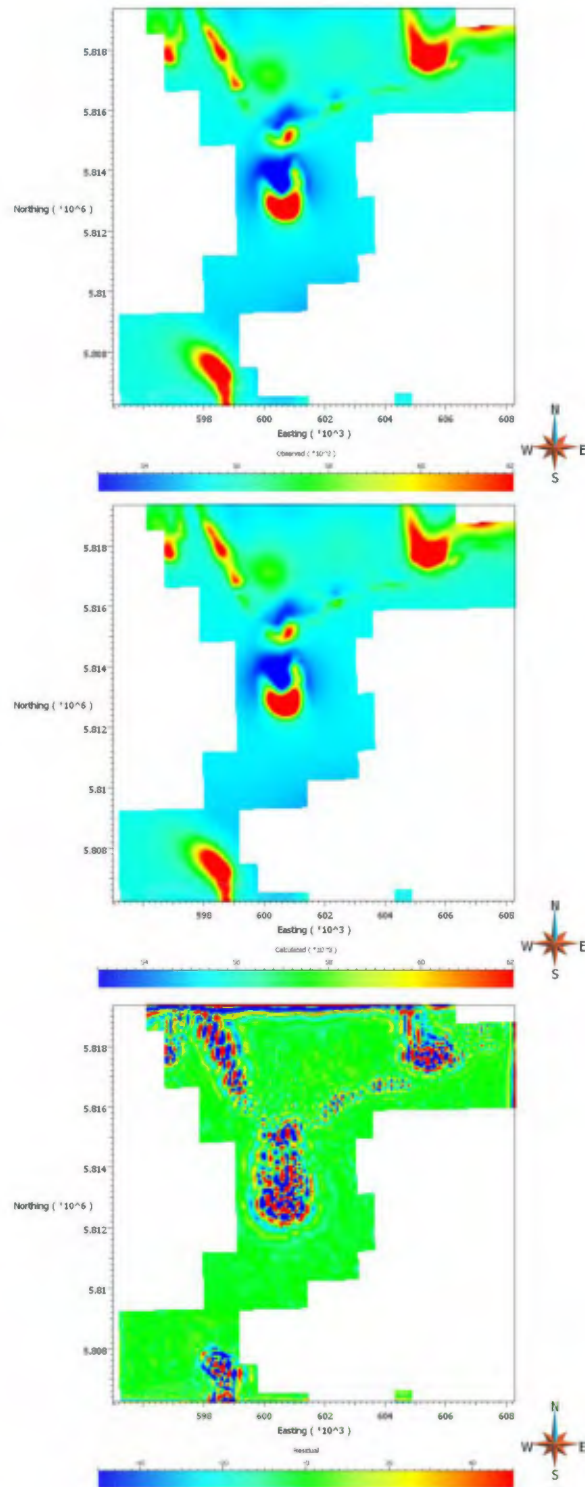
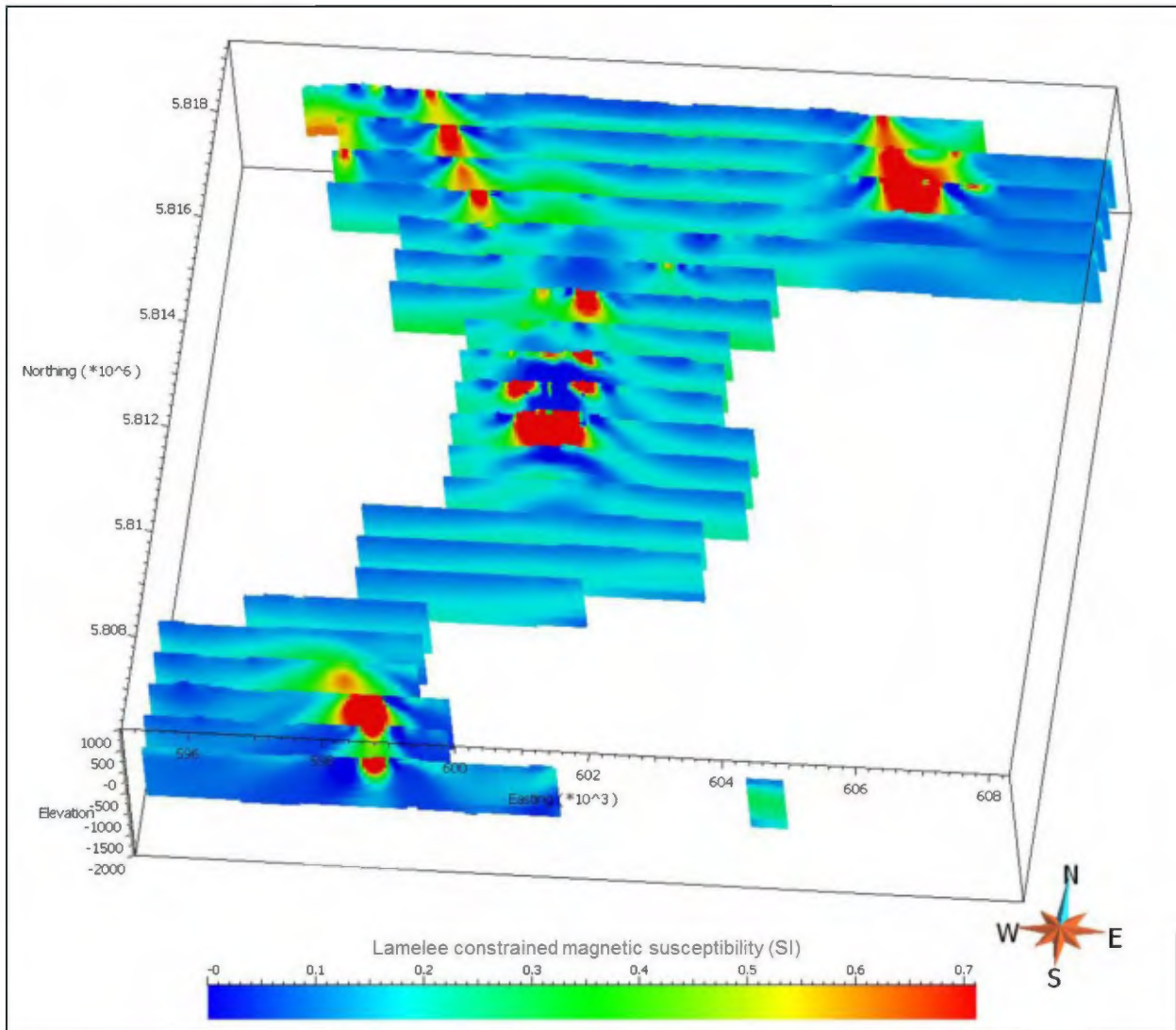


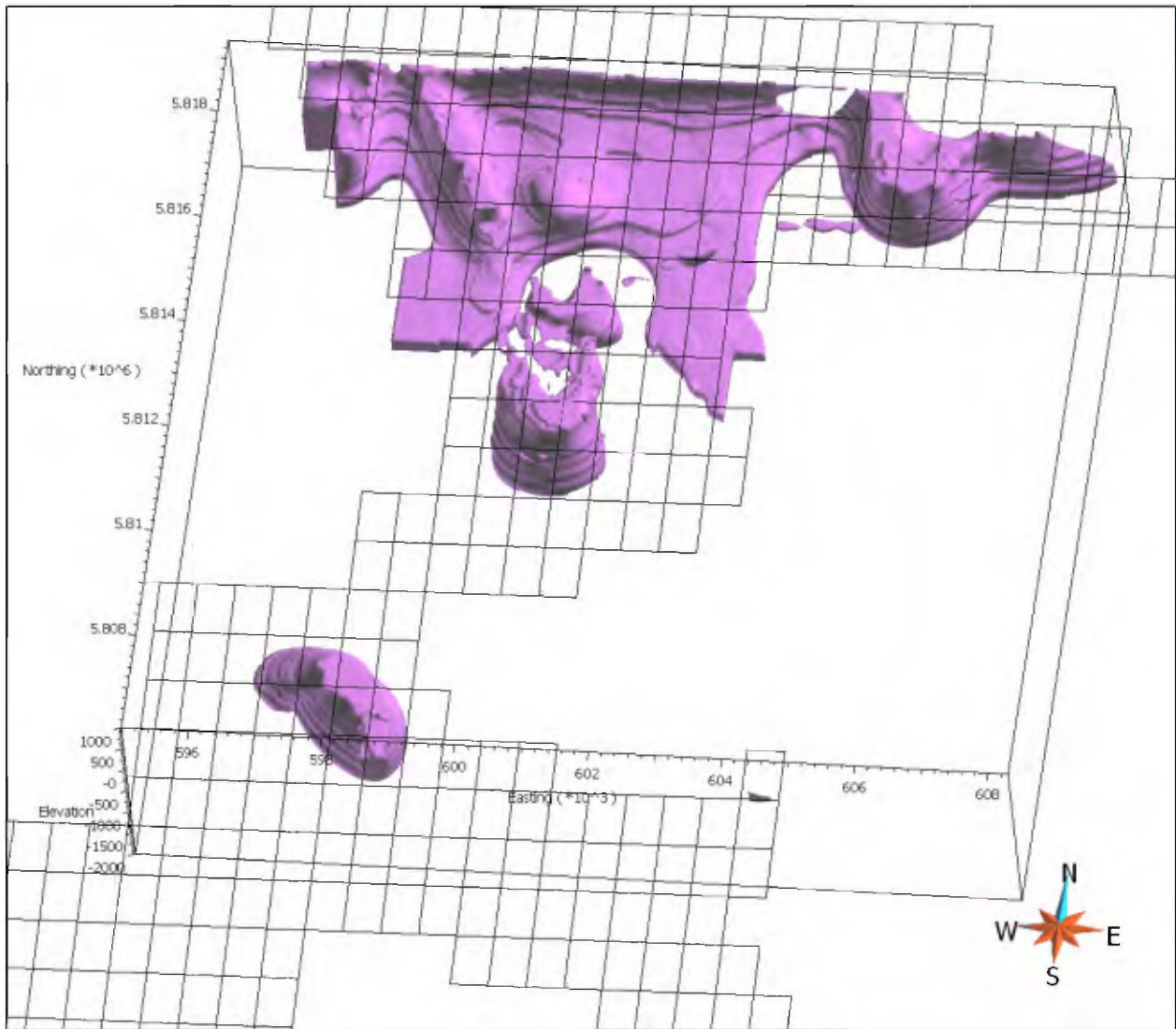
Figure 11. Observed, predicted, and residual data from Lamelee block magnetic inversion.



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**Figure 12.** East-west vertical cross-sections through the Lamelee block constrained magnetic inversion model.



**Figure 13.** Magnetic susceptibility isosurface from the Lamelee block constrained magnetic inversion model. Cut-off at 0.26 SI.

### 3.2.3. *Hobdad-Peppler Block Magnetic Inversion*

The Hobdad-Peppler block contains the Hobdad, Peppler, and Lac Jean deposits. The approximate extents of the model are 19 km x 11 km x 1 km. Cell sizes are 50 m<sup>3</sup>.

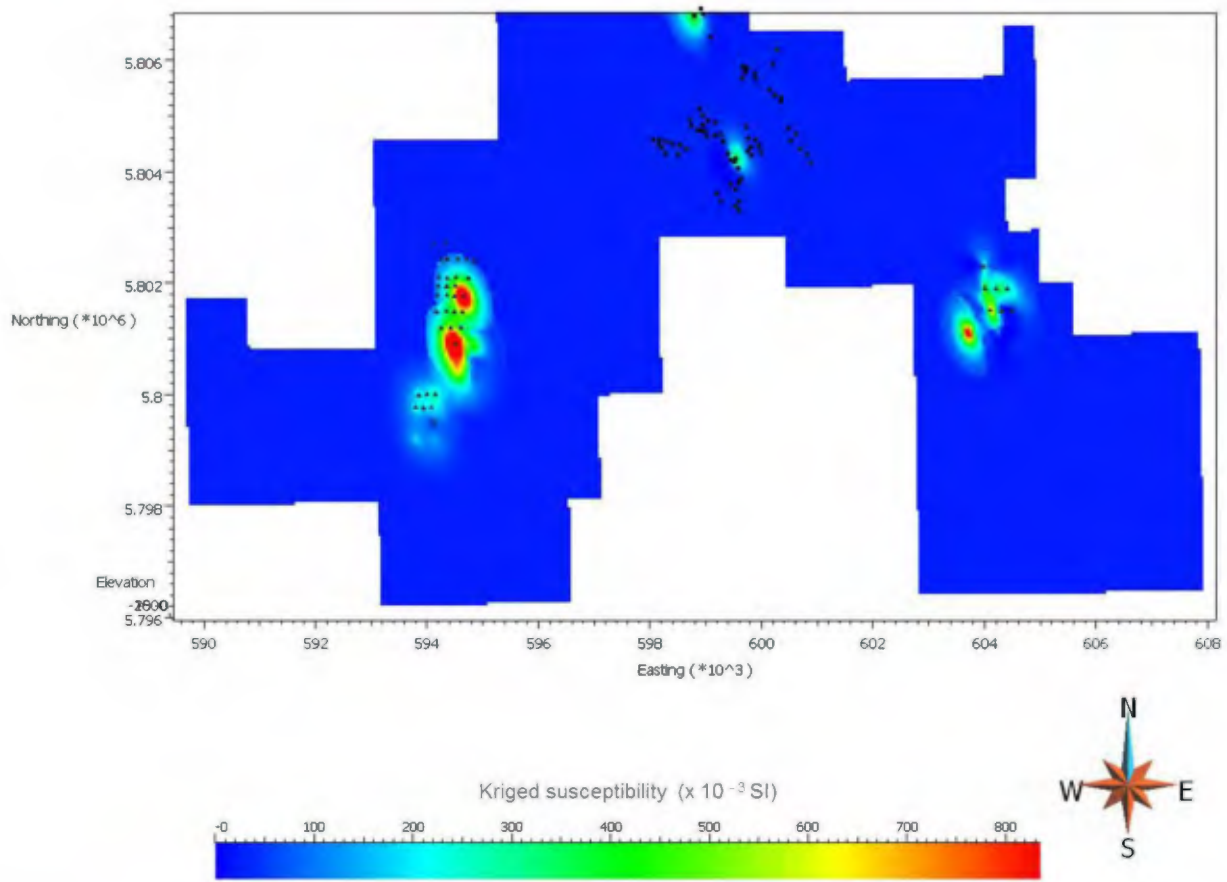
Inversion constraints for the magnetic inversion within the southern Hobdad-Peppler block are derived from borehole physical property data, estimation of susceptibility values for downhole lithology at Peppler, and estimation of susceptibility values for Lac Jean surface samples (Figure 14). Borehole magnetic susceptibility data, susceptibility data collected from hand held meters, and estimated susceptibilities for outcrop samples were interpolated onto the inversion grid using kriging methods. Beyond the extent of observed and locally interpolated data, the model attains a global mean of 0.24 SI ( $24 \times 10^{-3}$  SI), determined from apparent susceptibility modelling.

The observed and predicted data are shown in Figure 15. Again, magnetic remanence is considered to be the reason for the high misfit between observed and predicted magnetic data over the high susceptibility source bodies in the Hobdad, Peppler and Lac Jean deposit areas. Although the inversion models are deemed acceptable for purposes of mineral potential modelling, more advanced inversion modelling is required to resolve remanence issues. This is discussed further in section 3.4.

Hobdad-Peppler block inversion results are shown in figures 16 and 17.



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**Figure 14.** Kriged magnetic susceptibility data from Hobdad and Pepler borehole surveys, and Lac Jean surface samples. Global mean determined from apparent susceptibility modelling.



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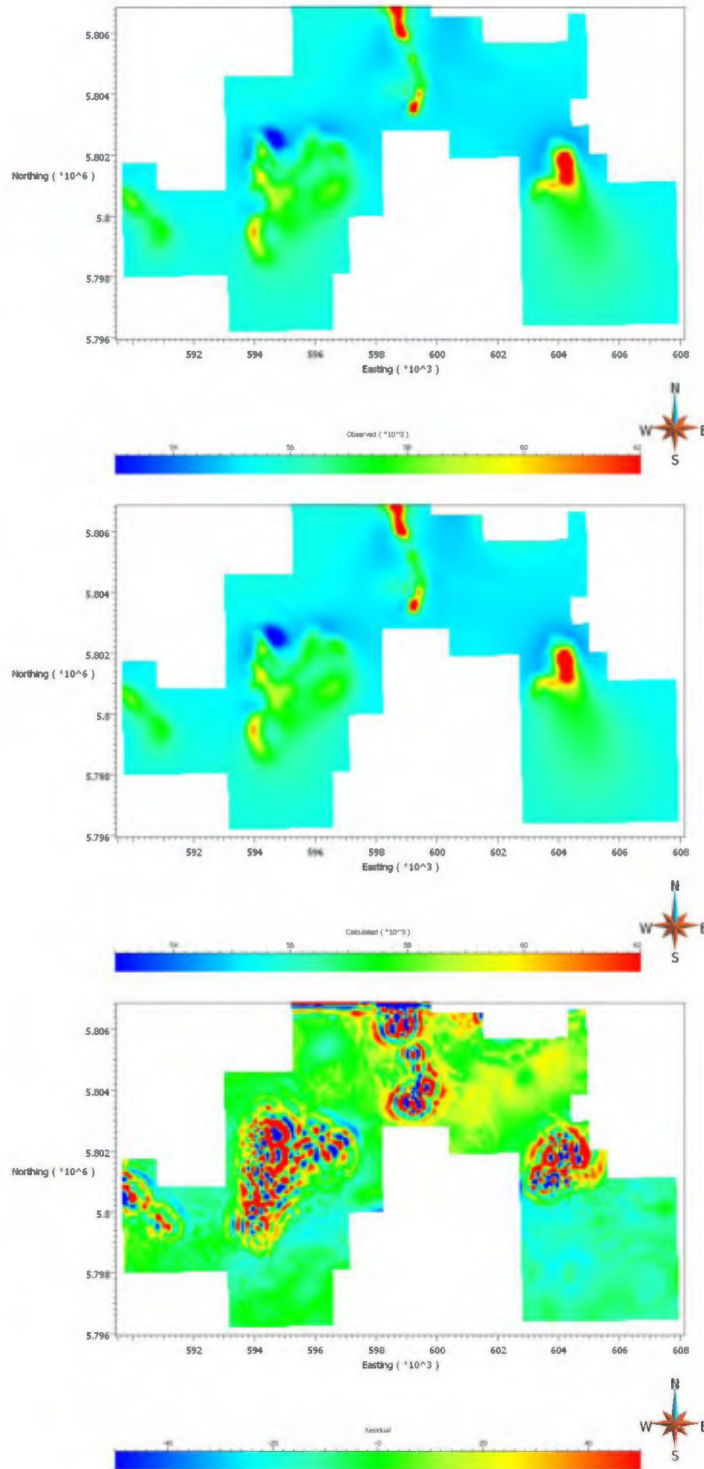
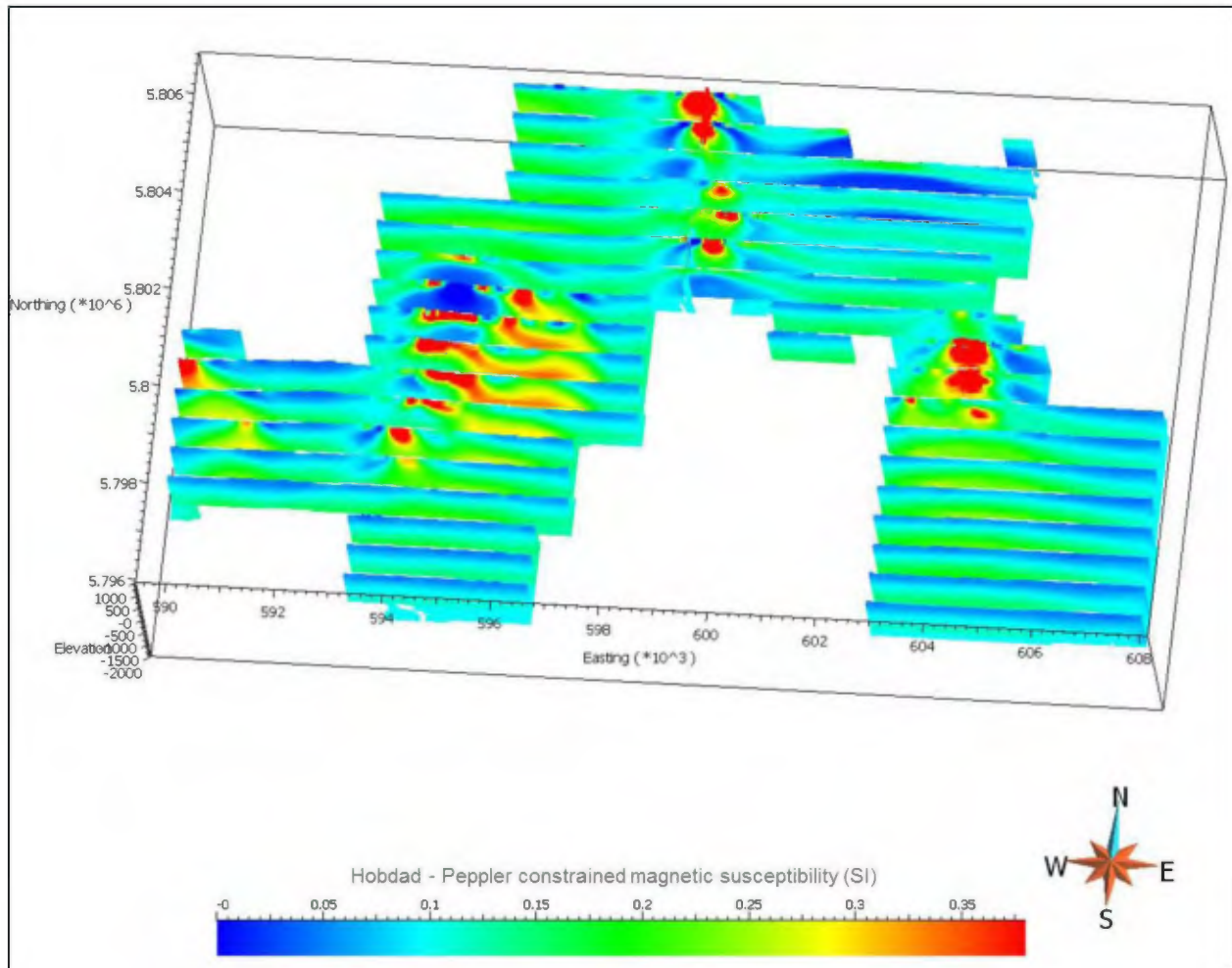


Figure 15. Observed, predicted, and residual data from the Hobdad-Pepler block magnetic inversion.



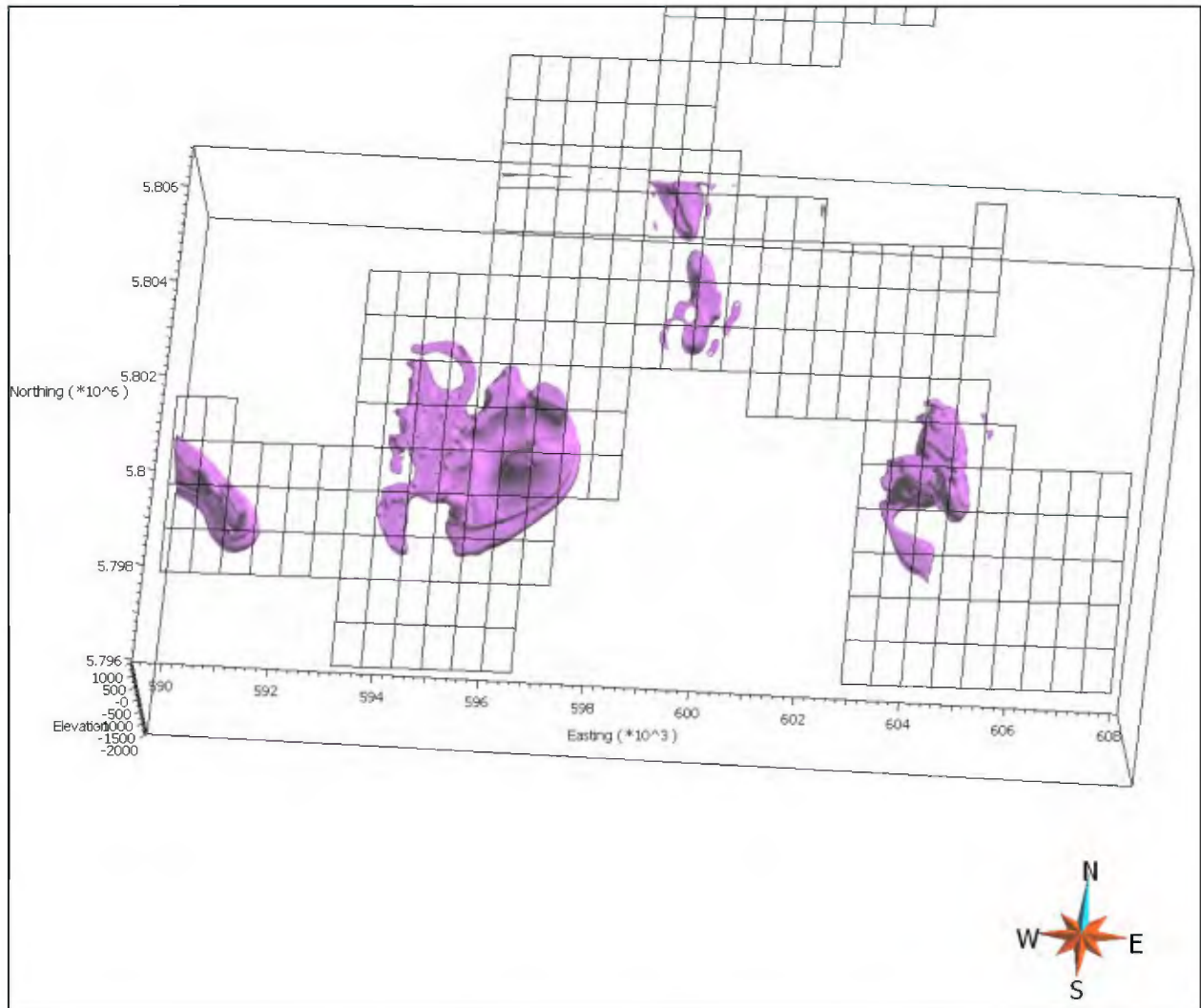
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**Figure 16.** East-west vertical cross-sections through the Hobdad-Peppler block constrained magnetic inversion model.



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**Figure 17.** Magnetic susceptibility isosurface from the Hobdad-Pepler block constrained magnetic inversion model. Cut-off at 0.24 SI.

#### 3.2.4. *Northern Claims Block Magnetic Inversion*

The Northern Claims block encompasses Cliffs Natural Resources claims north of the Lamelee deposit. No borehole or surface sample data were available for constraining inversions. The starting background susceptibility value from Lamelee,  $0.058 (58 \times 10^{-3} \text{ SI})$  was used to keep the inversion background values consistent across the two areas.

The observed and predicted data are shown in Figure 18. Again, high residuals over known high susceptibility iron ore bodies indicate difficulty in predicting observed magnetic data due to the presence of magnetic remanence.

Northern Claims inversion results are shown in figures 19 and 20.



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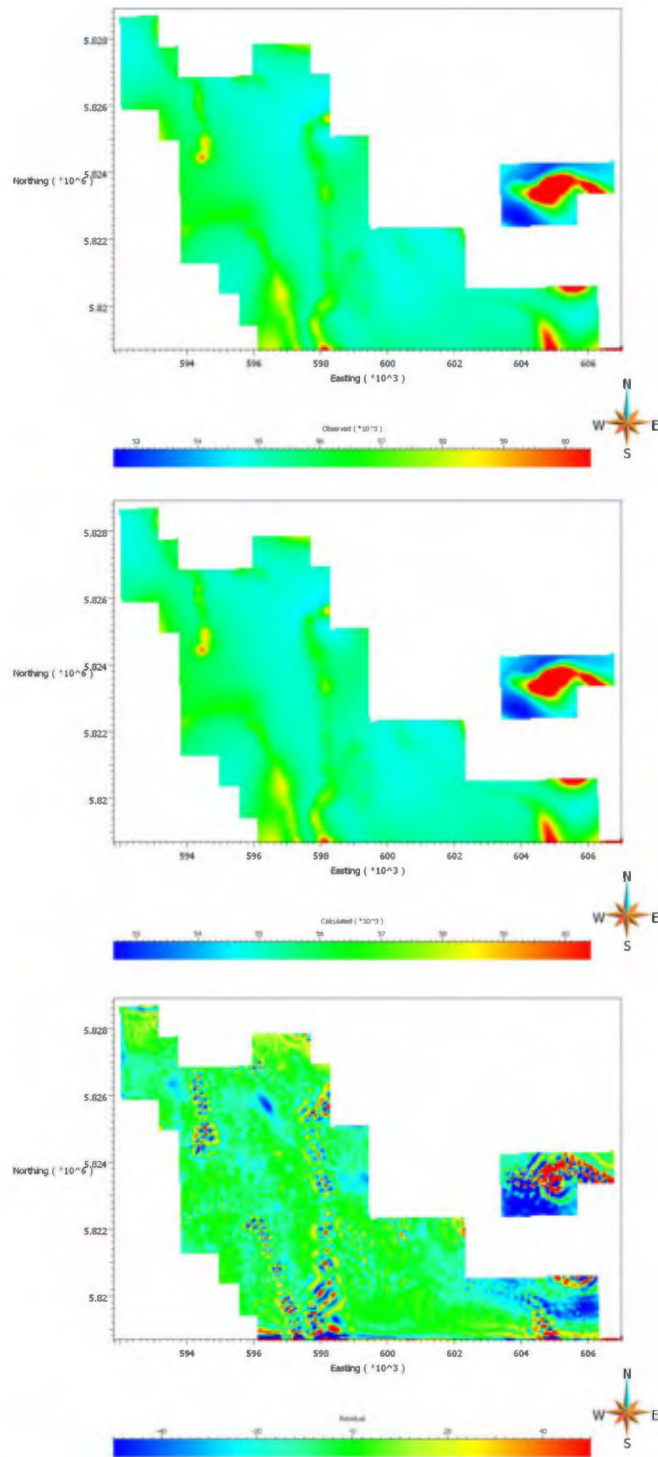
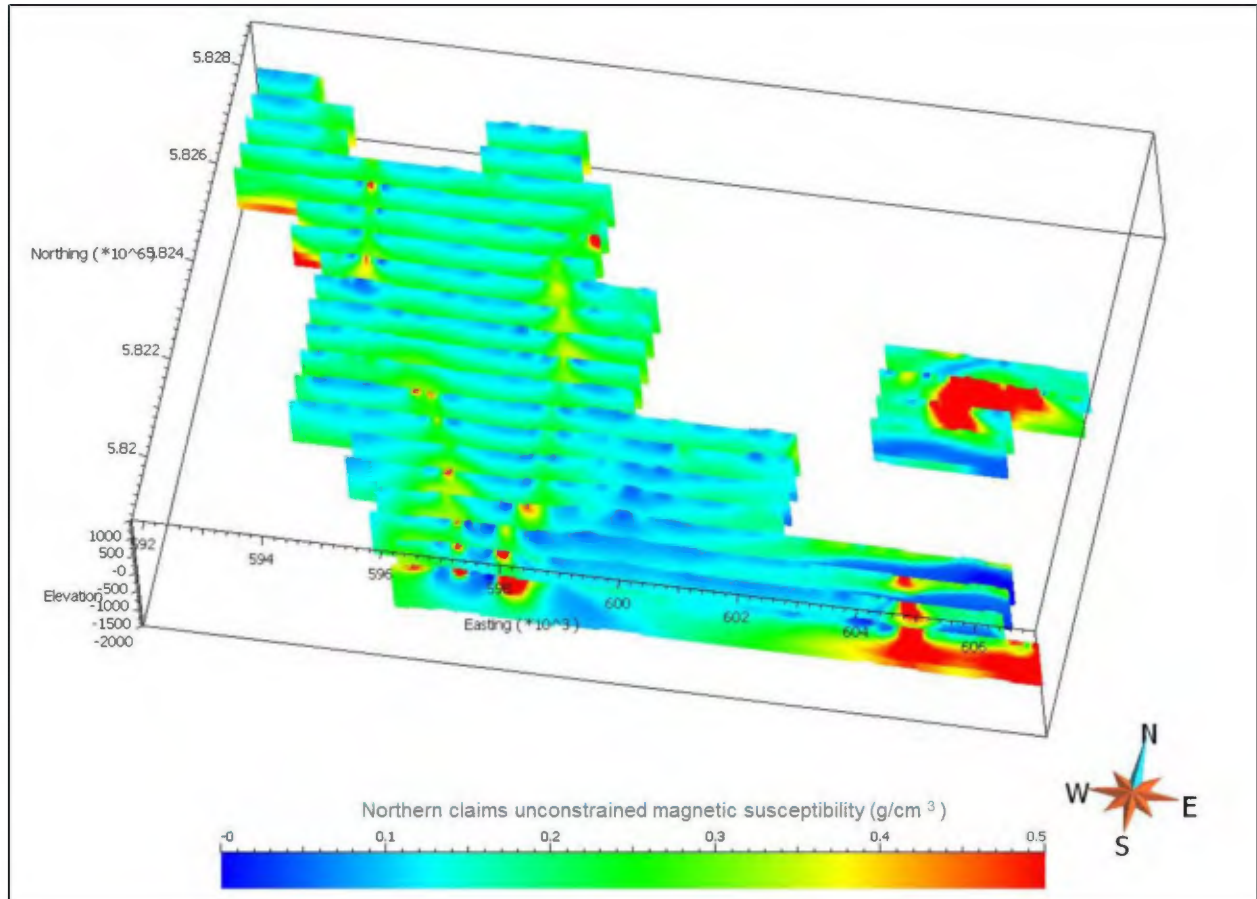


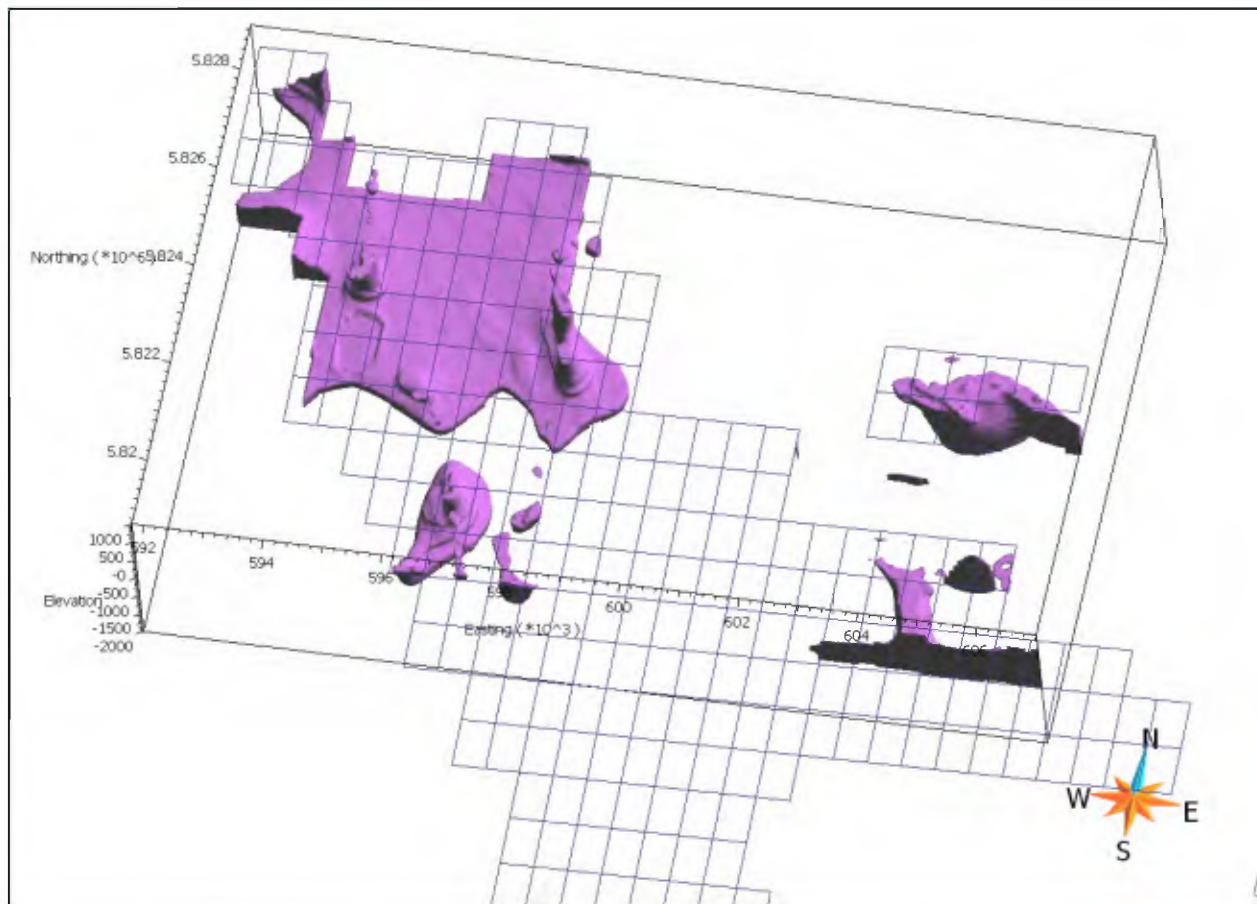
Figure 18. Observed versus predicted data from the Northern Claims block magnetic inversion.



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**Figure 19.** East-west vertical cross-sections through the Northern Claims block constrained magnetic inversion model.



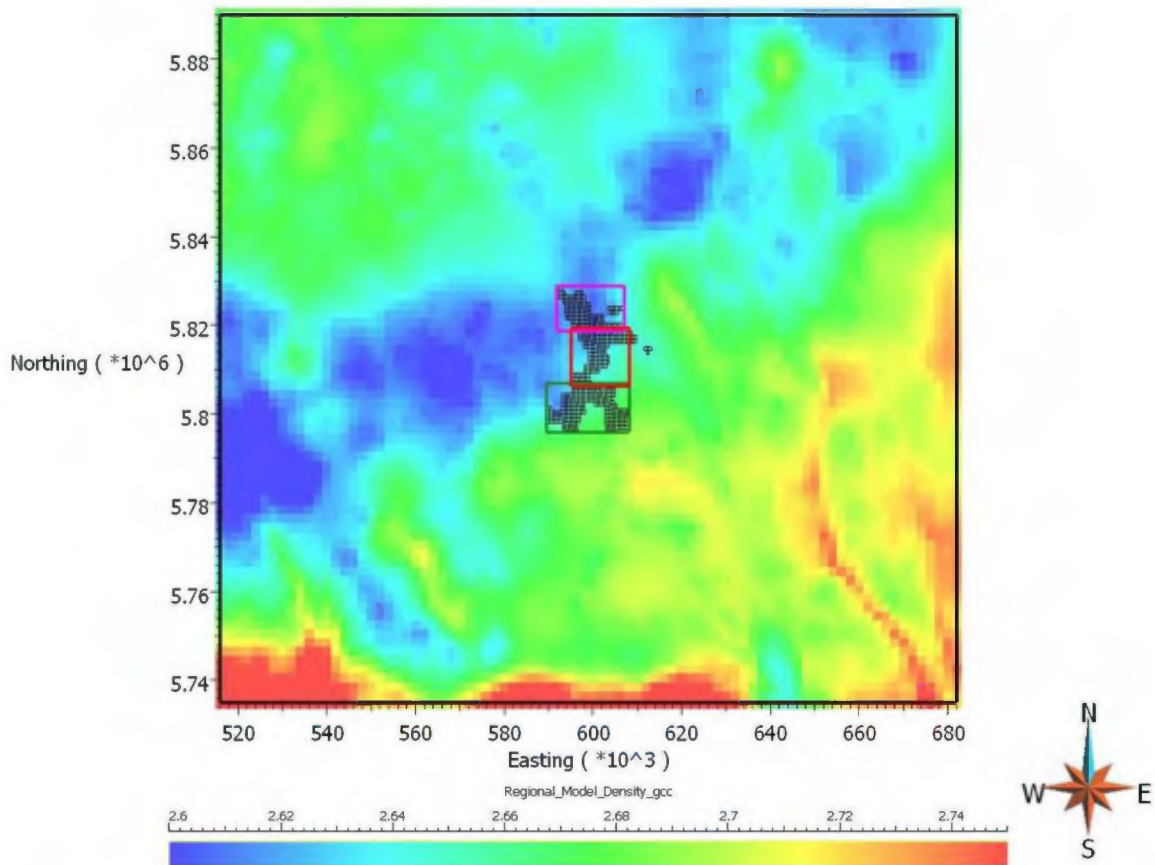
**Figure 20.** Magnetic susceptibility isosurface from the Northern Claims block constrained magnetic inversion model. Cut-off at 0.32 SI.

### 3.3. 3D Gravity Gradiometry Data Inversion

#### 3.3.1. *Regional Density Modelling*

Regional density anomalies were taken into account using publicly available Natural Resources Canada gravity data surrounding the project area. The regional models consider an area extending at least 60 km away from the borders of the three local inversion blocks.

Gravity data were inverted to produce a regional apparent density model (lateral variations only, Figure 21), and the response of the regional model was taken into account during gravity inversion at the project scale.



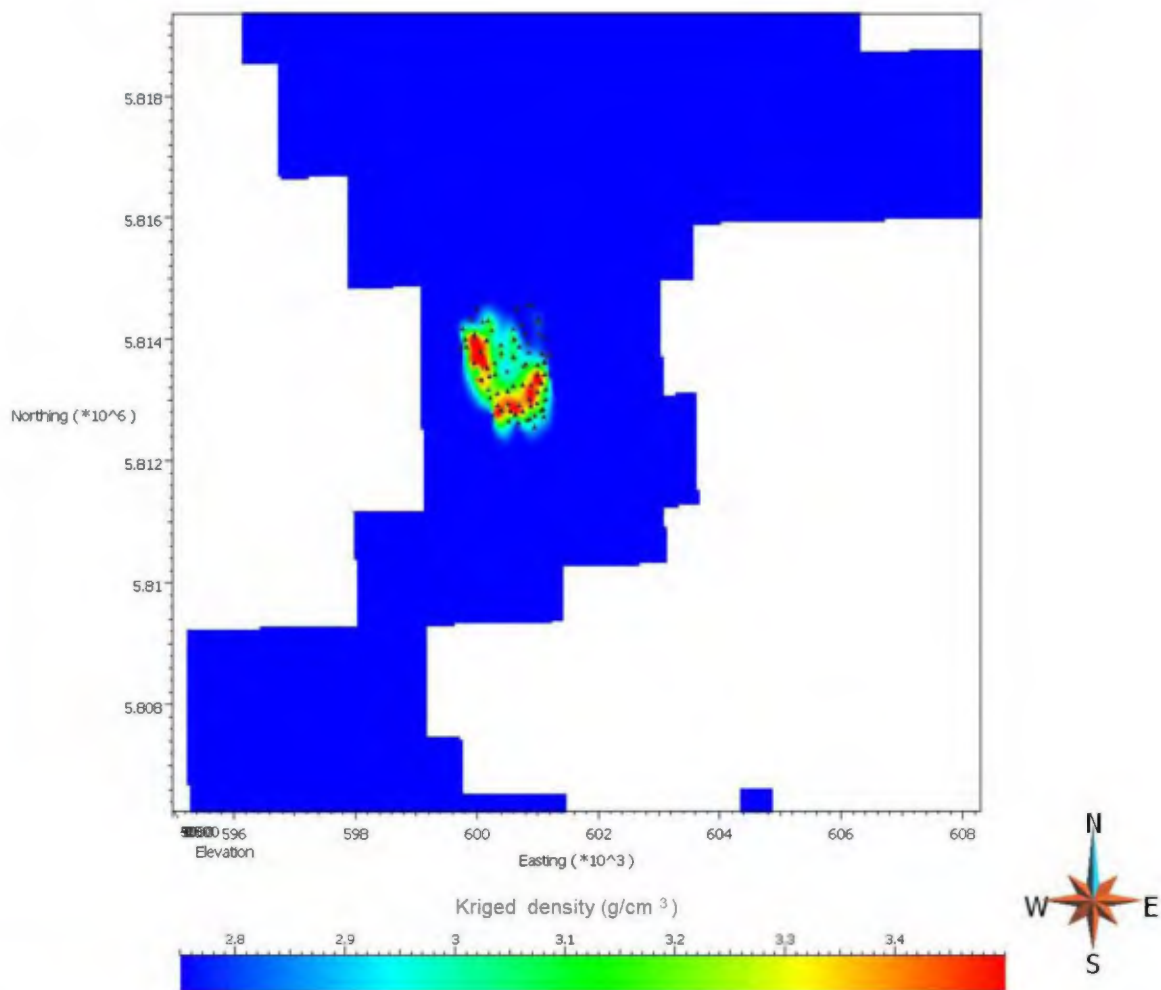
**Figure 21.** Regional scale apparent density model calculated from Natural Resources Canada gravity data.

### 3.3.2. *Lamelee Block Gravity Inversion*

Borehole density data were compiled and used as constraints for density modelling. Borehole density was interpolated onto the inversion grid using kriging methods (Figure

22). Beyond the extent of observed and locally interpolated data, the model attains a global mean of  $2.66 \text{ g/cm}^3$  determined from apparent density modelling.

Major lakes were modelled using lake outlines and lake sediment sample depths, and were included in the density models to take into account the effect of the mass of water.



**Figure 22.** Kriged density data from Lamelee borehole surveys. Global mean determined from apparent density modelling.

The VPmg inversion workflow used for all gravity inversions for this project is outlined in Figure 23. As for magnetic modelling, inversion begins with a laterally varying basement inversion (regional apparent density modelling from section 3.3.1.) which is completed to model deep or more regional gravity sources. After this, a 3D heterogeneous density model is sought which honors constraining information and suitably predicts the observed gravity data. The inversion process is iterative, and starts with modelling the vertical component of gravity, GDD, to calculate a preliminary result, as most of the gravity signal is contained in the vertical component. This preliminary density model is further refined, and the data misfit is then further reduced through modelling of all airborne gravity gradiometer components. The data predicted by the final Lamelee block gravity inversion versus the observed data are shown in Figure 24.

The Lamelee gravity inversion results are shown in figures 25 and 26. Several cross-sections indicate the depth and 3D extents of the high density bodies related to known iron formation (figures 27 and 28).

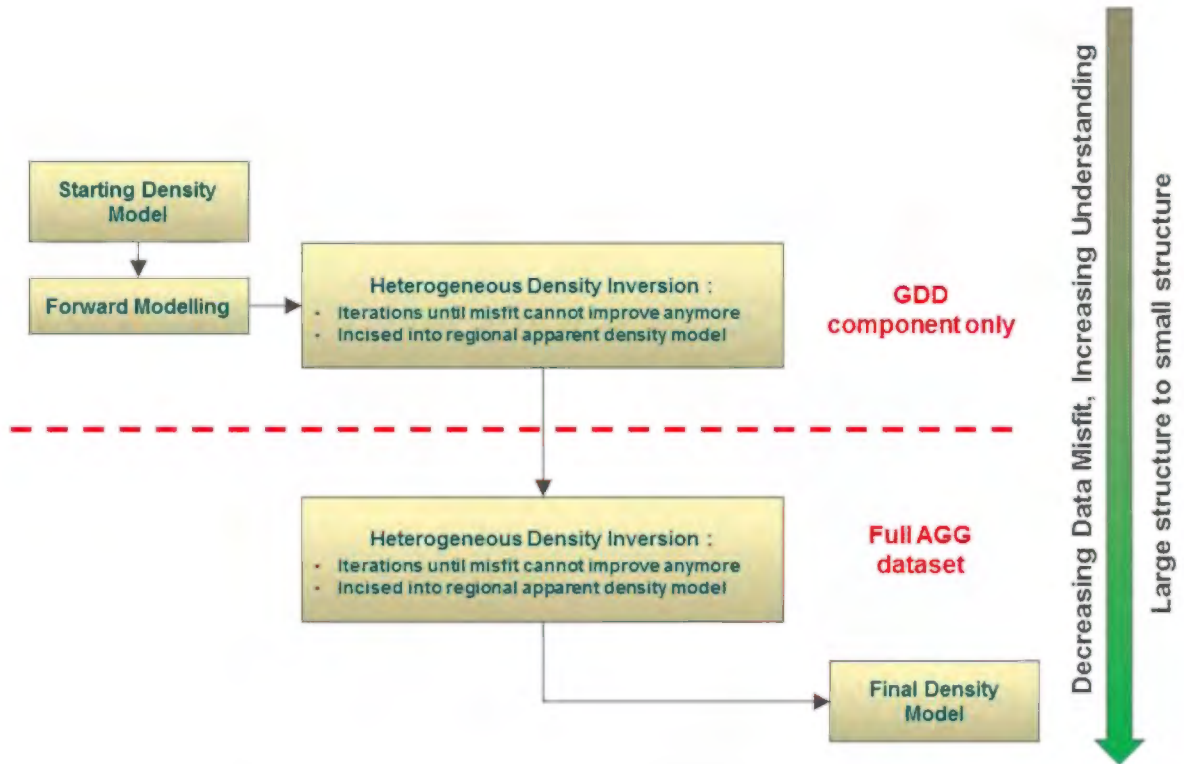


Figure 23. VPmg gravity gradiometry inversion workflow.



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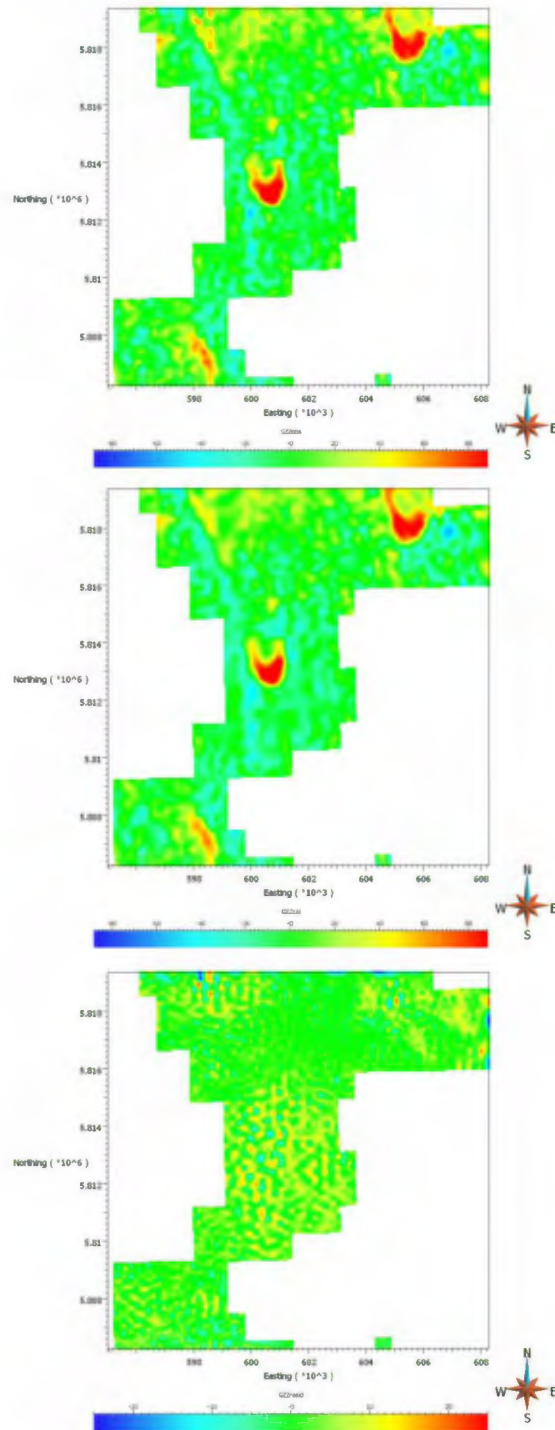
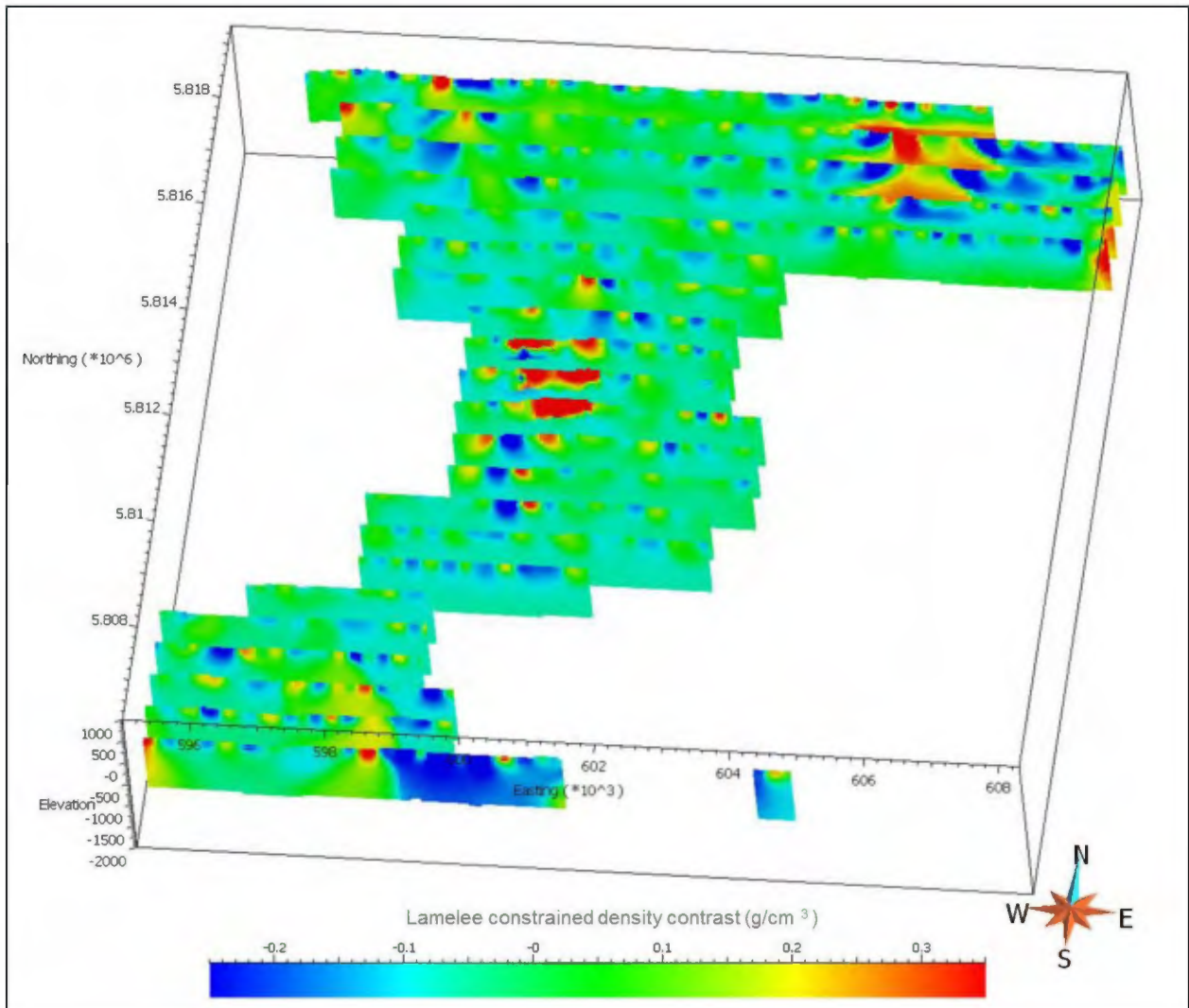
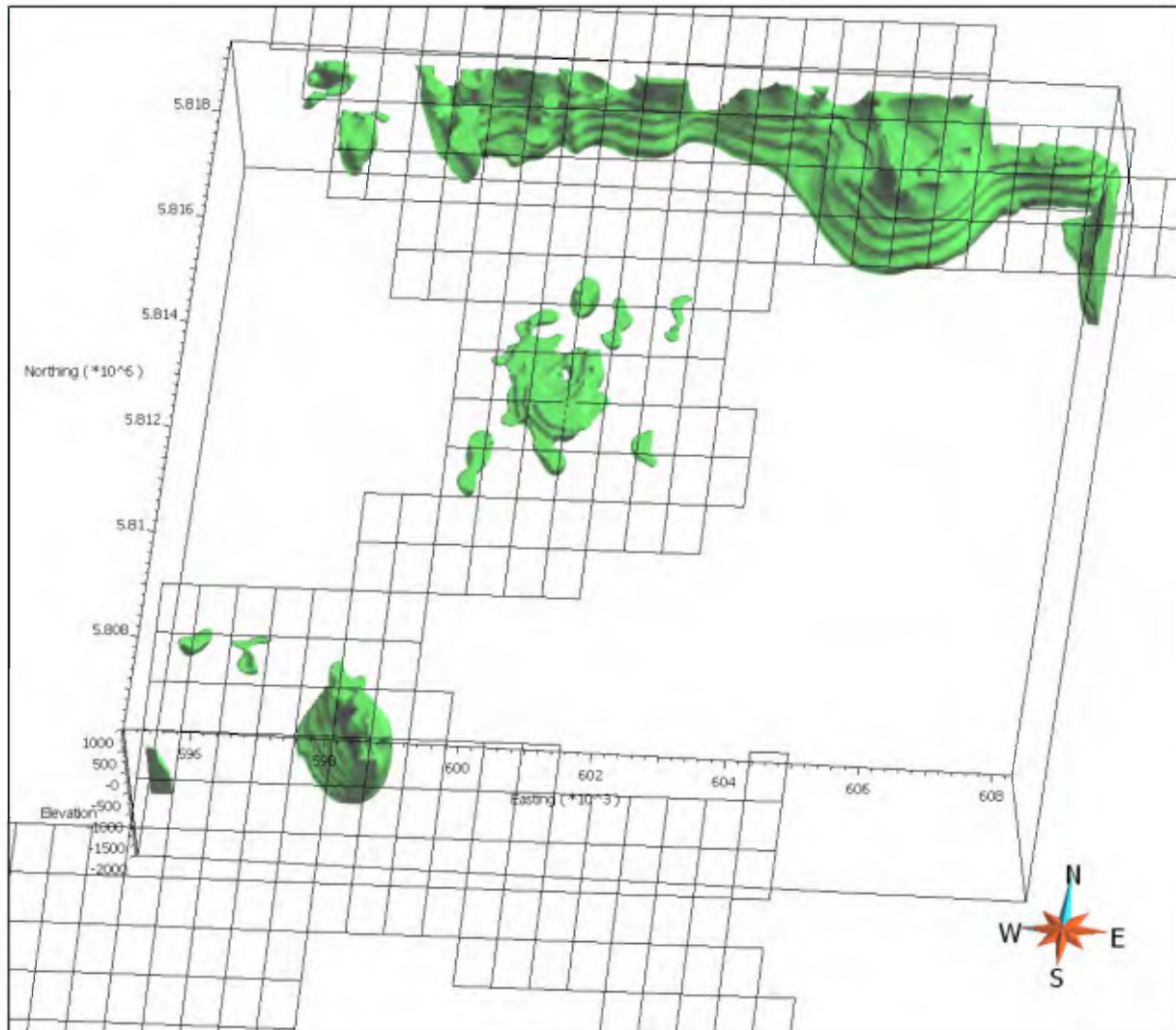


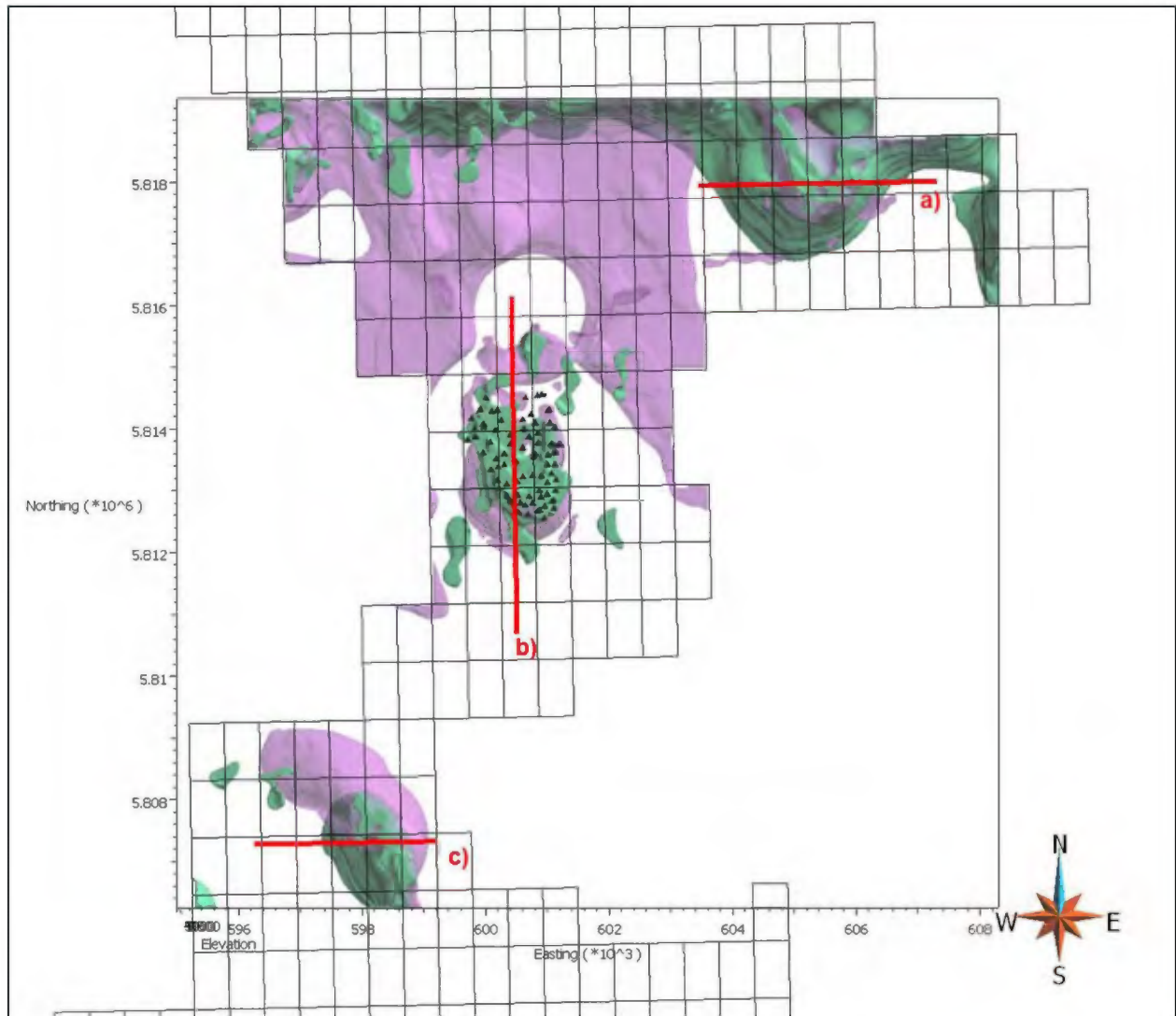
Figure 24. Observed, predicted, and residual data from Lamelee block gravity inversion.



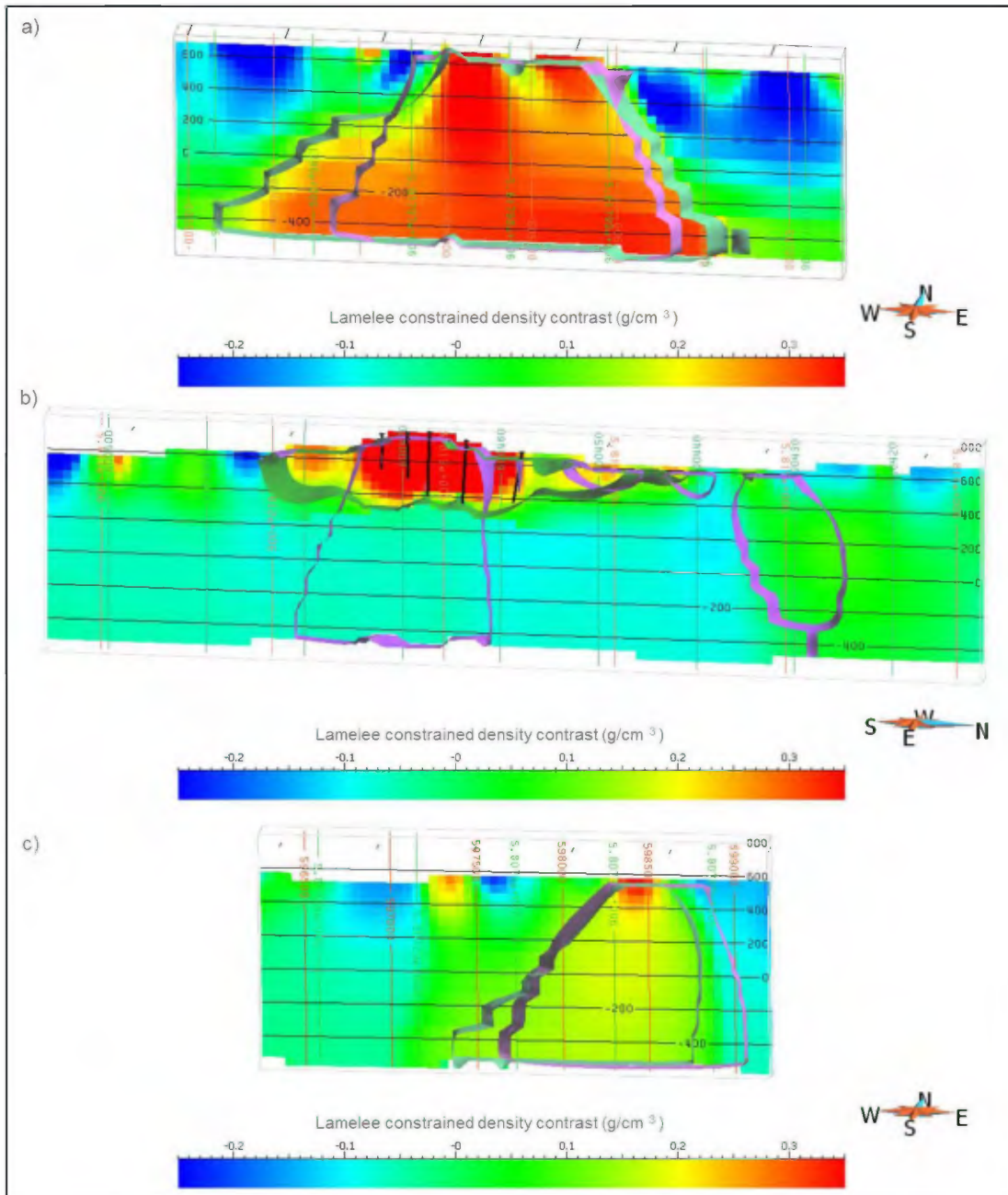
**Figure 25.** East-west vertical cross-sections through the Lamelee block constrained gravity inversion model.



**Figure 26.** Density isosurface from the Lamelee block constrained gravity inversion model. Density contrast cut-off at  $0.12 \text{ g/cm}^3$  (density of  $2.78 \text{ g/cm}^3$ ).



**Figure 27.** Plan view of Lamelee block showing high magnetic susceptibility (purple) and high density (green) isosurfaces. Red lines are locations of cross-sections in Figure 28. Black tetrahedra are drill hole collars.

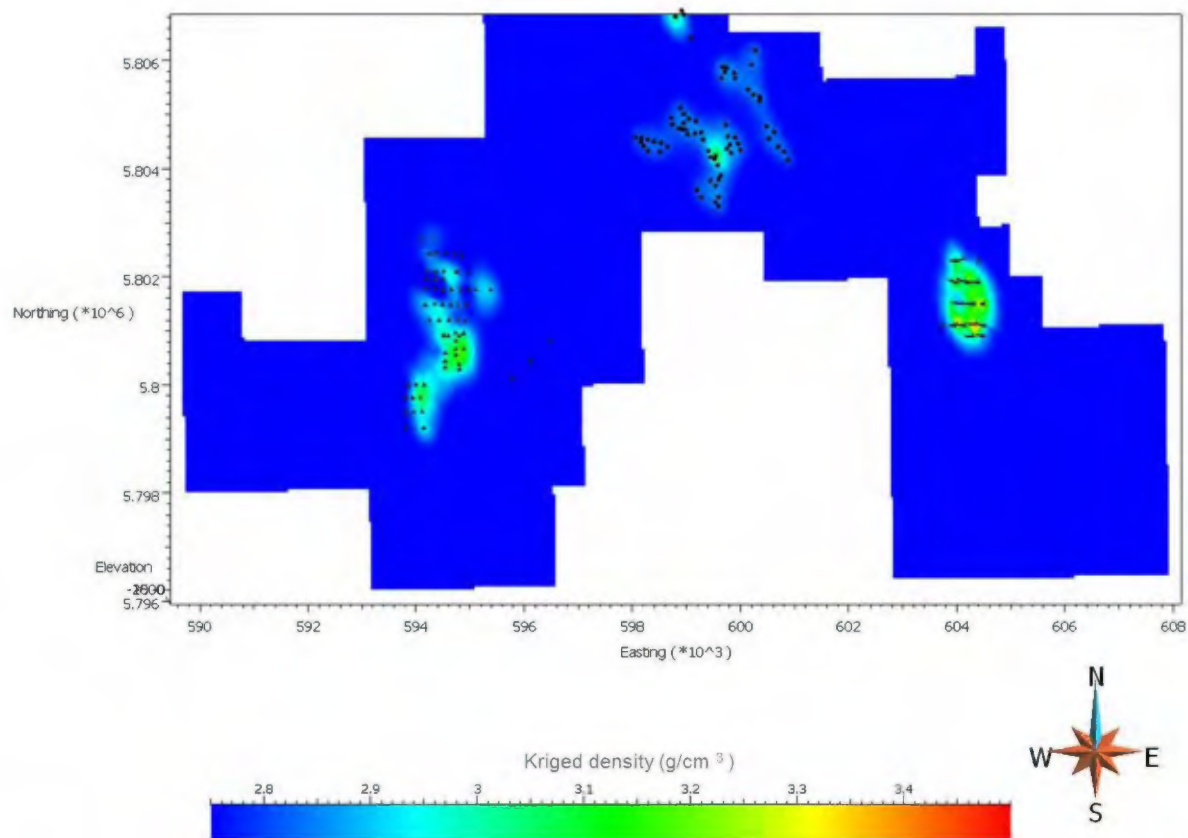


**Figure 28.** Cross-sections through the Lamellee block 3D density model, with density (green) and susceptibility (purple) isosurfaces. Section a) crosscuts correlated high density and high susceptibility features in the northeast part of the model. Section b) through the Lamellee deposit shows a shallow high density body correlated with a high susceptibility body that extends to depth. Section c) shows a generally correlated high susceptibility and high density body extending to depth and dipping steeply to the west.

### 3.3.3. *Hobdad-Peppler Block Gravity Inversion*

Borehole density data, and estimated densities for outcrop samples and logged lithology were used as constraints for gravity inversion, and were interpolated onto the inversion grid using kriging methods (Figure 29). Beyond the extent of observed and locally interpolated data, the model attains a global mean of  $2.68 \text{ g/cm}^3$  determined from apparent density modelling.

The observed and predicted gravity data are shown in Figure 30. Inversion results are shown in figures 31 and 32, with cross-sections through the model in the Hobdad and Peppler deposit areas are depicted in figures 33 and 34.



**Figure 29.** Kriged density data from Hobdad and Peppler borehole surveys, and Lac Jean surface samples. Global mean determined from apparent density modelling.



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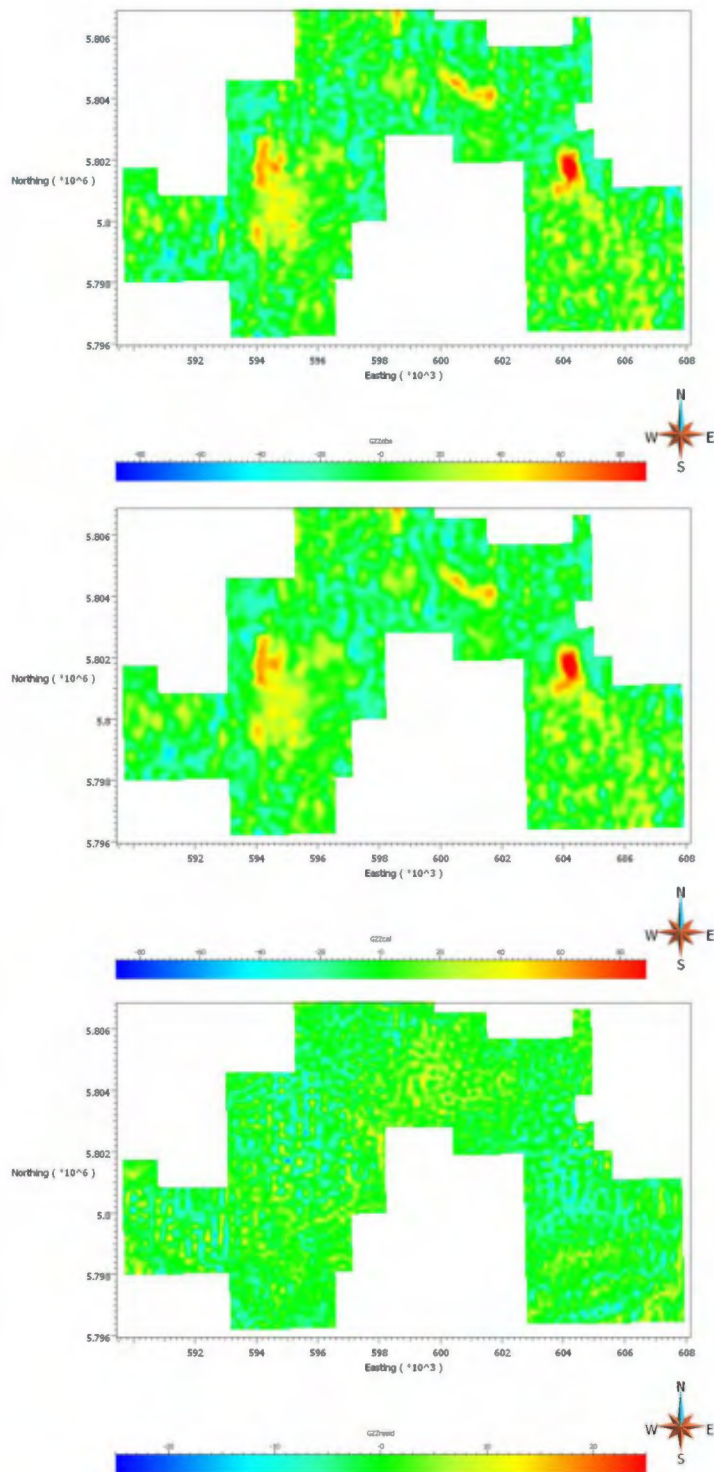
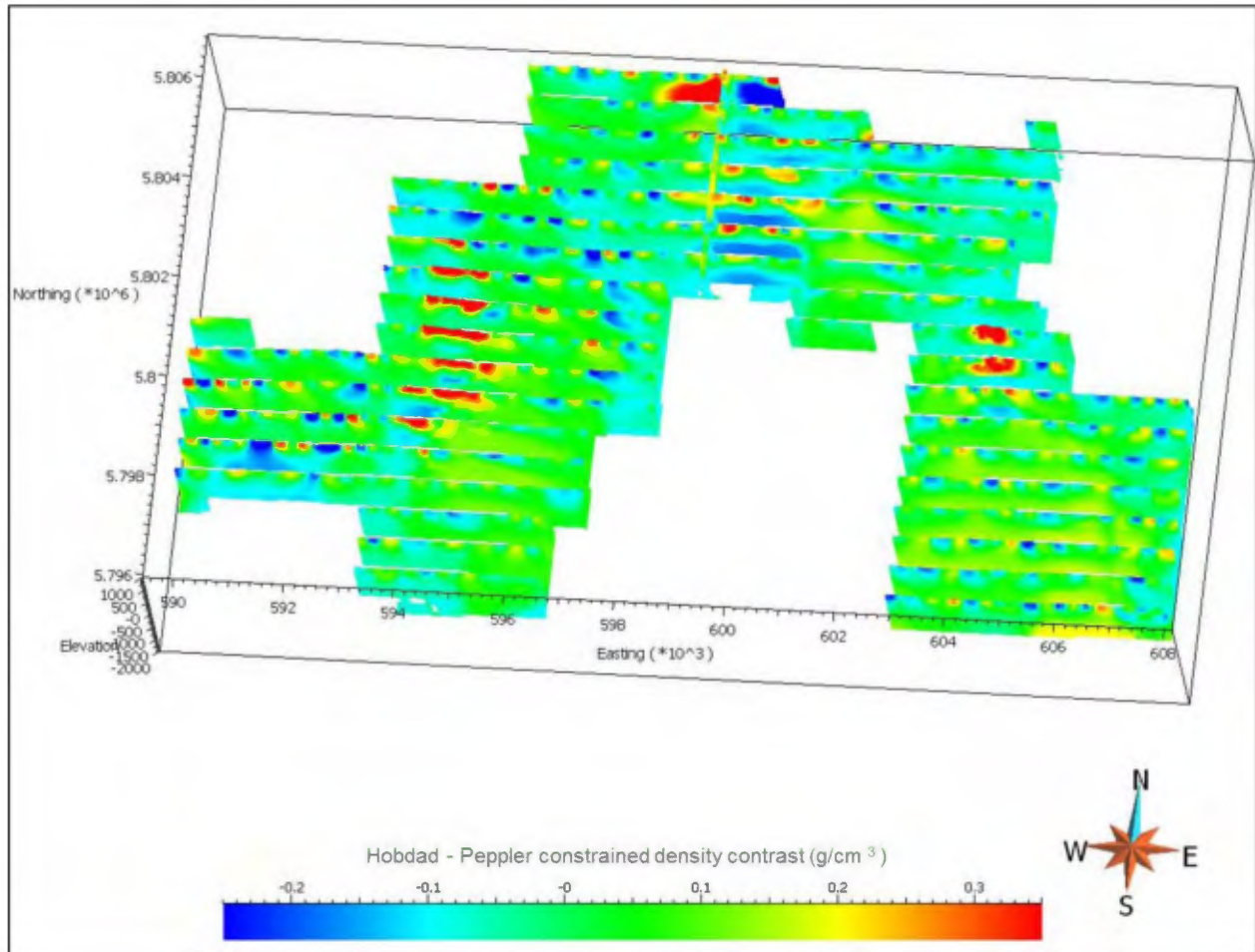


Figure 30. Observed, predicted, and residual data from the Hobdad-Pepler block gravity inversion.



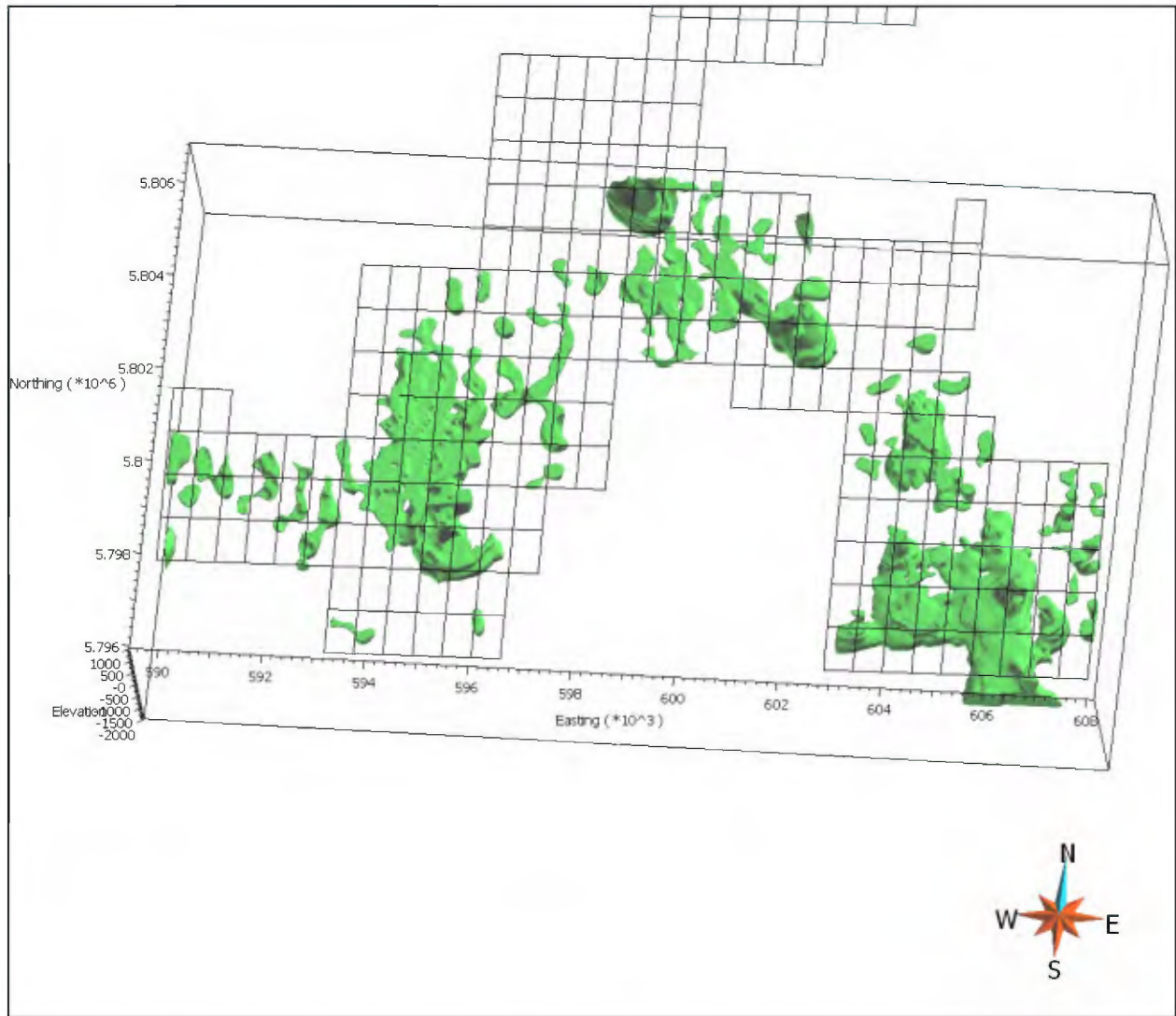
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**Figure 31.** East-west vertical cross-sections through the Hobdad-Peppler block constrained gravity inversion model.



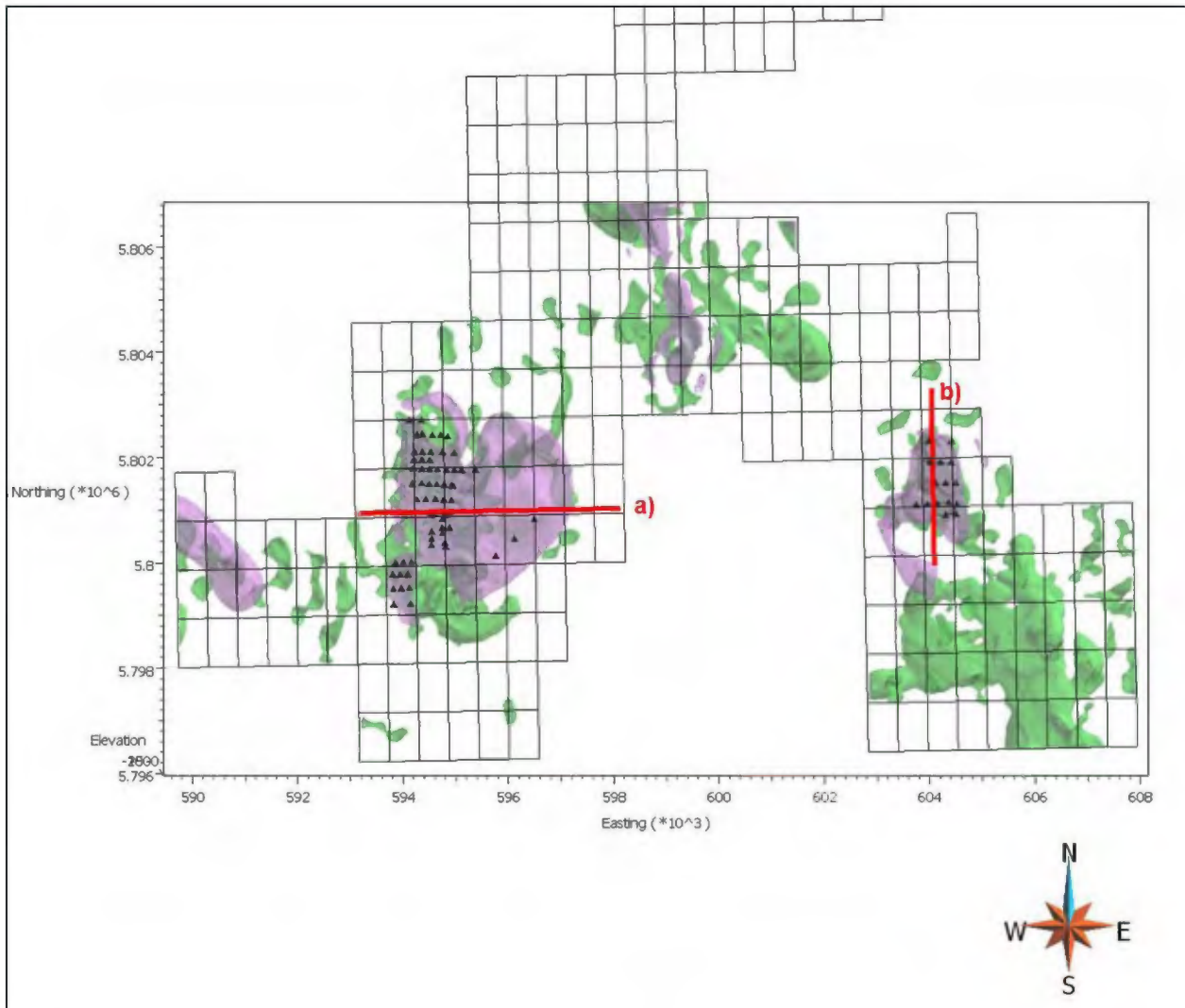
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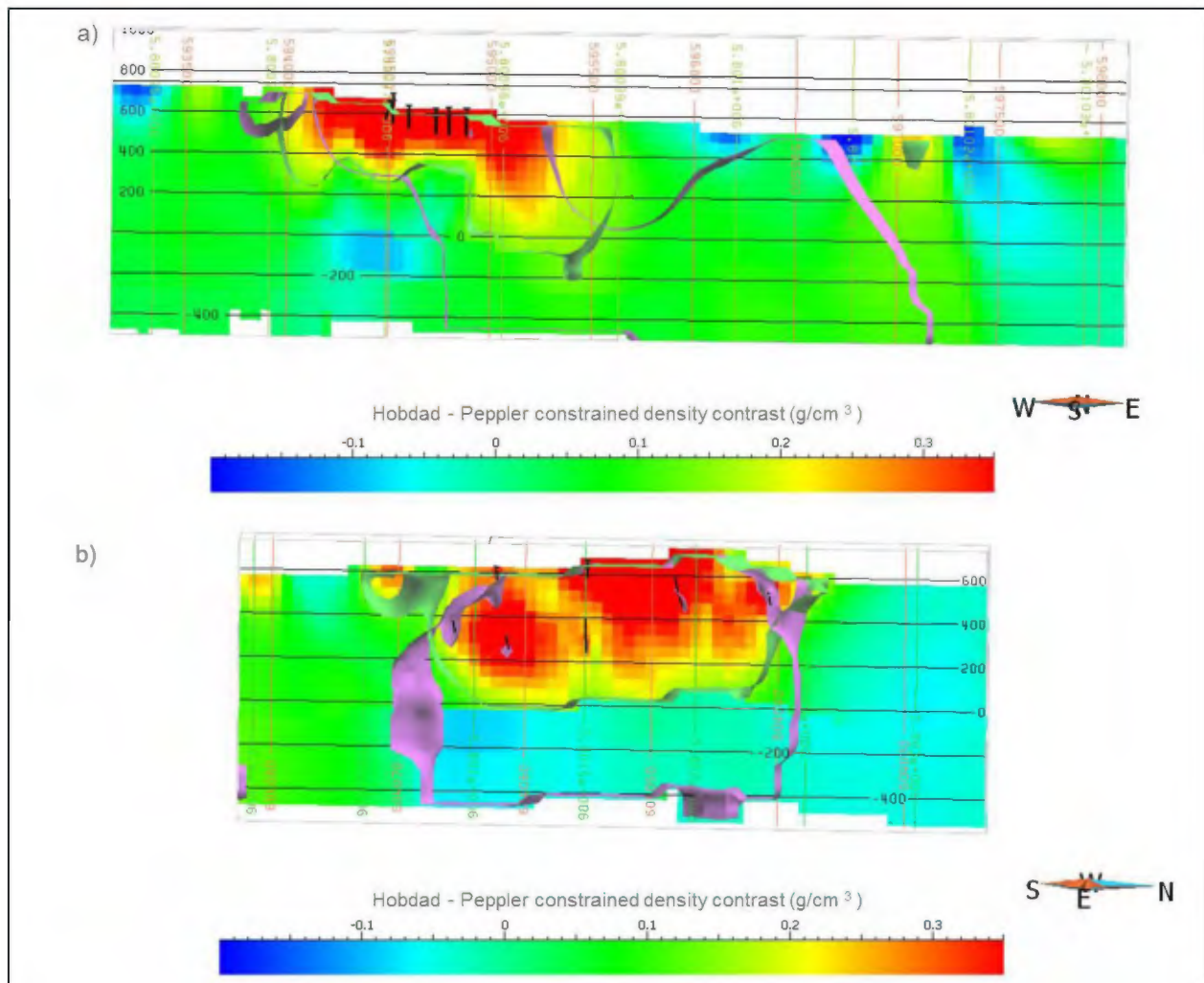
**Figure 32.** Density isosurface from the Hobdad-Pepler block constrained gravity inversion model. Density contrast cut-off at  $0.12 \text{ g/cm}^3$  (density of  $2.80 \text{ g/cm}^3$ ).



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**Figure 33.** Plan view of Hobdad-Pepler block showing high magnetic susceptibility (purple) and high density (green) isosurfaces. Red lines are locations of cross-sections in Figure 34. Black tetrahedra are drill hole collars.



**Figure 34.** Cross-sections through the Hobdad-Peppier block 3D density model, with density (green) and susceptibility (purple) isosurfaces. Section a) through the Peppier deposit shows a shallow high density body correlated with high susceptibilities. High susceptibilities continue to the east and extend to depth. Section b) through the Hobdad deposit shows a shallow high density body correlated with a high susceptibility body that extends to depth.

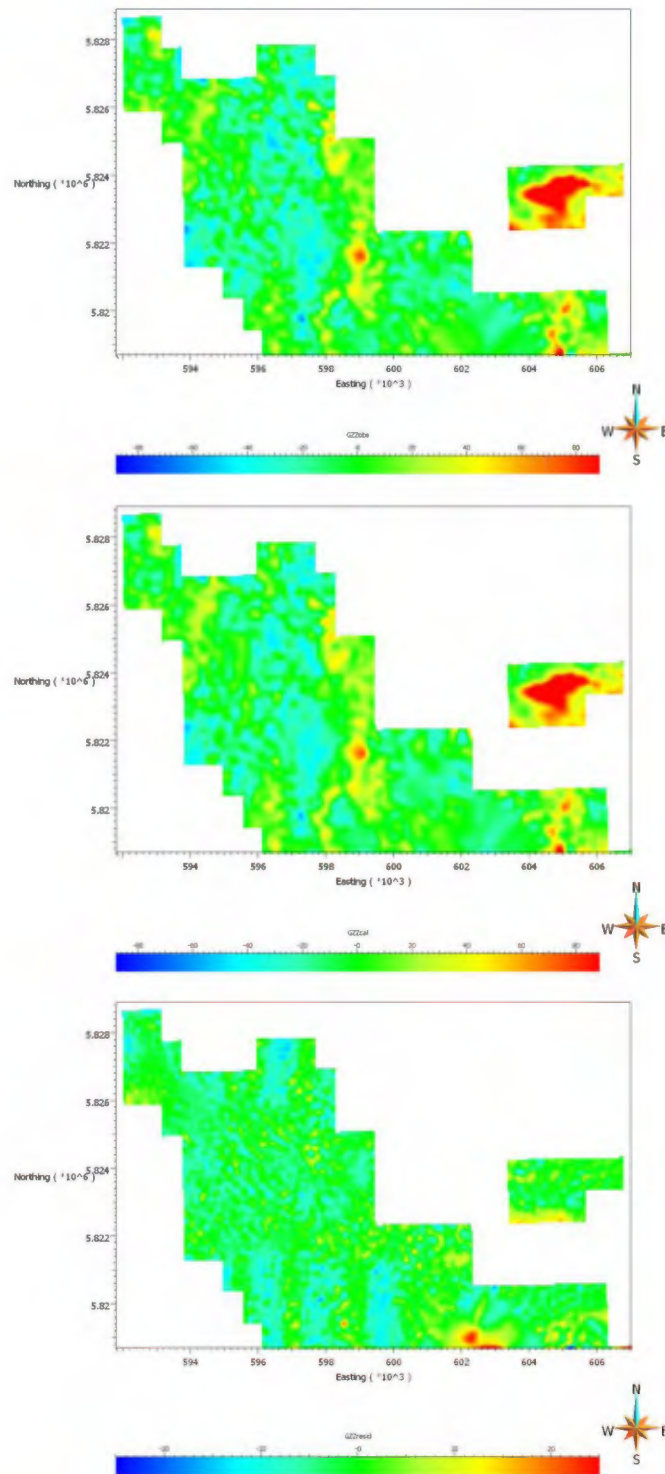
#### 3.3.4. *Northern Claims Block Gravity Inversion*

No borehole or surface sample data were available for constraining inversions in the Northern Claims block. The starting background density value from Lamelee,  $2.66 \text{ g/cm}^3$  was used to keep the inversion background values consistent across the two areas.

The observed and predicted gravity data are shown in Figure 35. Inversion results are shown in figures 36 and 37.



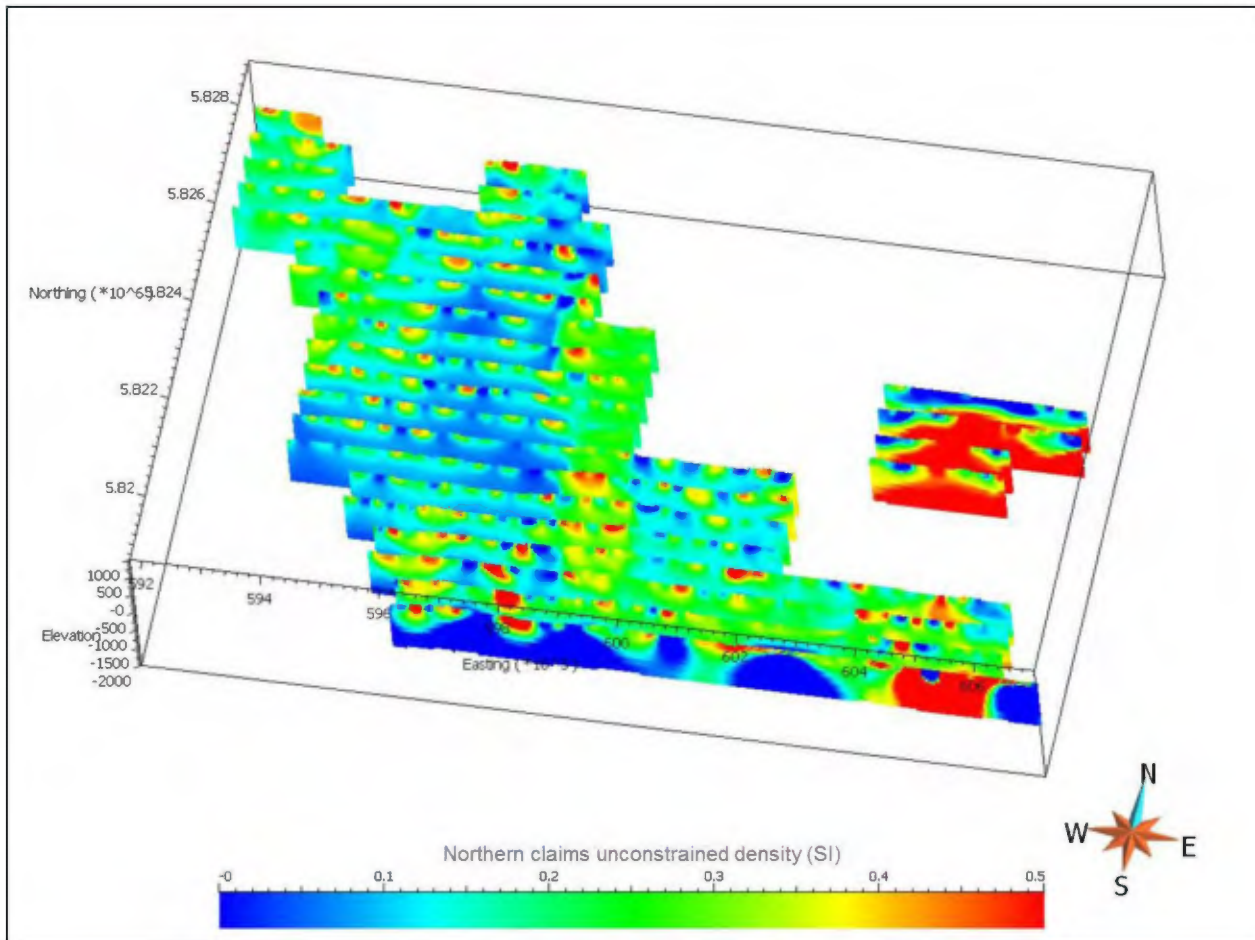
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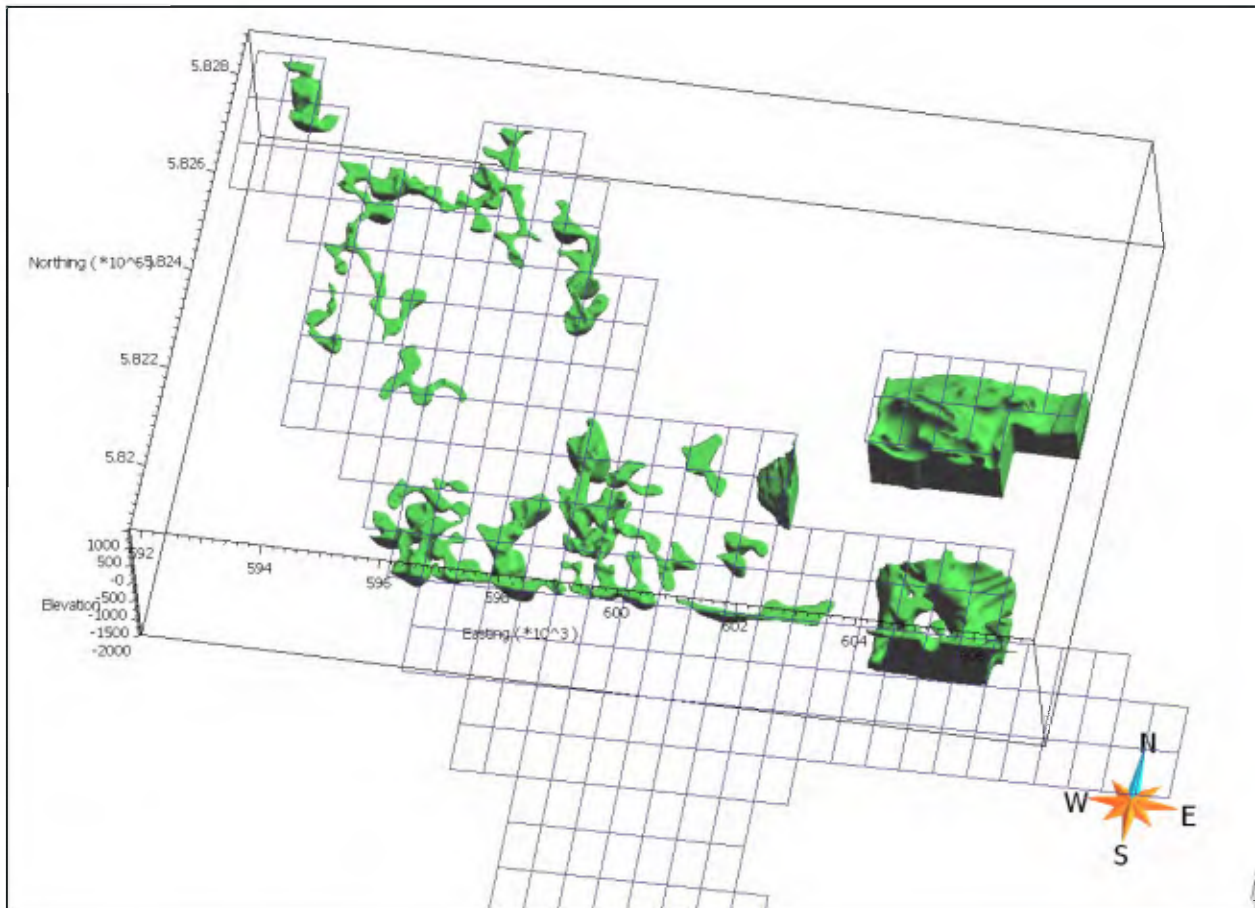
**Figure 35.** Observed, predicted, and residual data from the Northern Claims block gravity inversion.



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**Figure 36.** East-west vertical cross-sections through the Northern Claims block constrained gravity inversion model.



**Figure 37.** Density isosurface from the Northern Claims block constrained gravity inversion model. Density cut-off at  $0.12 \text{ g/cm}^3$  (density of  $2.78 \text{ g/cm}^3$ ).

### 3.4. Inversion Modelling Limitations

Modelling magnetic data in this region involved significant challenges due to the very high susceptibilities of magnetite-bearing iron formation resulting in self demagnification. Additional difficulties in modelling were encountered due to the extreme contrasts between susceptibilities of background geology and magnetite-bearing iron formation. Magnetic data may therefore not be directly representative of the susceptibility of the causative sources, which is the default assumption of the inversion algorithms used here, but is affected by secondarily induced magnetic fields which may oppose the



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primary inducing magnetic fields, reducing the total magnetic response. Because of these issues, it is difficult to determine what the true susceptibility of the source is. VPmg inversion algorithms are capable of resolving effects of self-demagnetization, however the refined solutions are very computationally demanding. Intense remanence is also suspected to occur within iron formation in the project area. Ancient magnetic fields recorded in the rock can also lead to magnetic data observations that do not match the susceptibilities expected for the source rock. VPmg can be applied to solve remanence problems, however, remanent magnetic data from oriented rock samples are necessary for constraining the modelling.

## 4. 3D Mineral Potential Modelling

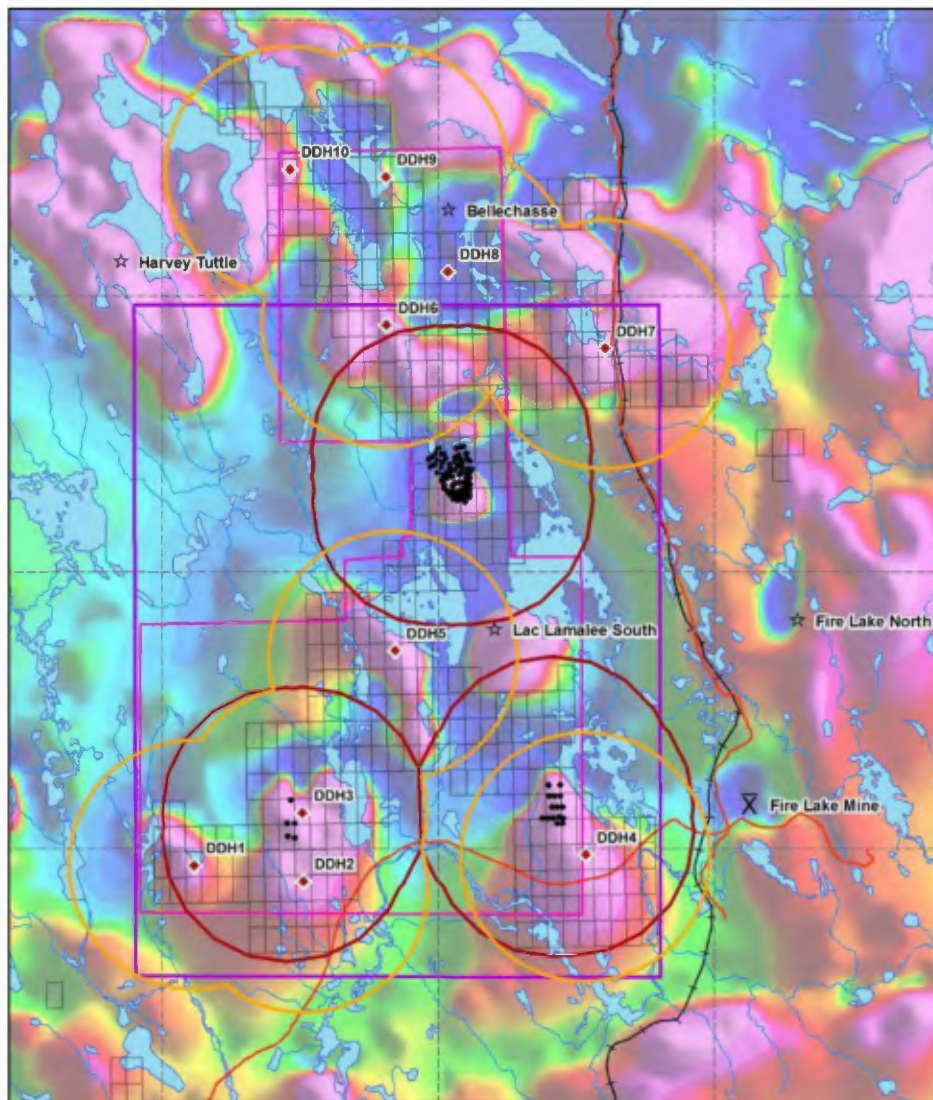
### 4.1. Targeting Strategy

Prior to application of Mira Geoscience’s Targeting Workflow to extract 3D drill targets from multidisciplinary exploration data, ten drill targets were initially planned for Cliffs Natural Resources’ 2014 exploration program (Table 2 and Figure 38). These initial sites were identified based on 2D magnetic data grids, and were strategically located to ensure coverage of existing mineral claims. 3D mineral potential modelling would then be completed to validate or revise the preliminary targets.

Exploration criteria used for 3D mineral potential modelling and revised drill target locations were each to be assessed by the Cliffs Quebec iron ore working group and approved by Cliffs personnel. Three separate meetings, attended by members of the Cliffs Quebec iron ore working group, were held between June and July 2014 to complete assessment for determination of final drilling sites.

**Table 2.** Initial drill hole plans based on regional magnetic surface expression to identify preliminary targets for assessment and ranking from 3D target volumes output from mineral potential modelling.

HoleID	Easting	Northing	Depth	Azimuth	Dip
DDH1	591164	5799390	250m	0	-70
DDH2	595113	5798820	250m	270	-75
DDH3	595082	5801290	200m	270	-75
DDH4	605330	5799780	250m	270	-70
DDH5	598428	5807170	200m	270	-75
DDH6	598127	5818950	250m	270	-75
DDH7	606023	5818110	250m	180	-75
DDH8	600346	5820880	250m	0	-90
DDH9	598096	5824310	200m	270	-80
DDH10	594630	5824590	200m	270	-80



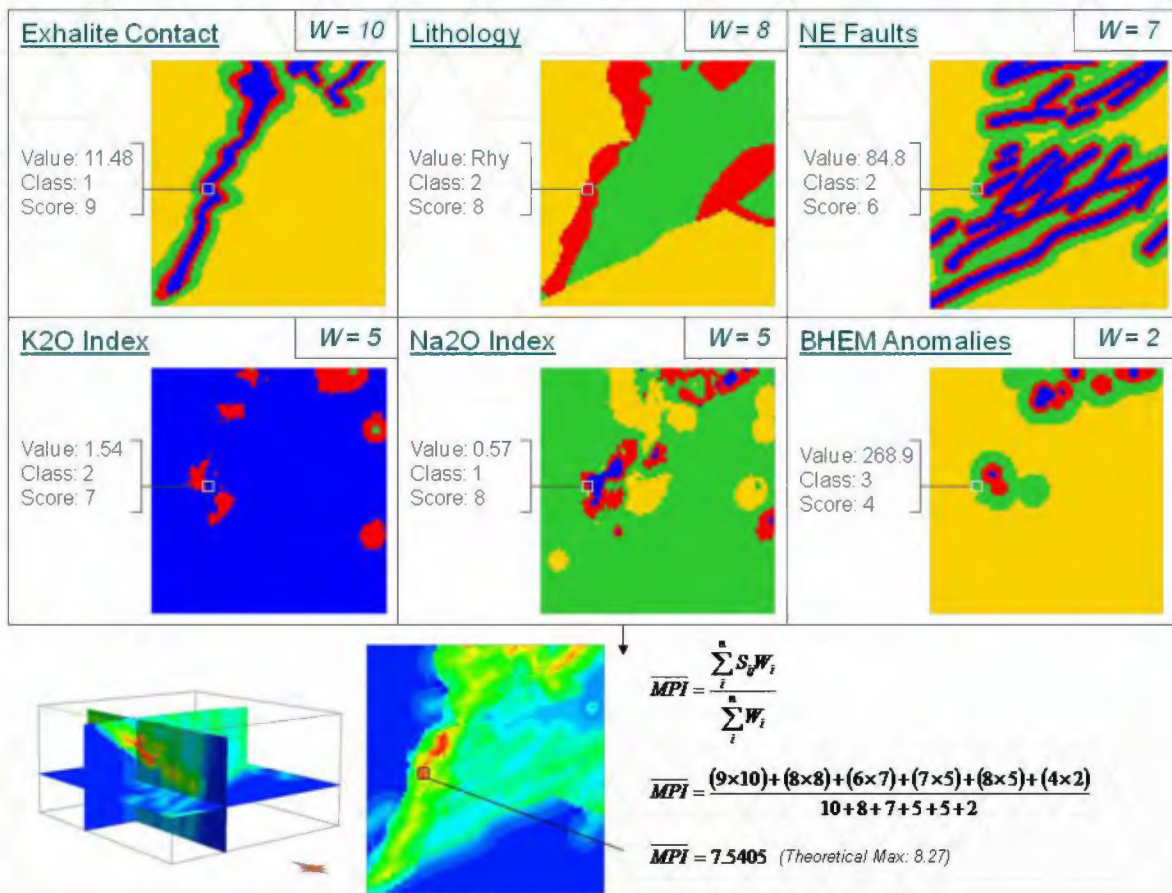
**Figure 38.** Preliminary targets in plan-view over regional magnetic background; DDH1 – DDH10 are represented by red diamonds.

#### **4.2. Application of the Targeting Workflow**

Mineral potential modelling was completed on two separate blocks. The first block contains the Lamelee, Hobdad, and Peppler deposits. Inversion results from the Lamelee and Hobdad-Peppler blocks were merged together to generate a single block for targeting. As inversion modelling over Cliffs claims north of Lamelee was completed later, targeting was completed separately for the northern block. It should be noted that targeting was carried out on both southern and northern blocks using preliminary magnetic inversion results that were later refined. Eventual final magnetic inversion results did not vary significantly from earlier results used in targeting, at least in terms of locations of high susceptibility anomalies. Density models used for targeting were final, and not further refined after targeting was completed.

Mira Geoscience's Targeting Workflow for GOCAD Mining Suite was used for 3D mineral potential modelling. The Targeting Workflow was developed to facilitate the evaluation and combination of 3D evidential data layers to quantitatively identify prospective areas for focused exploration or drilling. A knowledge-driven, or data-driven approach can be applied. Knowledge-driven targeting requires the input of geoscientific experts to assign thresholds and weighting schemes to the exploration criteria layers. Data-driven methods identify correlations between various input data and existing occurrences of mineralization, and strength of spatial relationships determine weights and optimal cut-off values identifying critical ranges of data values.

For this project a multi-class index overlay knowledge-driven approach was chosen. This approach involves subdivision of each evidential data layer into several classes. Each layer, representing some exploration criteria, is assigned a weight, and the sub-classes are assigned scores. To calculate the Mineral Potential Index (MPI) value for a cell within the 3D targeting model, its class is identified, and then the weight assigned to that criteria layer and the score assigned to the specified class is multiplied. The result is divided by the sum of the weights of all the criteria layers. (Figure 39).



**Figure 39.** Calculation of the Mineral Potential Index (MPI) value for a single cell within a 3D targeting grid. Images are plan slices through 3D evidential data layers reclassified based on lithology, geochemical criteria, and distance to important geological and geophysical features.

Data to be used for 3D mineral potential modelling must first be interpreted to identify and quantify geological, geophysical, or geochemical features of interest. Each exploration dataset or model must then be converted to a 3D property on the targeting grid, or voxel. Each 3D cell within the targeting voxel will then contain multiple exploration variables which can be queried to identify regions where several favorable features expected to be related to mineralization co-exist.

Data considered for 3D mineral potential targeting on Cliffs Quebec iron ore properties include:

- Magnetic susceptibility inversion models.
- Density models
- Structure interpreted from gravity gradiometer data
- Lake sediment geochemical data
- Resistivity data from Fire Lake EM survey
- Elevation data

The exploration criteria, the representative quantitative evidential layers generated for targeting, and the assigned weights, cut-offs, and scores are detailed in Table 3. Weights and scores were assigned to the evidential layers based on apparent correlations with known occurrences of iron ore in the region.

For each of the targeting blocks two targeting sessions were run. The first combines all of the exploration criteria, and the second removes lake sediment geochemical criteria, as the data distribution may be too sparse for targeting at this scale.

It is important to note that lake sediment and lineation data are 2D, thus there will be a bias toward surficial cells within the model.

**Table 3.** List of exploration criteria, weights, cut-offs, and scores using for mineral potential modelling for iron ore in the area of Cliffs Natural Resources Lamelee, Hobdad, and Peppler projects.

<b>Exploration Criteria</b>	<b>Evidential Layer on Targeting Voxet</b>	<b>Weight</b>	<b>Cut-offs</b>	<b>Scores</b>
Proximal to, or within, high density anomalies signifying high density magnetite or hematite mineralization	Distance to high density anomalies (isosurfaces) extracted from Lamelee and Hobdad/Peppler gravity gradient inversions	10	100, 200, 400, 600 (m)	8, 6, 4, 2, 0
Proximal to, or within, high magnetic susceptibility anomalies signifying high susceptibility magnetite mineralization	Distance to high susceptibility anomalies (isosurfaces) extracted from Lamelee and Hobdad/Peppler magnetic inversions	8	100, 200, 400, 600 (m)	8, 6, 4, 2, 1
Proximal to boundaries between high and low density volumes - representing contacts of Fe-ore bearing stratigraphic layers	Distance to strong lineaments from invariant lineament analysis of gravity gradient data by Intrepid Geophysics/lineations from total horizontal derivative of gravity gradient data	8	100, 200, 400, 600 (m)	8, 6, 4, 2, 1
Within areas of low resistivity (higher conductivity)	Low resistivity zones from Fire Lake EM apparent resistivity grid with lakes and drainage removed, painted onto top two cells below topographic surface	6	600, 900, 1200, 2400 (Ohm-m)	6, 5, 4, 2, 1

<b>Exploration Criteria</b>	<b>Evidential Layer on Targeting Voxet</b>	<b>Weight</b>	<b>Cut-offs</b>	<b>Scores</b>
Proximity to anomalous Fe in lake sediments	Distance to lake sediment samples with Fe > 28350 (75th percentile)	5	250, 500, 1000, 1500 (m)	8, 6, 4, 2, 1
Proximity to anomalous Mg in lake sediments	Distance to lake sediment samples with Mg > 3380 (90th percentile)	4	250, 500, 1000, 1500 (m)	8, 6, 4, 2, 1
Proximity to anomalous Al in lake sediments	Distance to lake sediment samples with Al > 17600 (75th percentile)	4	250, 500, 1000, 1500 (m)	8, 6, 4, 2, 1
Proximity to anomalous Mn in lake sediments	Distance to lake sediment samples with Mn > 375 (75th percentile)	3	250, 500, 1000, 1500 (m)	8, 6, 4, 2, 1
Topographic highs indicating resistant lithology/mineralogy	Elevation model > 600 m elevation	2	400, 500, 600, 700 (m)	8, 6, 4, 2, 1

### 4.3. Targeting Results

The results of 3D mineral potential modelling over the Lamelee-Hobdad-Peppler Quebec iron ore claims are presented in this section using 2D plan slices through the 3D Mineral Potential Index (MPI) models. Clusters of cells characterized by high MPI values are identified using a chosen cut-off value. Painting the target clusters by MPI value reveals regions within the target clusters that have the highest prospectivity based on the compiled evidential layers.

#### 4.3.1. *Lamelee-Hobdad-Peppler Block*

Figure 40 shows each evidential layer used for targeting within the Lamelee-Hobdad-Peppler block with existing iron ore occurrences overlain. Iron ore occurrence locations were downloaded from Ministère de l'Énergie et des Ressources Naturelles du Québec.

##### Lamelee-Hobdad-Peppler targeting result including geochemical criteria

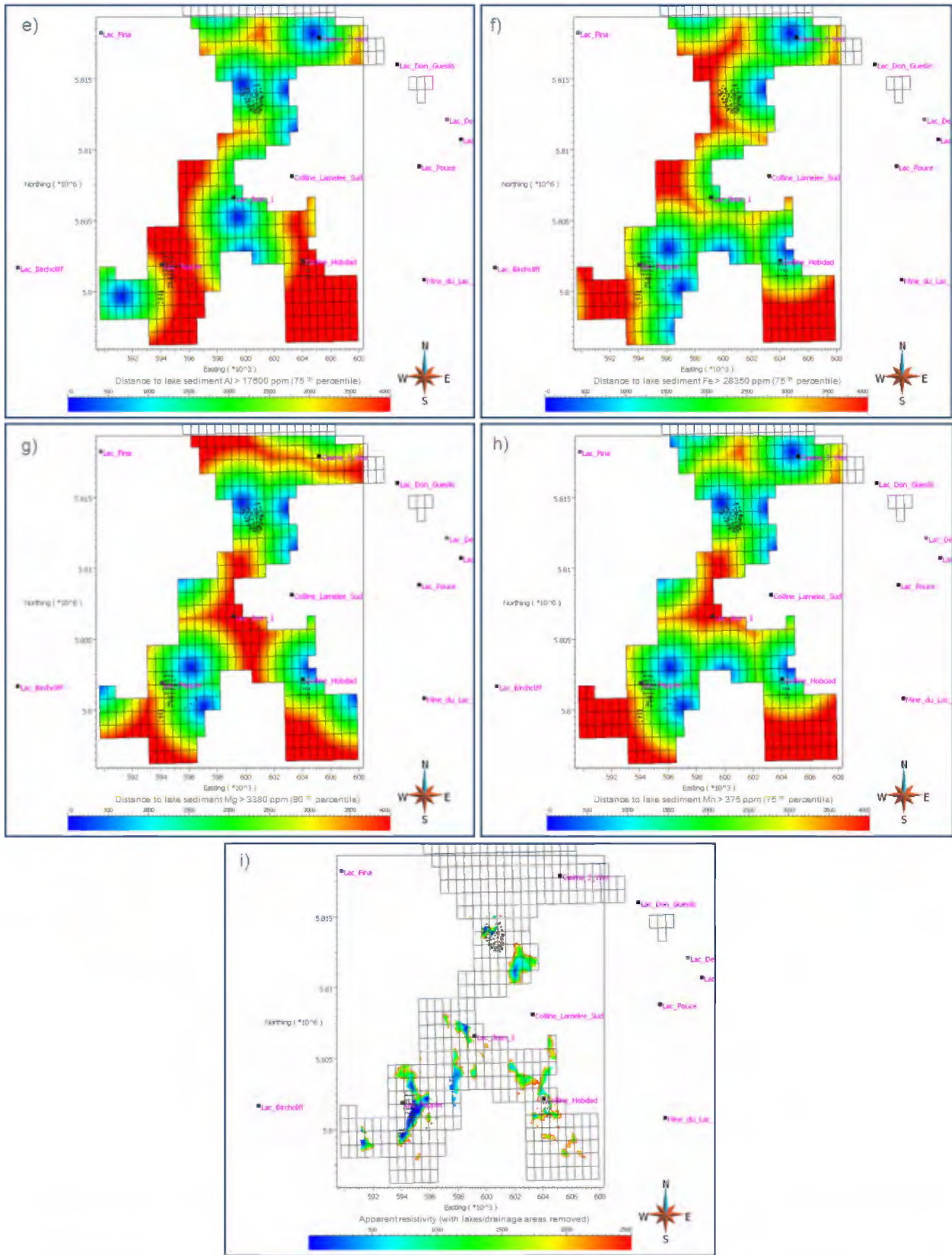
A plan slice at 500 m elevation through the Mineral Potential Index (MPI) model resulting from targeting including geochemical data in the Lamelee-Hobdad-Peppler block is shown in Figure 41. Figure 42 shows 'target regions' representing volumes of connected cells with MPI values greater than 4.5 (out of a maximum MPI of 7.65). The regions are painted by the MPI, showing the variability within the high prospectivity volumes.

##### Lamelee-Hobdad-Peppler targeting result excluding geochemical criteria

A plan slice at 500 m elevation through the Mineral Potential Index (MPI) model resulting from targeting that excludes geochemical data is shown in Figure 43. Figure 44 shows 'target regions' representing volumes of connected cells with MPI values greater than 3.5 (out of a maximum MPI of 5.78). The regions are painted by the MPI, showing the location of the highest prospectivity cells within the volumes.

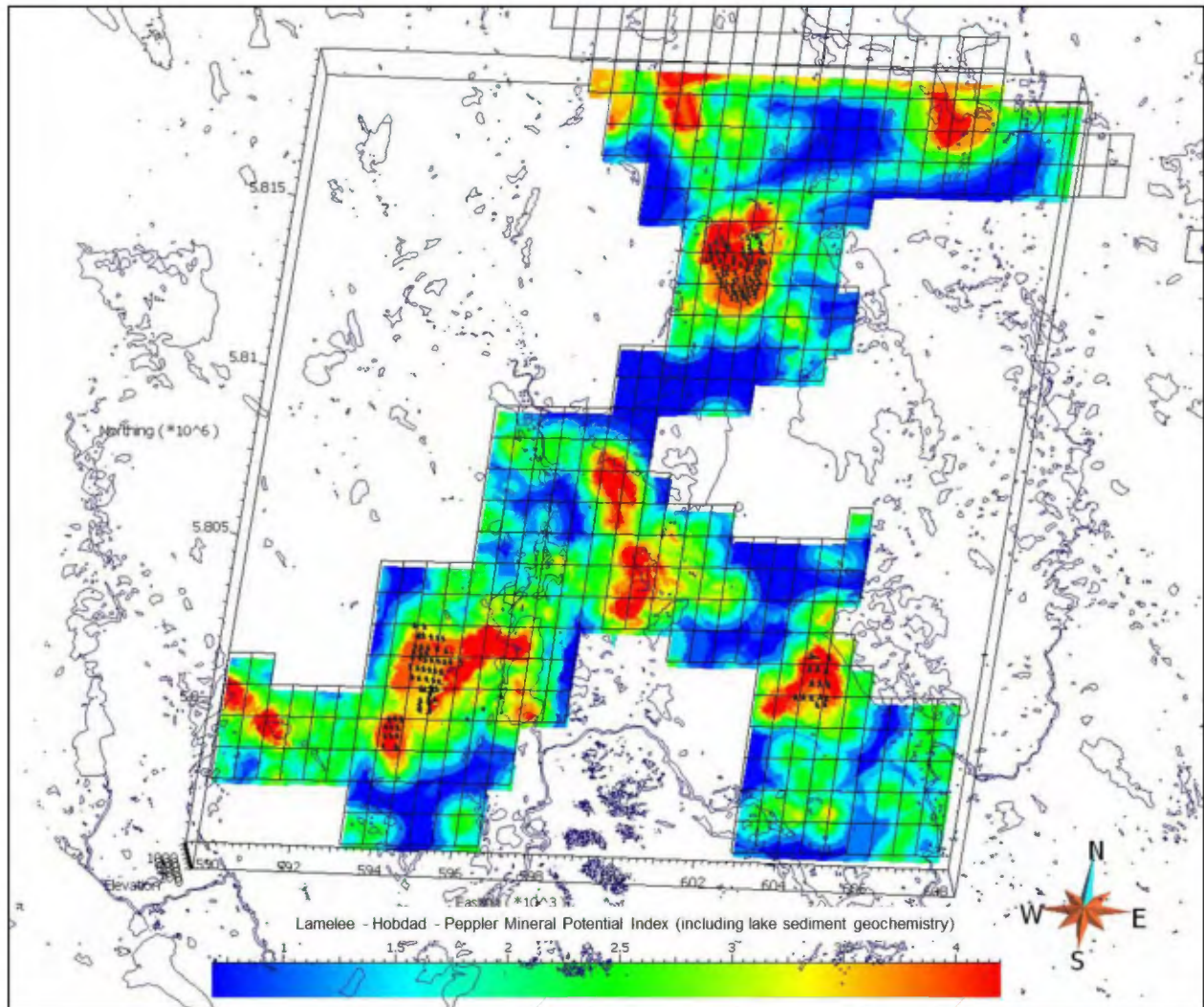
Both results highlight existing iron ore occurrences, and suggest high potential extensions to the northeast of the drilled region associated with the Peppler deposit, to the southwest of existing Hobdad drilling, and to the north of Lamelee drilling. The principle differences between the two results is the relative lowering of mineral potential index values in the east Faber deposit area (northeast model area), and increased mineral potential values in the southern Hobdad deposit area when geochemical data is excluded.







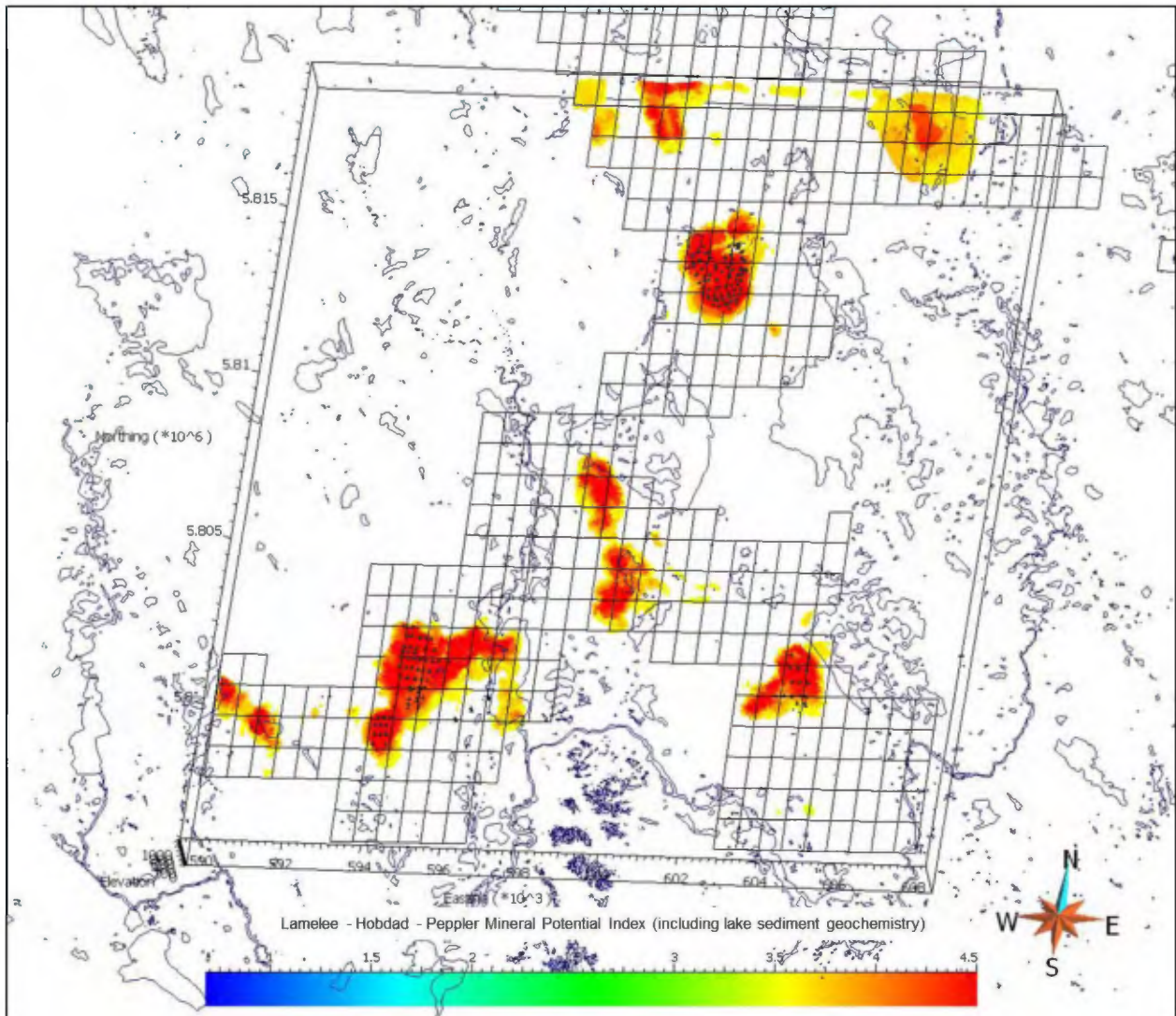
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**Figure 41.** Plan slice at 500 m elevation through the Lamelee-Hobdada-Peppler Mineral Potential Index (MPI) model generated through combination of all evidential layers *including* lake sediment geochemical layers.



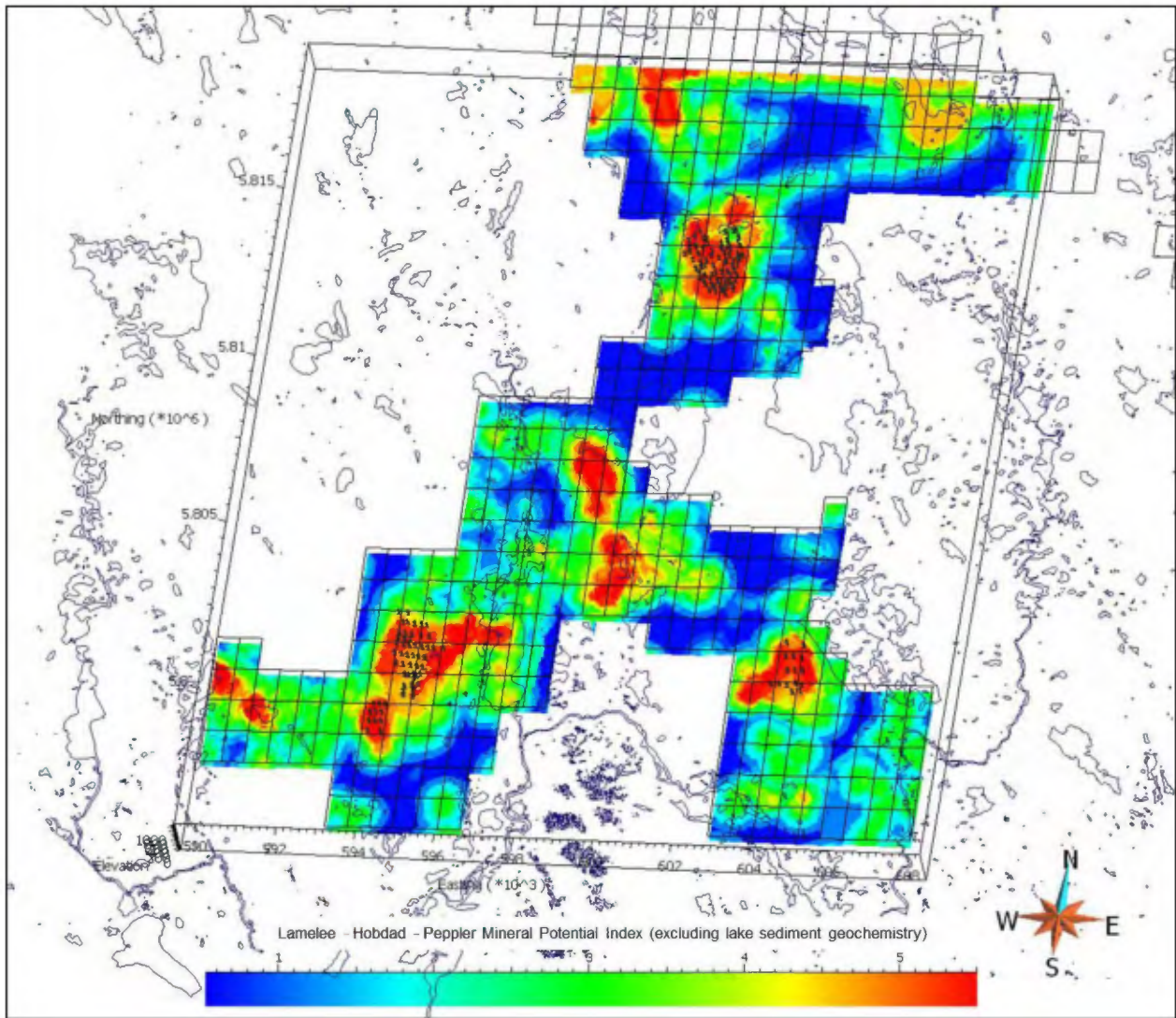
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**Figure 42.** 3D high prospectivity regions from the Lamelee-Hobdad-Peppler area, including geochemical criteria. Regions were generated by querying cells with MPI values  $> 4.5$  (out of a maximum MPI of 7.65).



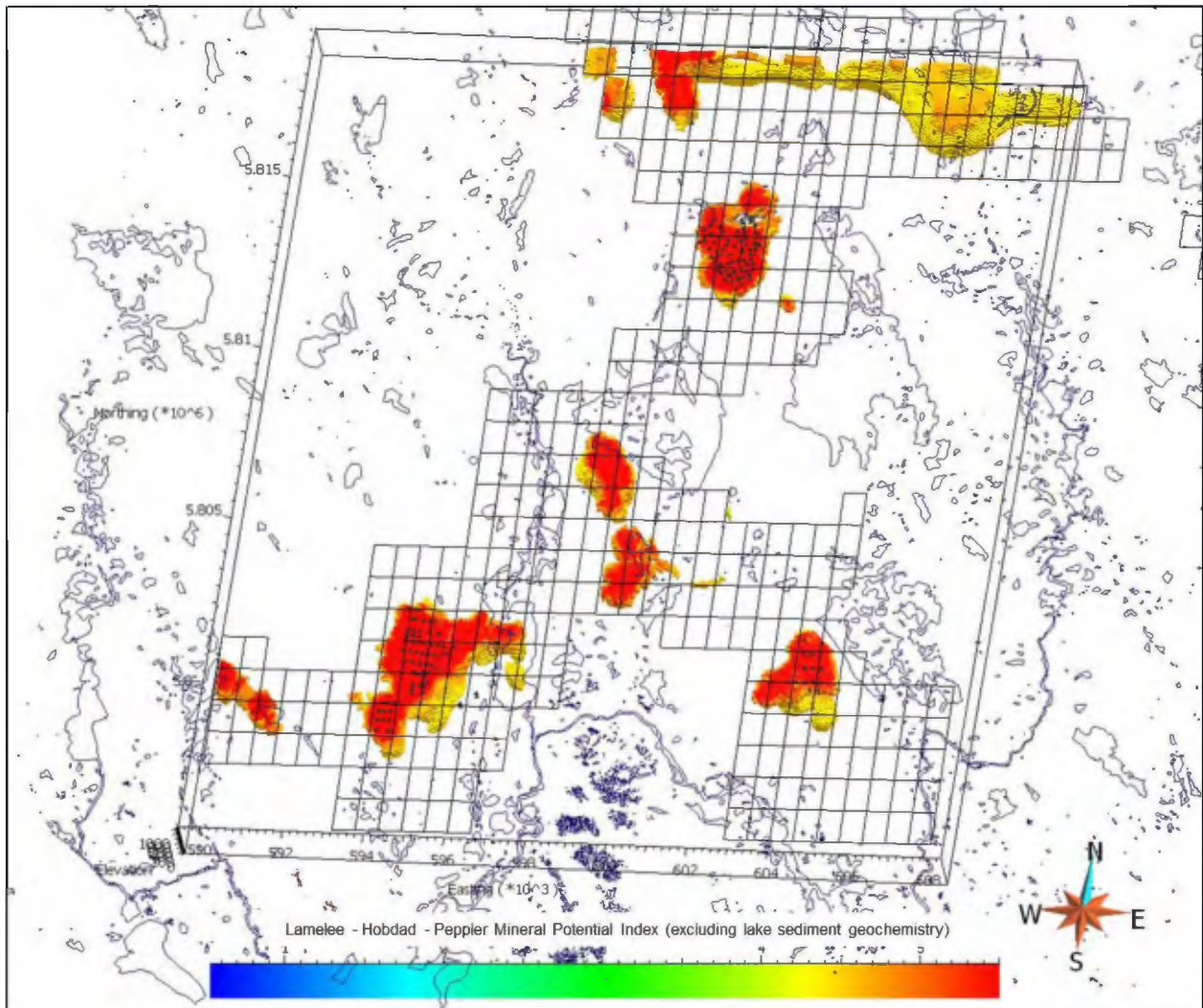
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**Figure 43.** Plan slice at 500 m elevation through the Lamelee-Hobdad-Peppler Mineral Potential Index (MPI) model generated through combination of all evidential layers *excluding* lake sediment geochemical layers.



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**Figure 44.** 3D high prospectivity regions from the Lamelee-Hobdada-Peppler area, excluding geochemical criteria. Regions were generated by querying cells with MPI values > 3.5 (out of a maximum MPI of 5.78).

#### 4.3.2. *Northern Claims Block*

Figure 45 shows each evidential layer used for targeting within the Northern Claims block with existing iron ore occurrences overlain. Iron ore occurrence locations were downloaded from Ministère de l'Énergie et des Ressources Naturelles du Québec.

##### Northern Claims targeting result including geochemical criteria

A plan slice at 500 m elevation through the Mineral Potential Index (MPI) model resulting from targeting including geochemical data in the Northern Claims block is shown in Figure 46. Figure 47 shows 'target regions' representing volumes of connected cells with MPI values greater than 4.2 (out of a maximum MPI of 7.18). The regions are painted by the MPI, showing the variability within the high prospectivity volumes.

##### Northern Claims targeting result excluding geochemical criteria

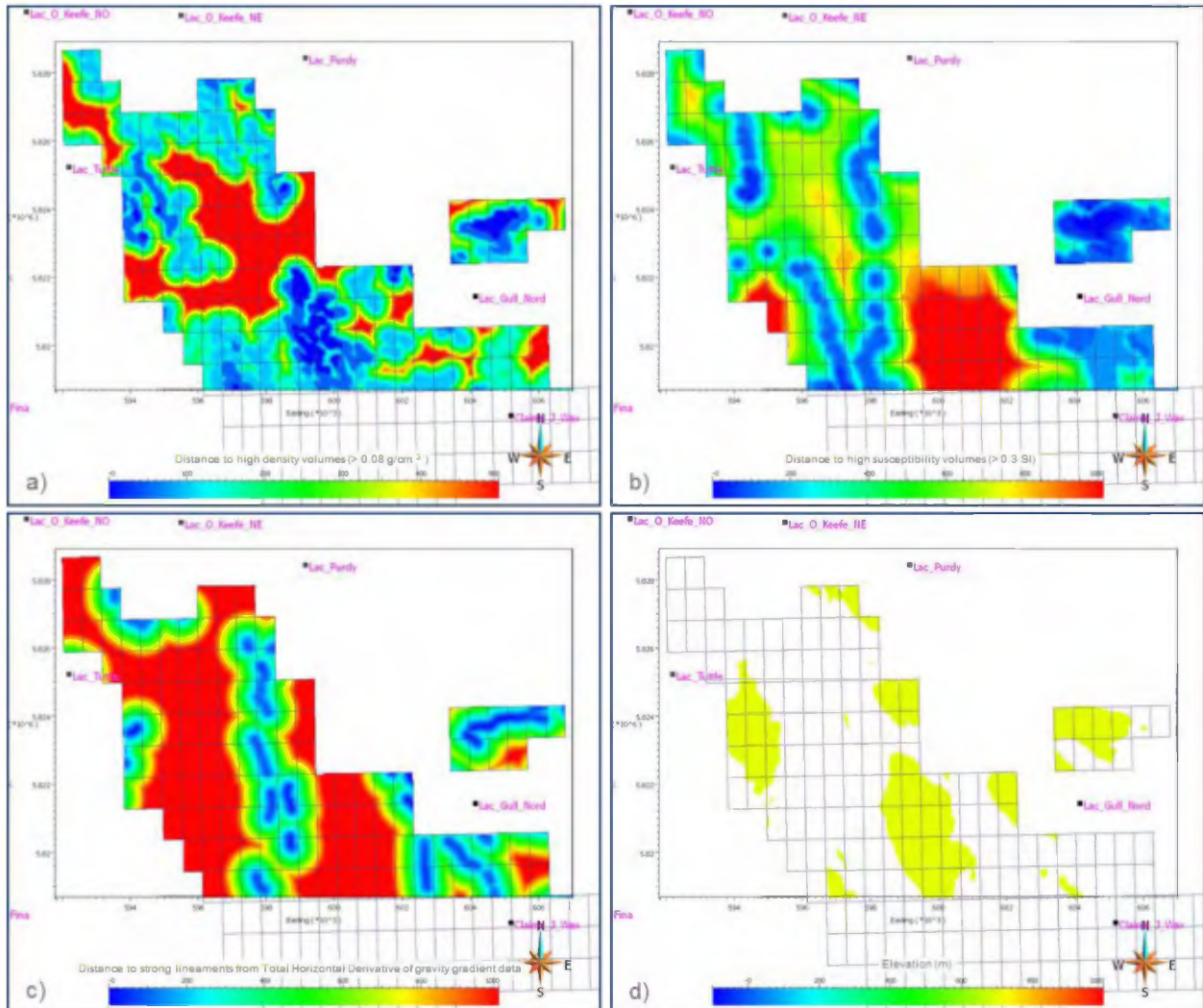
A plan slice at 500 m elevation through the Mineral Potential Index (MPI) model resulting from targeting that excludes geochemical data is shown in Figure 48. Figure 49 shows 'target regions' representing volumes of connected cells with MPI values greater than 6 (out of a maximum MPI of 8). The regions are painted by the MPI, showing the location of the highest prospectivity cells within the volumes.

Both results highlight existing iron ore occurrences, and suggest high potential in areas surrounding the east and west limbs of the Faber iron ore formation. The Faber belt is a 26 km long synclinal iron ore belt with a fold axis located just north of the Lamelee deposit. When lake sediment geochemical data is incorporated as evidence for targeting, some additional sites are highlighted within the model, including a small high potential region in the west-central part of the model, and a high potential extension to the east Faber target area. With no resistivity data (one evidence layer less than



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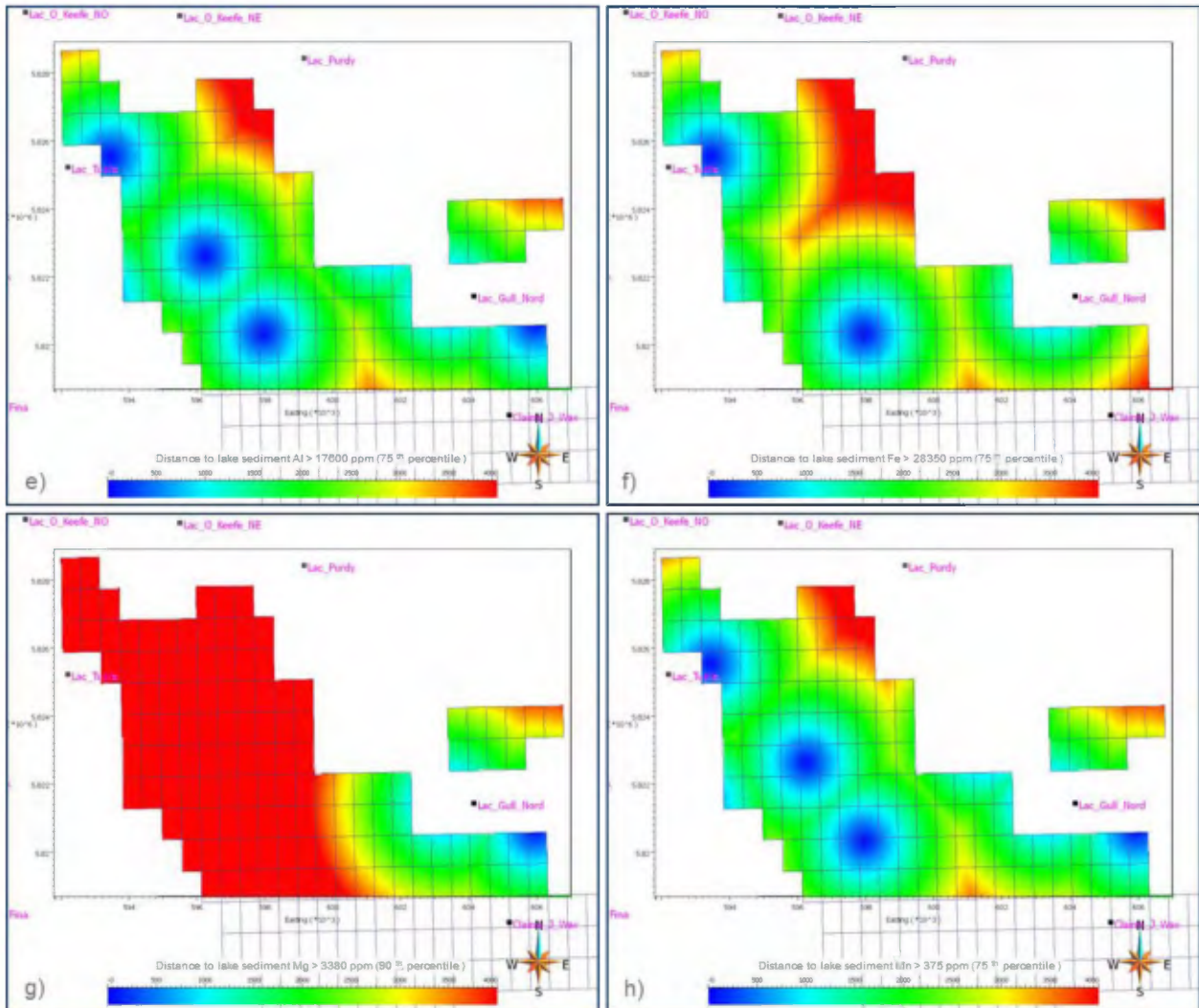
southern results), the incorporation or exclusion of geochemical data has a noticeable effect on the result.



**Figure 45.** Evidential layers for mineral potential modelling within the Northern Claims targeting block. a) Distance to high density bodies, b) distance to high susceptibility bodies, c) distance to interpreted lineaments from gravity data, d) elevation, e) (continued on the following page) distance to lake sediment samples with high Al, f) distance to lake sediment samples with high Fe, g) distance to lake sediment samples with high Mg, and h) distance to lake sediment samples with high Mn.



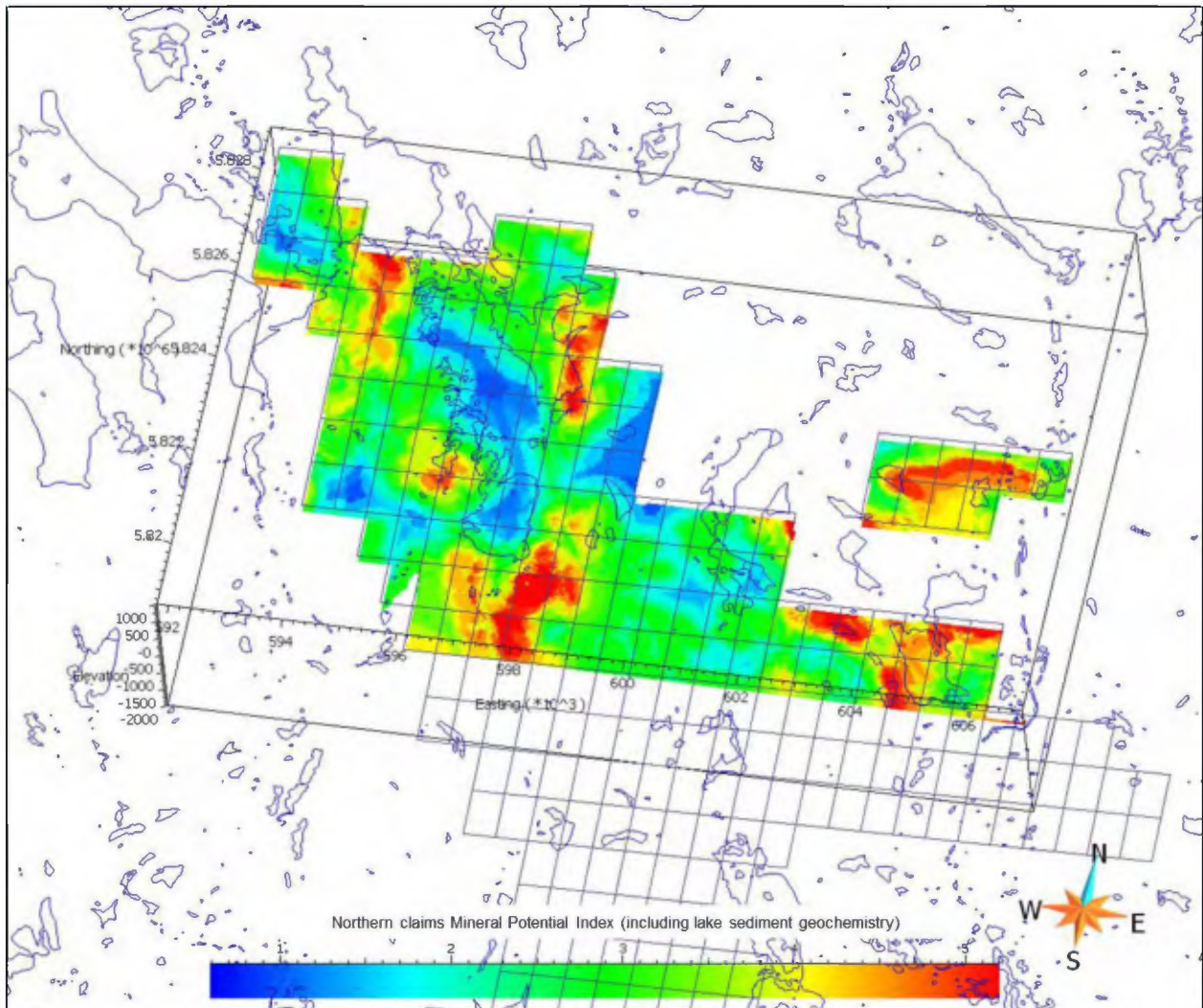
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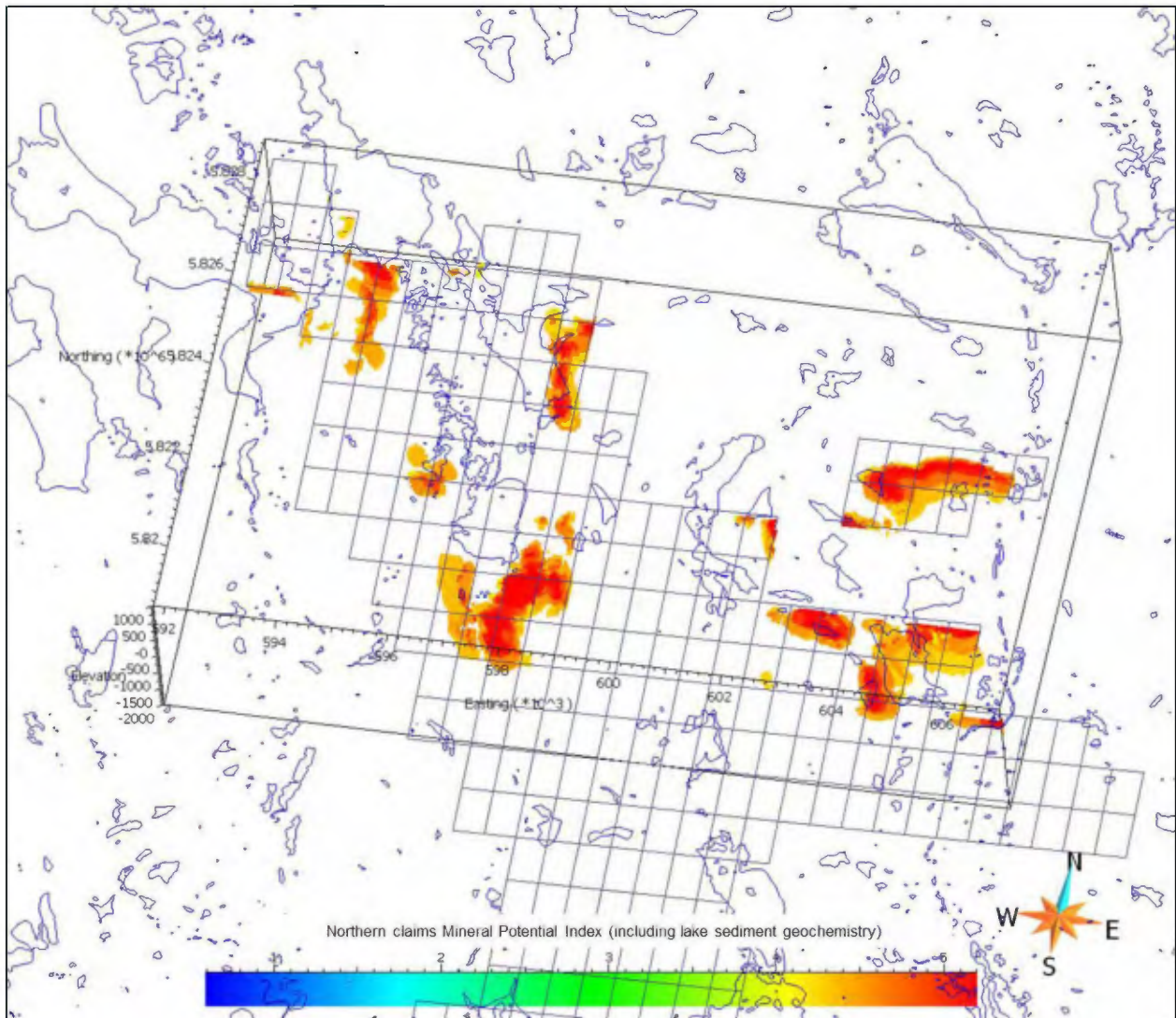
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**Figure 46.** Plan slice at 600 m elevation through the Northern Claims Mineral Potential Index (MPI) model generated through combination of all evidential layers *including* lake sediment geochemical layers.



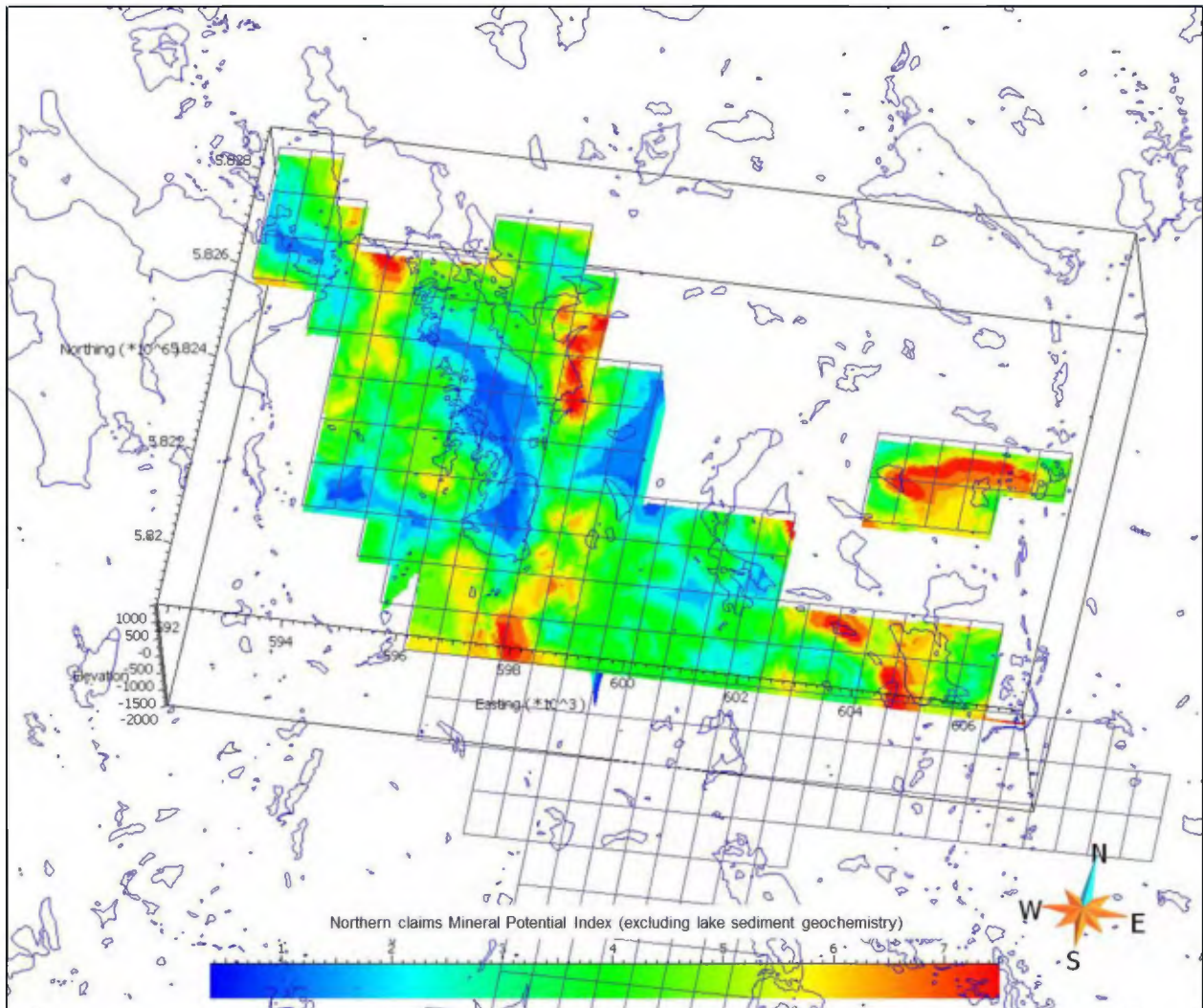
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**Figure 47.** 3D high prospectivity regions from the Northern Claims area, including geochemical criteria. Regions were generated by querying cells with MPI values  $> 4.2$  (out of a maximum MPI of 7.18).



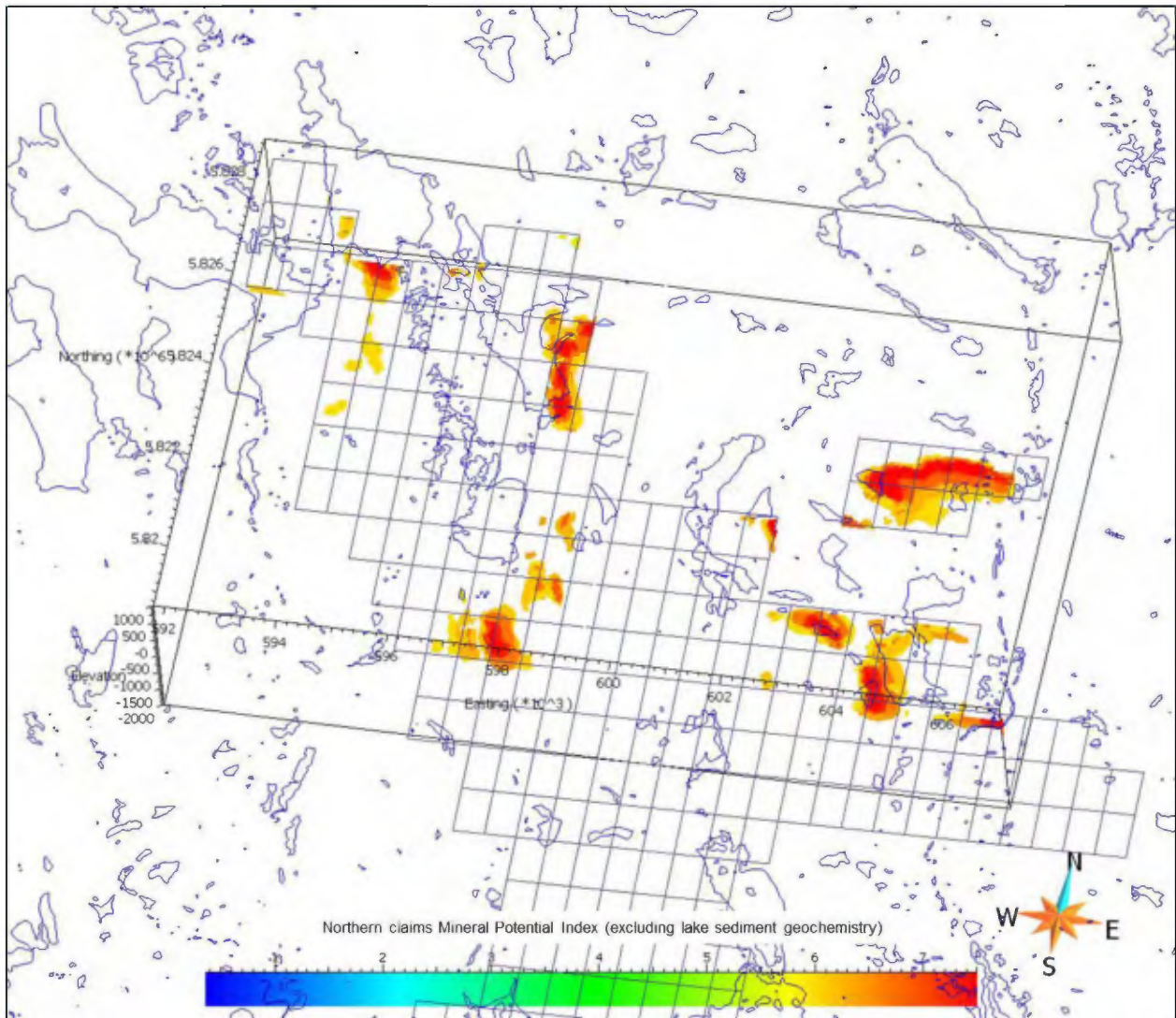
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**Figure 48.** Plan slice at 600 m elevation through the Northern Claims Mineral Potential Index (MPI) model generated through combination of all evidential layers *excluding* lake sediment geochemical layers.



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**Figure 49.** 3D high prospectivity regions from the Northern Claims area, *excluding* geochemical criteria. Regions generated by querying cells with MPI values > 6 (out of a maximum MPI of 8).

#### 4.4. Drill Targets

Targets derived from 3D mineral potential modelling were reviewed in three stages by Cliffs' personnel and the Cliffs Quebec iron ore working group, which includes consultants from Mira Geoscience, DGI Geoscience, Hammer Collaborations, and MapIT. The preliminary results from mineral potential modelling for the southern Lamellee-Hobdad-Peppler block were reviewed at the June 17<sup>th</sup>, 2014 Targeting Workflow workshop at the Cliffs Natural Resources office in Montreal, QC, with a secondary review of revised southern block targets completed on June 25<sup>th</sup>, 2014. The Northern Claims results were reviewed at a later date due to the later completion of inversion results for that area.

##### Lamelee-Hobdad-Peppler block targets

The southern claims block drill target review process involved assessment, adjustment, and agreement of the applied targeting criteria by the Cliffs Quebec iron ore working group and Cliffs personnel, and exploration of the variability of targeting results with changes to exploration criteria. The location, size, and shape of preliminary Targeting Workflow high potential targets were investigated relative to known deposits, historically identified targets, and preliminary 2014 drill targets (section 4.1). Some volumes identified as being of high potential were depicted as larger, smaller, or of different shape than previously understood. As expected, no areas of previously unidentified mineralization were revealed in the process, as gravity and magnetic anomalies were, and still remain, the key exploration criteria for iron ore detection.

During the June 17<sup>th</sup> and June 25<sup>th</sup> meetings, the working group also defined additional 'evaluation' criteria to assess the candidate target locations, and any other significant target volumes emerging from the finalized Targeting Workflow results. These evaluation criteria are as follows:

1. Has established “like mineralization” signature
2. Discrete volume of 50+ million tonnes or adds volume to existing deposits
3. Shallow depth to surface to top of target isosurface (i.e. low volume of overburden and/or waste rock)
4. Final depth to bottom of target isosurface limit of 400m from surface when assessing target volume
5. Proximity to roads/known deposits of <10km

A final review of the southern block targets (DDH1 through DDH7) took place on June 25<sup>th</sup>, 2014, where the final target regions were assessed with consideration of the defined and agreed upon evaluation criteria. Each proposed drill hole was reviewed relative to passing the evaluation criteria, surface access location, intersection of the target with preference to drill through the target within 250 m, azimuth, dip and target borehole length.

DDH2 and DDH3 were combined into a single target location defined as DDH2. Six drilling targets on the southern claims were revised and confirmed as passing the evaluation criteria; these were submitted to the project field team to commence drilling.

#### Northern Claims targets

The northern claims inversions were finalized and the targeting workflow volumes were completed using the same targeting criteria and evaluation criteria as the southern blocks. On July 21, 2014 a subset of the Cliffs Quebec iron ore working group assessed the northern claims targeting results with respect to proposed targets DDH8, DDH9 and DDH10. No new significant volumes of mineralization were identified. DDH8 and DDH10 did not pass the evaluation criteria and were terminated as candidates. DDH9 was reviewed and adjusted accordingly as per the same review process completed on the southern block candidate targets.

The southern claims block encompassing Lamalee, Peppler and Hobdad deposits as well as Peppler West and Lac Jean targets are depicted in Figure 50. The preliminary target designation relative to final drill hole name appearing in Figure 50 are:

DDH1:	PP-14-02	Peppler West
DDH2:	PP-14-01	Peppler
DDH4:	HH-14-01	Hobdad
DDH5:	LJ-14-01	Lac Jean

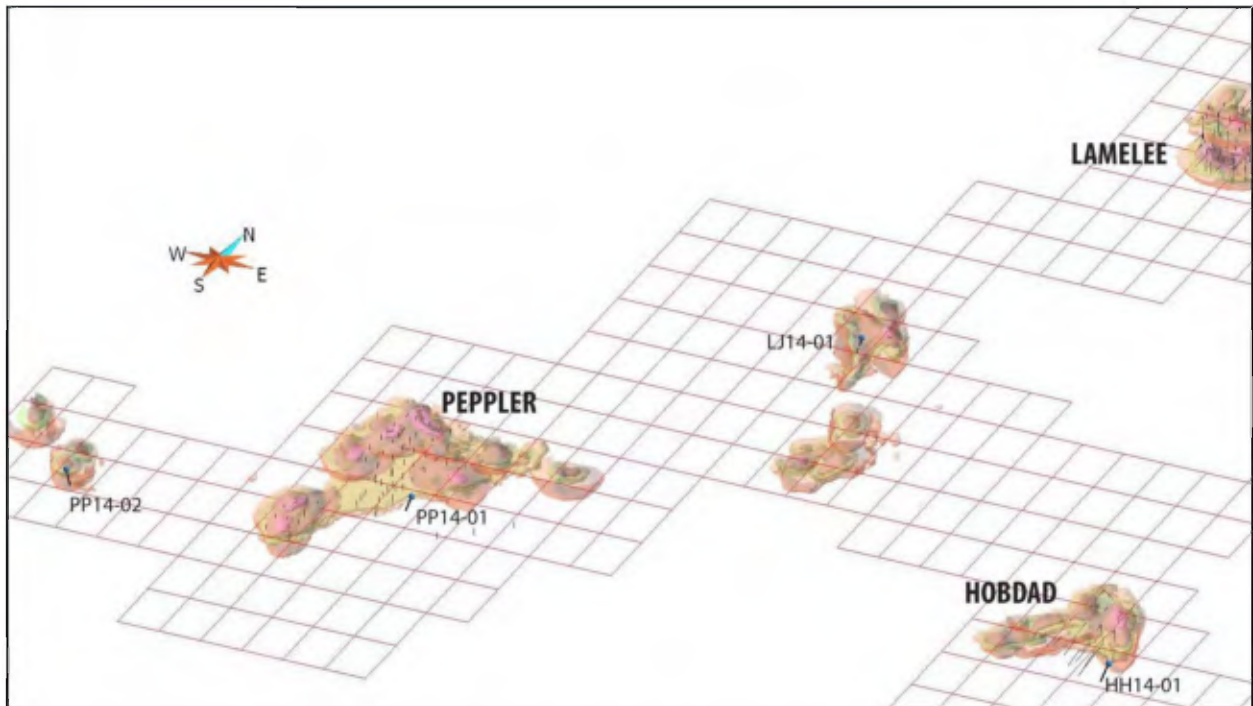


Figure 50. Southern claims block (Lamalee-Peppler-Hobdad block) 3D targeting volumes.

Figure 51 depicts the high potential volumes associated with Faber West and Faber East targets in the northern claims section plus the Lamalee deposit. The preliminary target designation relative to final drill hole name appearing in Figure 51 are:

DDH6:	FB-14-01	Faber West
DDH7:	FB-14-03	Faber East
DDH8:	-----	<i>Terminated</i>
DDH9:	FB-14-02	Faber West
DDH10:	-----	<i>Terminated</i>

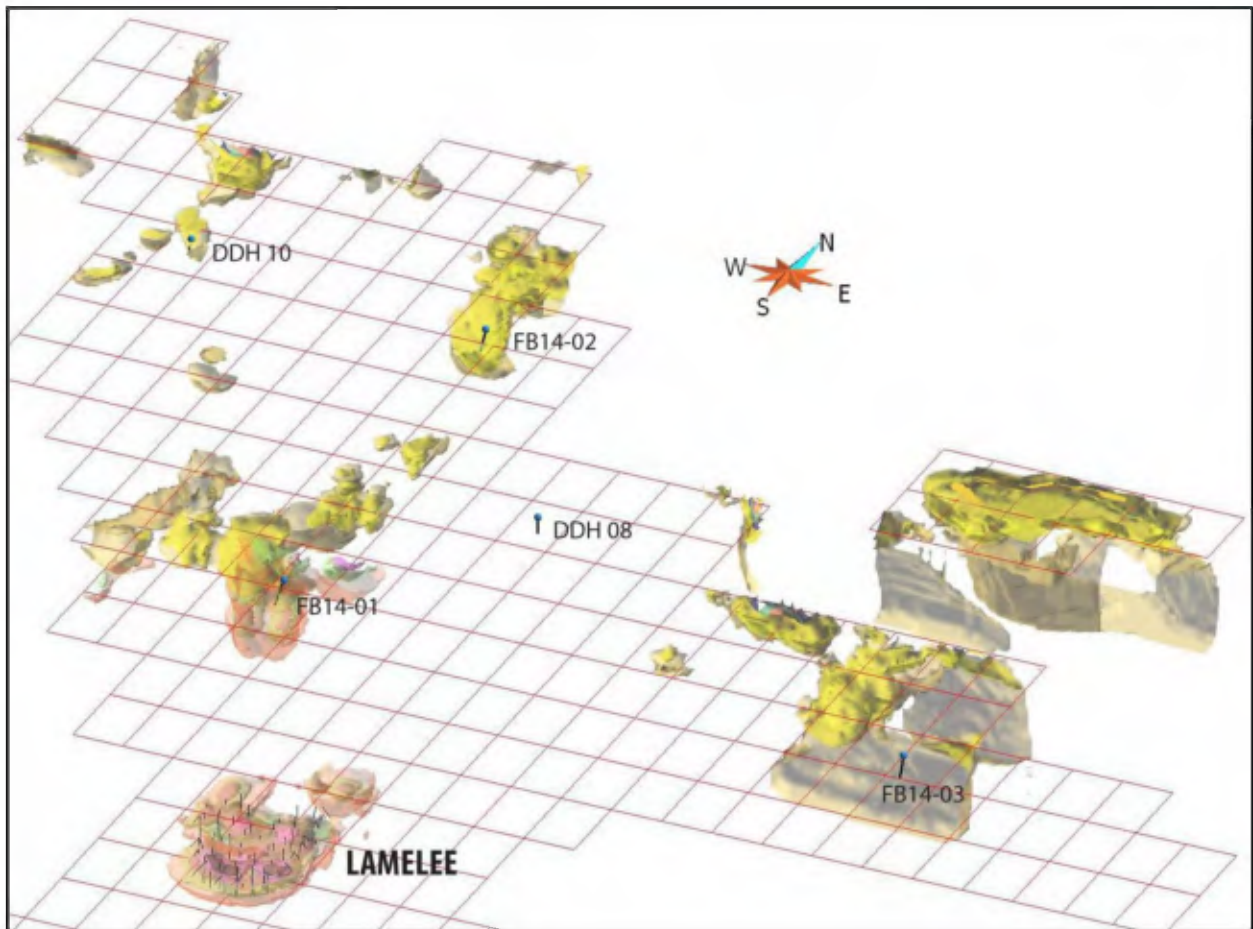


Figure 51. Northern claims block 3D targeting volumes.

Table 4 lists all of the final targets submitted for drilling to occur in July and August 2014. Figure 52 shows the location of the final drill targets.

**Table 4.** Final drill hole targets following the Targeting Workflow 3D mineral potential modeling work with Cliffs approved targeting criteria and results evaluation criteria.

HoleID	PrelimID	Easting	Northing	Elevation	Depth	Azimuth	Dip
PL-14-02	DDH1	595097	5800748	590	250m	0	-70
PL-14-01	DDH2	590926	5799447	591	249m	270	-70.5
Combined DDH2	DDH3						
HH-14-01	DDH4	604787	5800710	630	320m	270	-68.5
LJ-14-01	DDH5	598421	5806888	600	252m	270	-75
FB-14-01	DDH6	598495	5818690	630	350m	270	-74
FB-14-03	DDH7	605799	5818186	641	242m	180	-73
Terminated	DDH8						
FB-14-02	DDH9	598123	5824307	661	293m	270	-80
Terminated	DDH10						

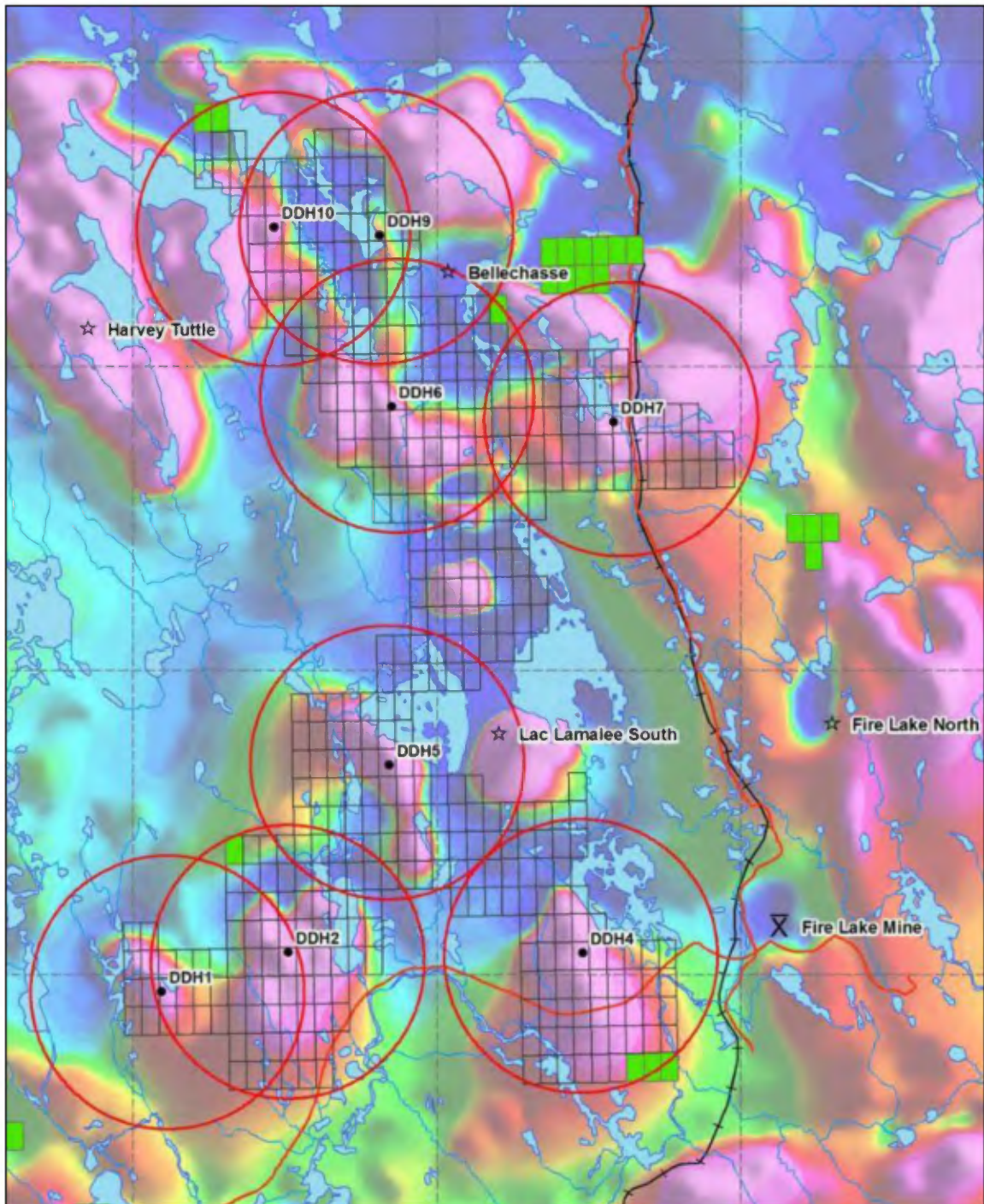


Figure 52. Location of final submitted drill targets in plan-view over regional magnetics background; DDH1 – DDH10 are represented by black circles.

The following sections describe each of the preliminary and final drill hole targets, with some discussion of results considering logged geology.

#### *4.4.1. DDH1 preliminary – PL-14-02 final*

The high potential target volume associated with preliminary drill hole DDH1 passed the minimum evaluation criteria and was drilled as PL-14-02 with minimal modification. The target collar location was adjusted slightly to the northwest with dip shallowing from -75 degrees to -70. Adjustments were made to move the drill hole closer to the southern edge of the target volume to accommodate drilling from the periphery into the target. This is depicted by the targeting volume cross-section in Figure 53, showing the location of PL-14-02 at the south of the 3D targeting volume representing the Pepler West target in Figure 50.

LP-14-02 was targeted and drilled to intersect a high density body modelled during 3D gravity inversion (Figure 53) that is spatially coincident with a high magnetic susceptibility anomaly (Figure 54). Figure 55 shows the location of LP-14-02 relative to the high potential target volume generated during mineral potential modelling. This orientation, and placement of the drill hole to intersect boundaries of anomalous volumes, was chosen to provide substantiation of the 3D modelling process, to build confidence in the 3D targeting model, and to characterize and differentiate host rocks from iron ore and mineralization. Schist and quartzite in the shallow parts of the hole correlate as expected with low densities and low susceptibilities. Magnetite-rich iron formation intersected at depth within the hole coincides with increased magnetic susceptibility and density from geophysical inversion models. This understanding of the transition from host to mineralization will help plan an efficient drilling plan for future step-out delineation and in-fill goals.



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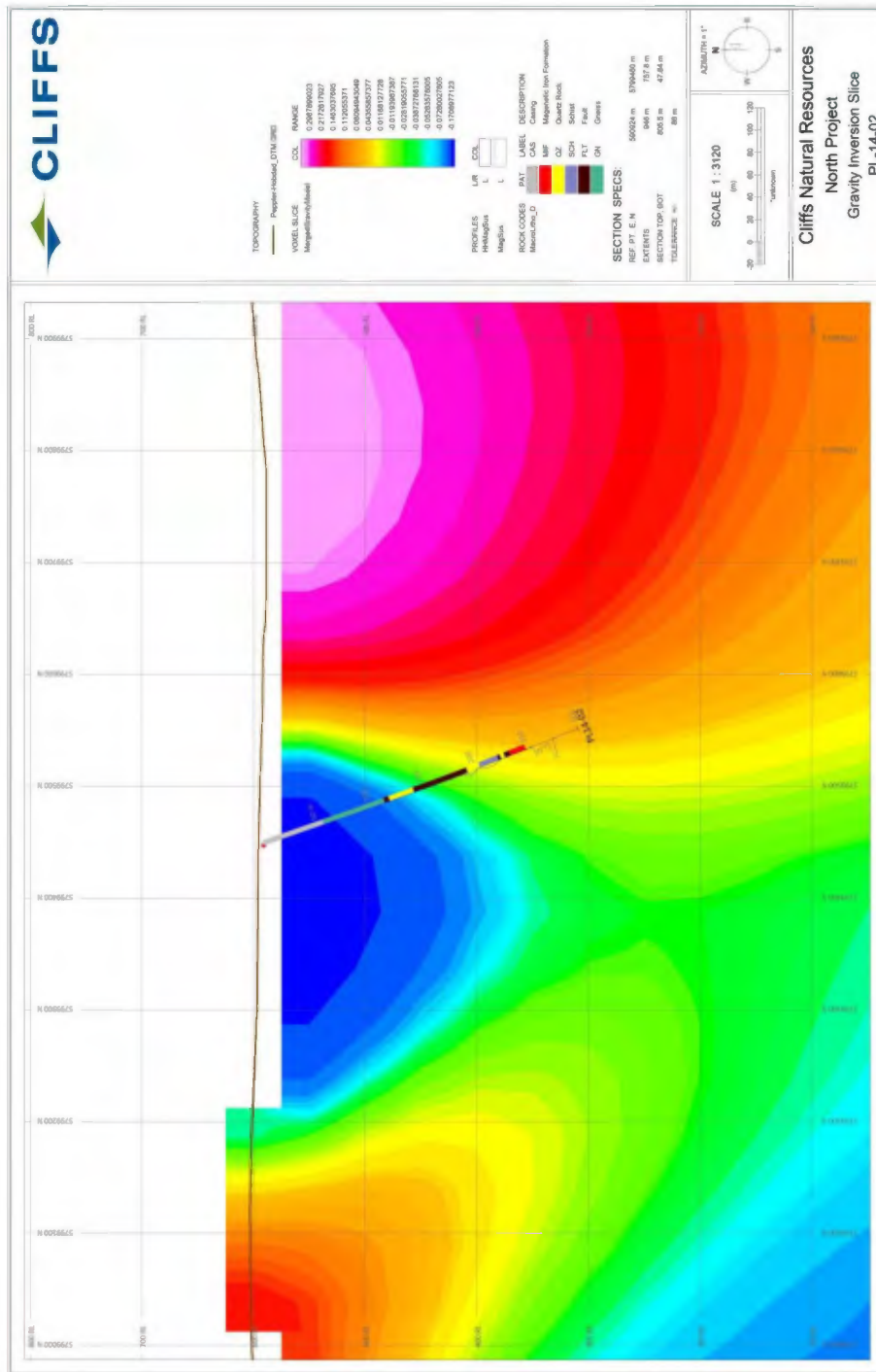
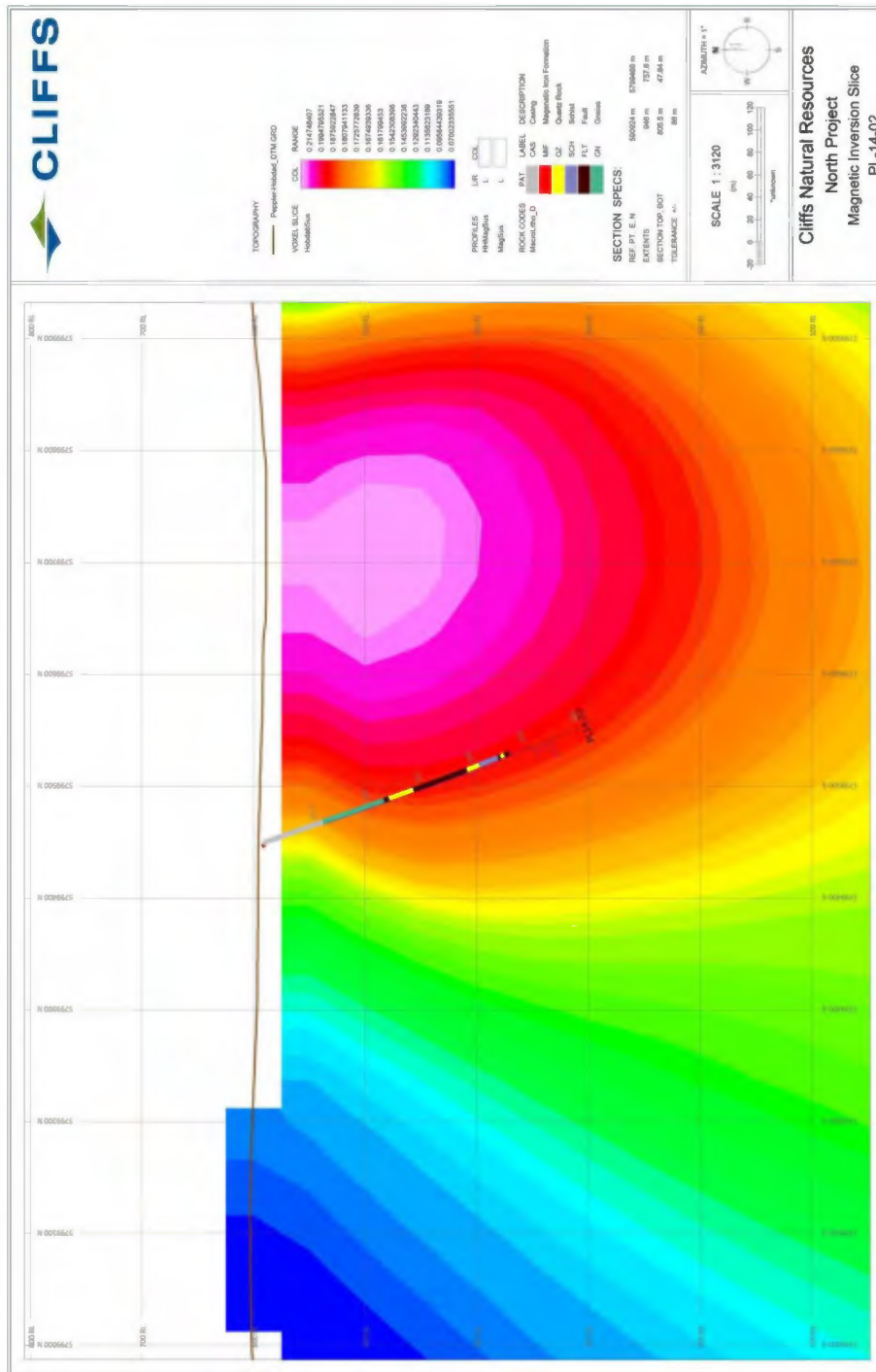


Figure 53. PL-14-02 (DDH1) Density model cross-section with logged geology and handheld magnetic susceptibility data.



**Figure 54.** PL-14-02 (DDH1) Magnetic susceptibility model cross-section with logged geology and handheld magnetic susceptibility data.



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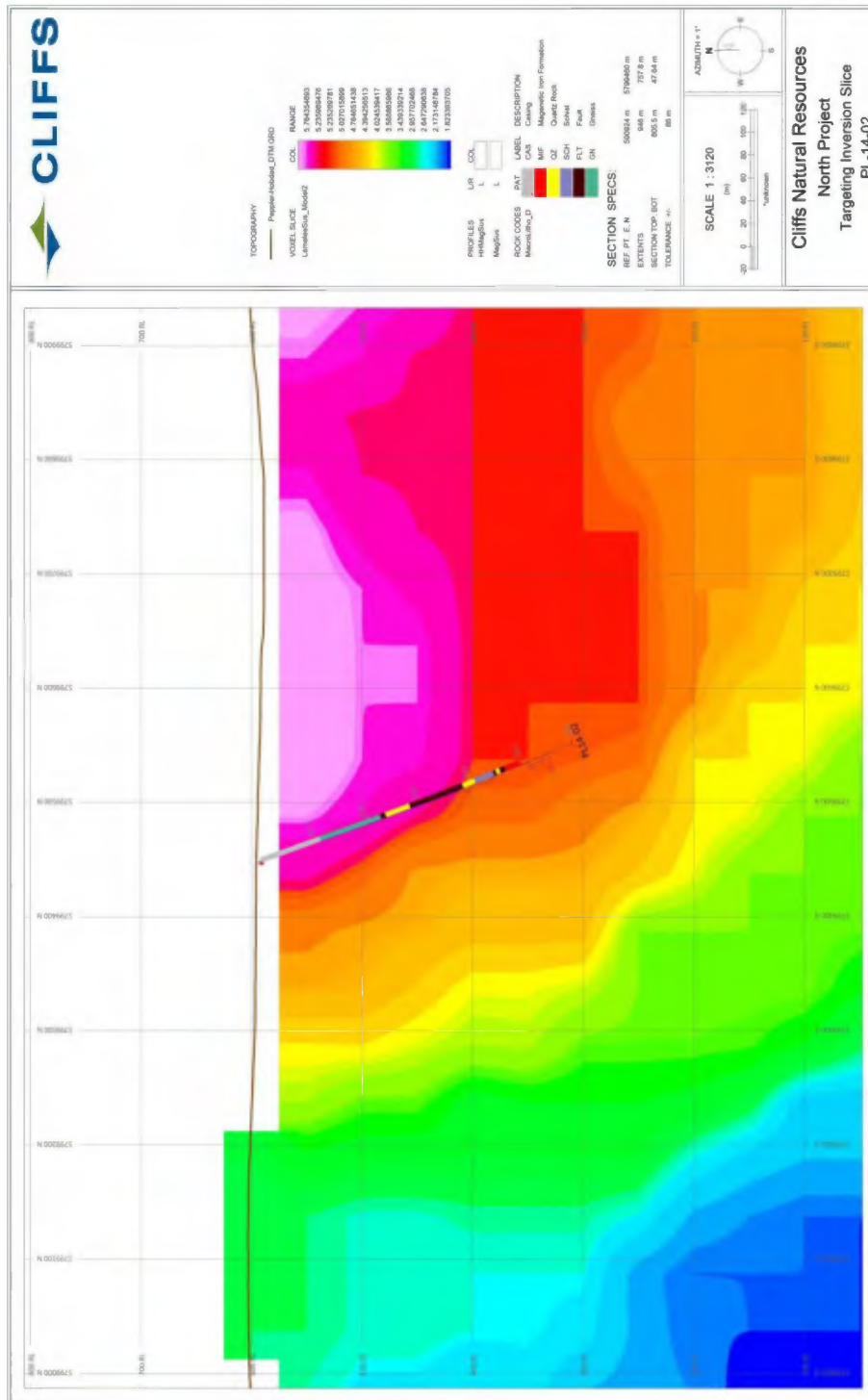


Figure 55. PL-14-02 (DDH1) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

#### **4.4.2. DDH2 and DDH3 preliminary – PL-14-01 final**

The high potential target volume associated with preliminary target hole DDH2 passed the minimum evaluation criteria. DDH2 and DDH3 were combined into a single target and drilled as PL-14-01 for more effective use of the allocated drilling budget. The drill hole is located at the southeastern margin of the 3D targeting volume representing the Peppler deposit in Figure 50.

PL-14-01 collar location was moved significantly to the north relative to the DDH2 location as well as being slightly north of the DDH3 target location. Adjustments were made to move PL-14-01 to the eastern edge of the high potential target volume as depicted in Figure 50. PL-14-01 was drilled from inside a high density anomaly across the boundary, and into a low density area, as depicted in the east trending cross-section in Figure 56. The hole was drilled towards a magnetic high as shown in Figure 57. There is good spatial correlation of intersected iron formation and high density and high susceptibility bodies. Orienting the hole to pass through boundaries of geophysical anomalies serves to instill confidence in the models and to characterize both the host rocks and the iron ore zones. Future drill planning can leverage the 3D high potential volume for an efficient step-out and in-filling drilling program to delineate the mineralization and define the resource respectively.

PL-14-01 was drilled from the periphery of the high potential volume resulting from 3D mineral potential modelling, inward toward the target as shown in Figure 58. The drill hole was shallowed from -75 to -70.5 degrees for a more effective use of the budgeted 250 m to intersect the target.



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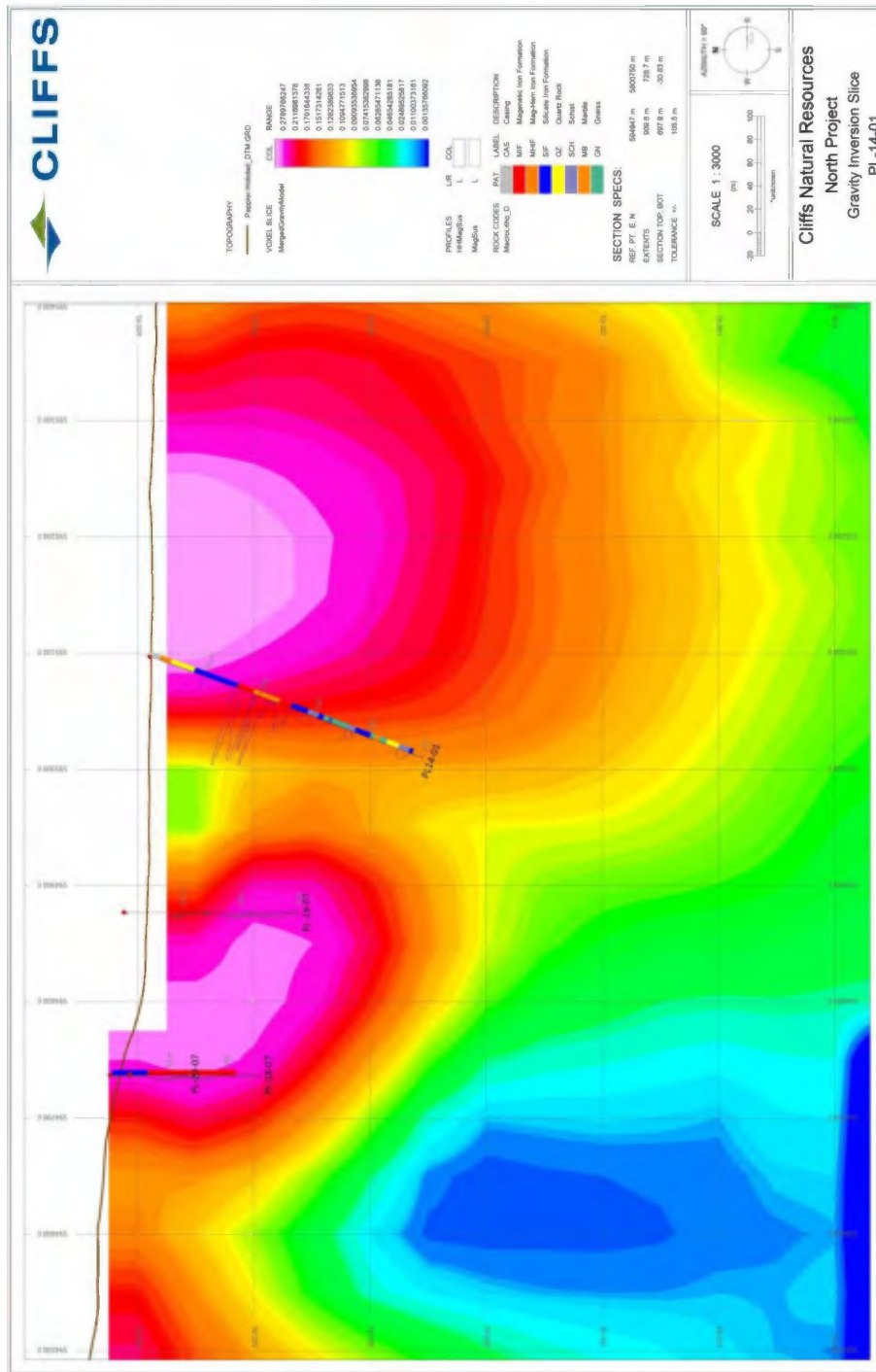


Figure 56. PL-14-01 (DDH2) Density model cross-section with logged geology and handheld magnetic susceptibility data.



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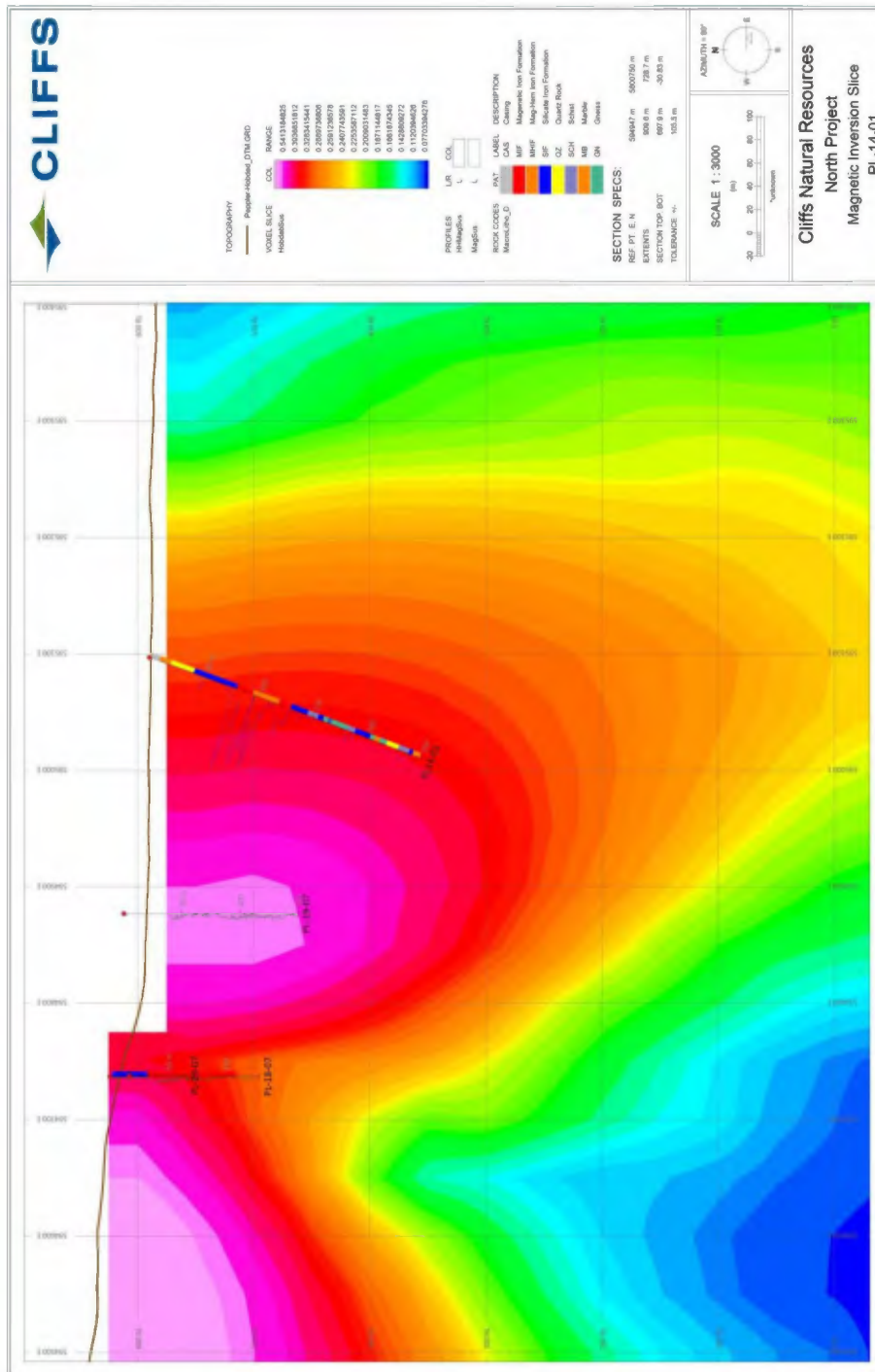
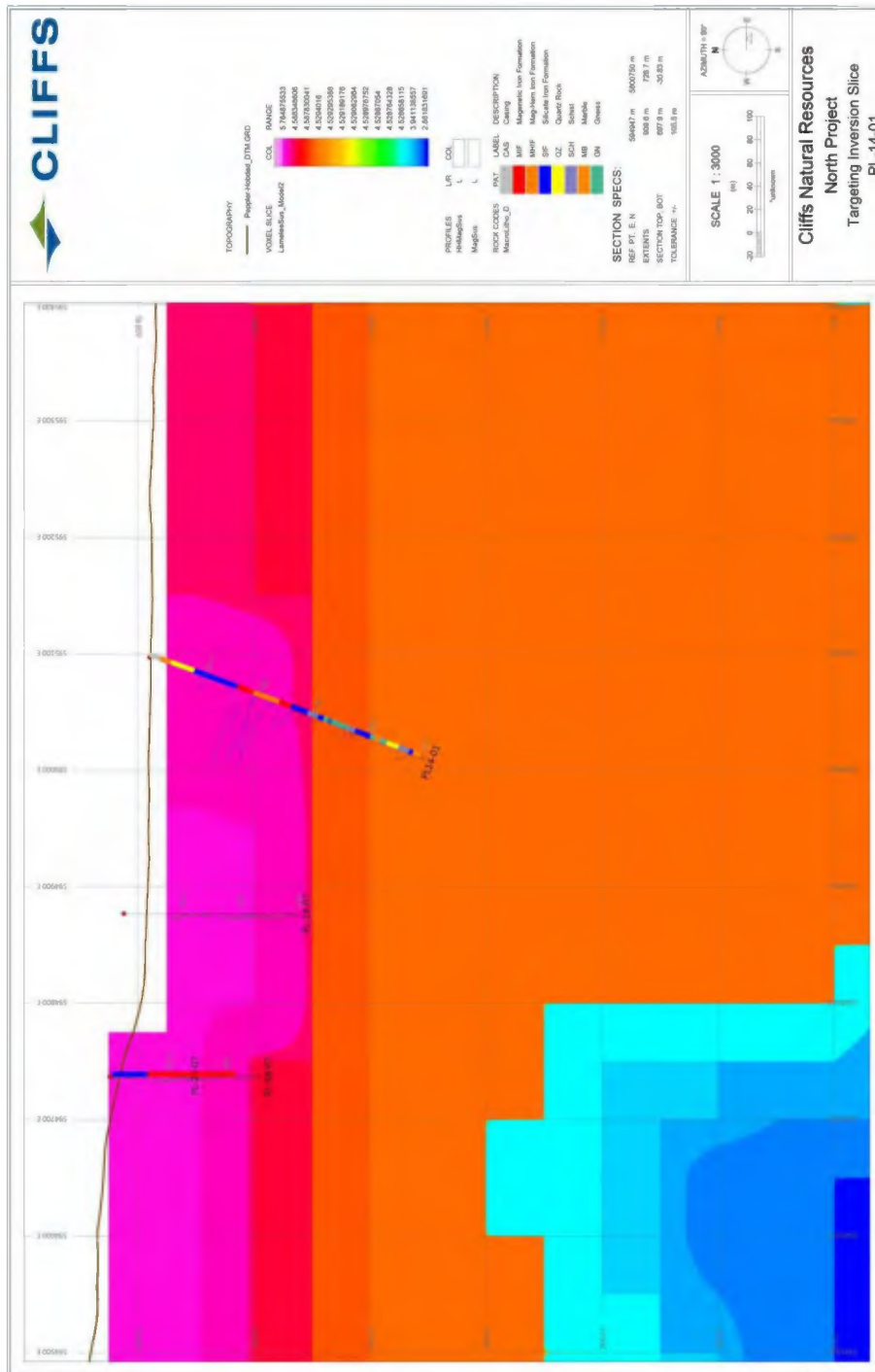


Figure 57. PL-14-01 (DDH2) Magnetic susceptibility model cross-section with logged geology and handheld magnetic susceptibility data.



**Figure 58.** PL-14-01 (DDH2) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

#### **4.4.3. DDH4 preliminary – HH-14-01 final**

The high potential target volume associated with preliminary target hole DDH4 passed the minimum evaluation criteria and was drilled as HH-14-01 with slight adjustments to the final location. The target collar location was moved to the south with dip shallowing from -70 degrees to -68.5. Adjustments were made to move the drill hole closer to the southern edge of the high potential volume to accommodate drilling from the periphery into the target. HH-14-01 is located at the southern margin of the 3D high potential volume representing the Hobdad deposit in Figure 50.

HH-14-01 was drilled into a high density anomaly as depicted in the east trending density model cross-section in Figure 59 and is drilled towards the magnetic high as represented in the magnetic inversion cross-section in Figure 60. The mineral potential volume cross-section depicted in Figure 61 shows that the main high potential region was intersected. Despite this, only gneissic host rock was encountered though the depth was increased from 250m to 320m in hopes of reaching mineralization. Figure 60 illustrates that HH-14-01 was drilled short of intersecting the target magnetic anomaly, but constraints on target depth and per borehole drilling budget prevented continuation. Though HH-14-01 did not intersect mineralization it does serve to act as a deposit delineation boundary to the south, with the high potential region extending northward towards existing and confirmed mineralization. This will help refine the targeting model for further delineation and in-fill drill planning in the future.







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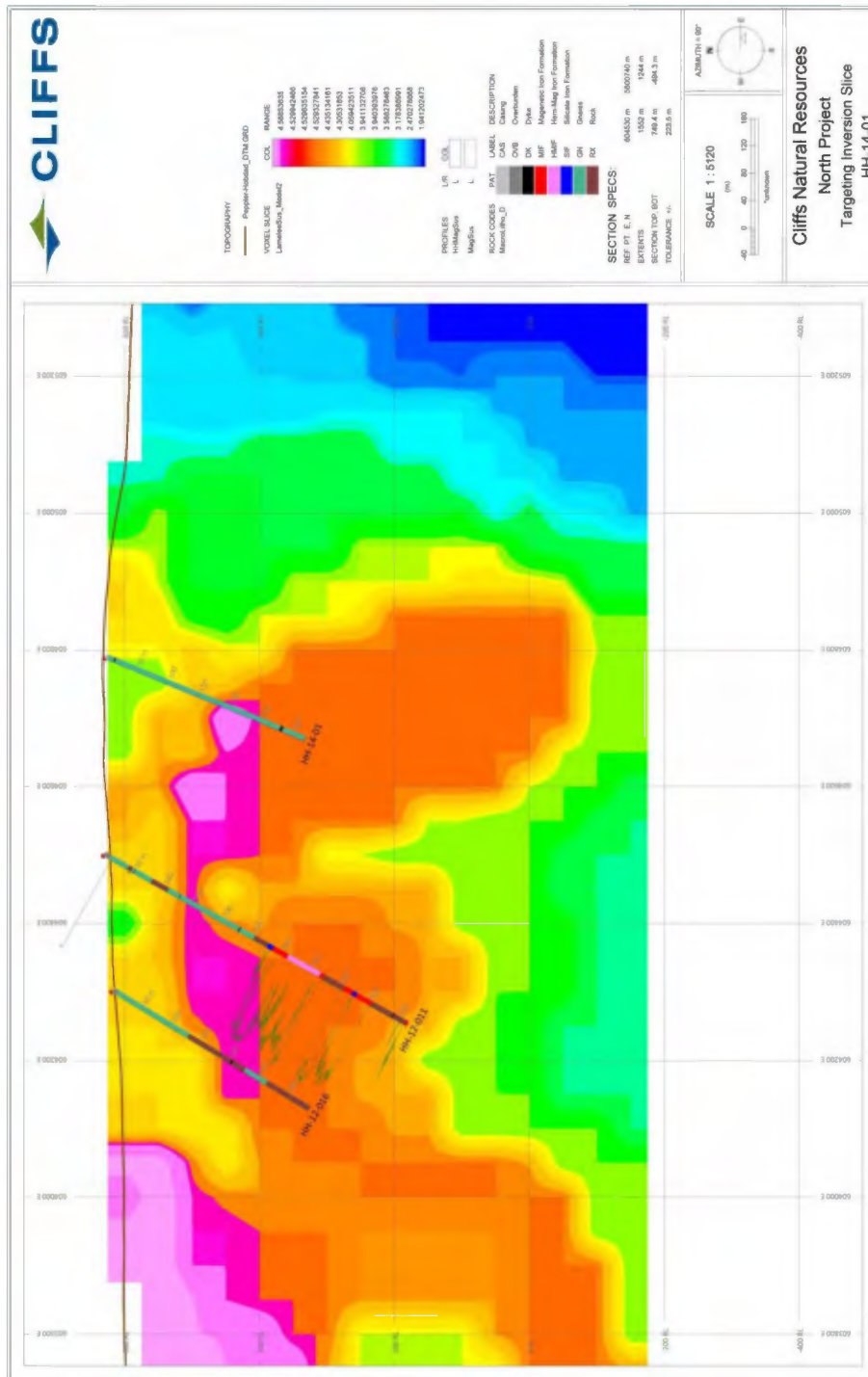


Figure 61. HH-14-01 (DDH4) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

#### **4.4.4. DDH5 preliminary – LJ-14-01 final**

The high potential target volume associated with preliminary target hole DDH5 passed the minimum evaluation criteria and was drilled as LJ-14-01 with slight adjustments to the final collar location. The target collar location was moved slightly south to intersect the bulk of the high potential target volume. The location of LJ-14-01 is shown in Figure 50. The hole is positioned in the center of the 3D high potential volume representing the Lac Jean target.

LJ-14-01 was drilled from a high density anomaly towards a density low (relative) as depicted in the cross-section in Figure 62, and at the periphery of a magnetic susceptibility high as represented in the cross-section in Figure 63. FJ-14-01 was drilled deeper than the planned depth to 252 m as mineralization was encountered at the latter portion of the borehole and continued. Iron formation in drill hole, which is predominantly hematite-rich here, occurs on the margins of a high density anomaly. It does not appear to be strongly susceptible, which might be expected due to its hematite-rich composition. Magnetite-rich iron formation intersected at the end of the hole does spatially correlate with slightly elevated values of susceptibility from the magnetic inversion model. This result corresponds to the location of the high potential region in the 3D mineral potential model volume cross-section providing confidence in the model for future delineation of this potential deposit.





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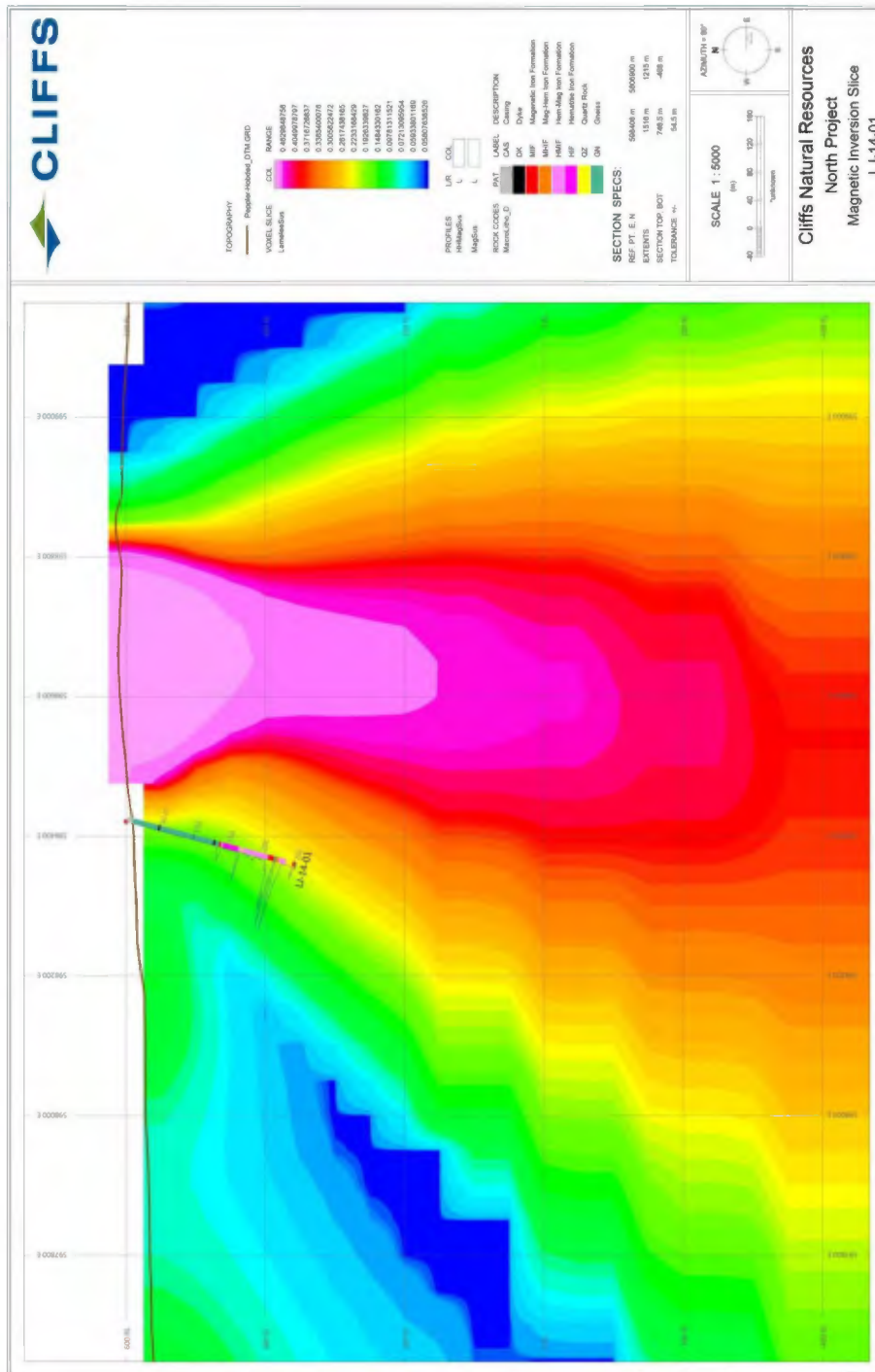


Figure 63. LJ-14-01 (DDH5) Magnetic susceptibility model cross-section with logged geology and handheld magnetic susceptibility data.



#### 4.4.5. *DDH6 preliminary – FB-14-01 final*

The high potential target volume associated with preliminary target hole DDH6 passed the minimum evaluation criteria and was drilled as FB-14-01 with slight adjustments to the final collar location. The target collar location was moved slightly southwest to intersect the bulk of the high potential volume. Figure 51 shows the location of FB-14-01 on the southeast periphery of the 3D high potential region representing the Faber West target.

FB-14-01 was drilled towards a high density anomaly and a high magnetic susceptibility anomaly as depicted in the east-trending cross-section in Figure 65 and Figure 66 respectively. Drilling was oriented to intersect the estimated boundary between host rock and iron ore in order to define the location of the southeastern boundary of mineralization and to provide a representative sample of both host rock and mineralization signatures. FB-14-01 was planned to a depth of 250 m but was continued to a final depth of 350 m as mineralization was continuing. Geophysical characteristics of the intersected rock types as inferred from inversion results, are consistent with previous physical property analysis: marble is low density and low susceptibility, whereas iron formation (MIF and SIF) intersected at depth is dense and magnetic. These correlations substantiate the models for future delineation drill planning of the Faber West target volume.



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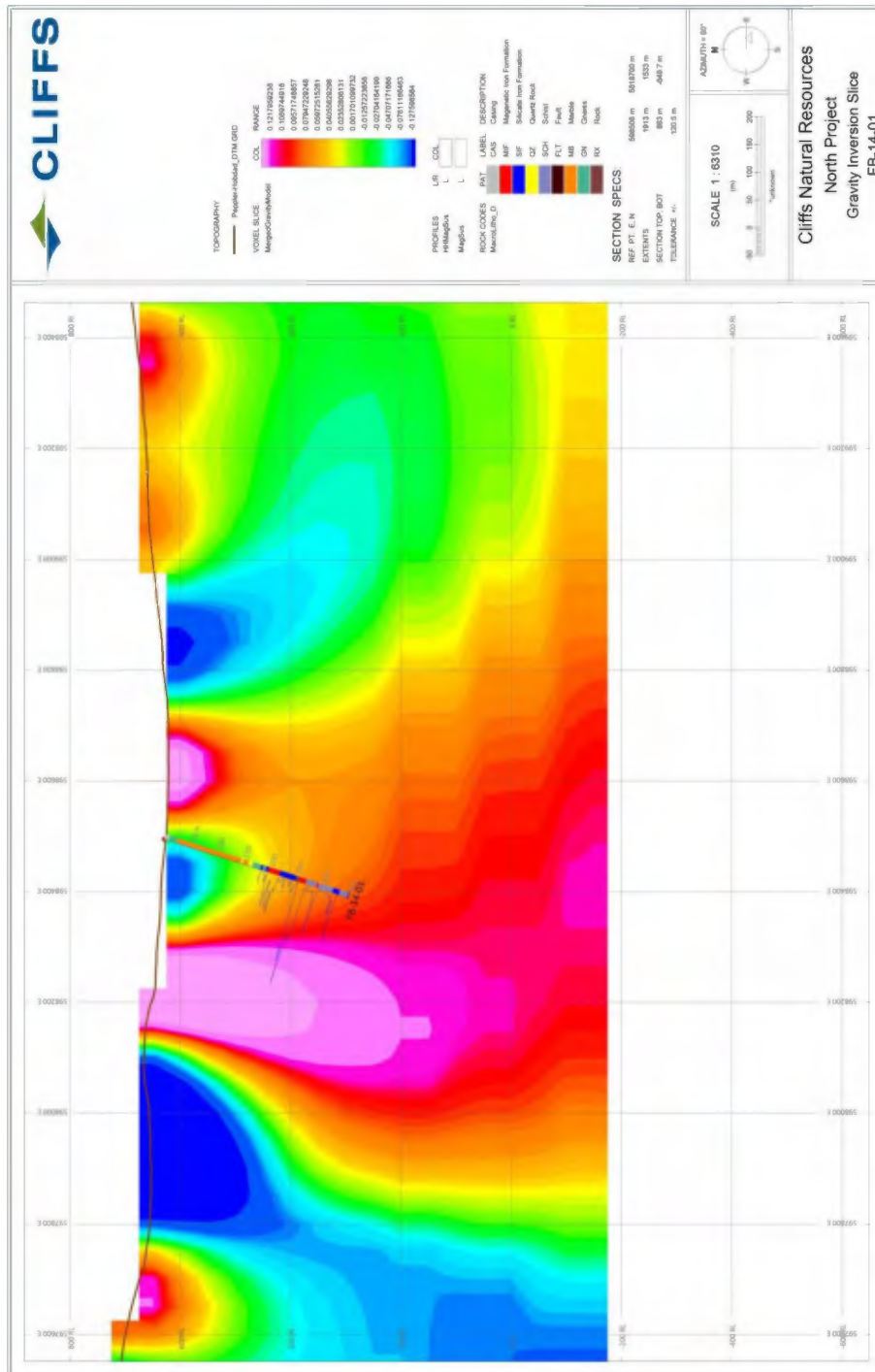


Figure 65. FB-14-01 (DDH6) Density model cross-section with logged geology and handheld magnetic susceptibility data.





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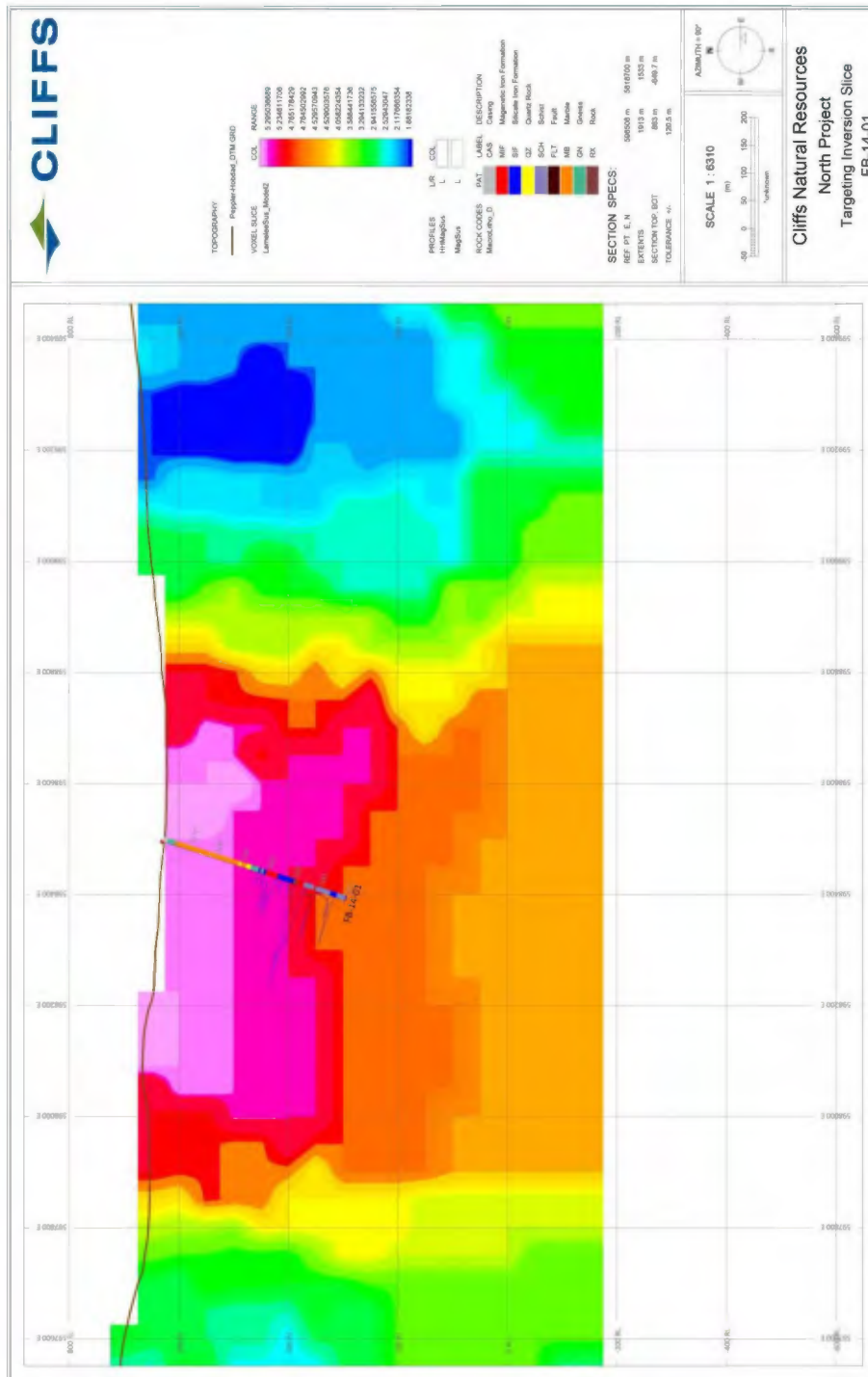


Figure 67. FB-14-01 (DDH6) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

#### 4.4.6. *DDH7 preliminary – FB-14-03 final*

The high potential volume associated with preliminary target hole DDH7 in the northern claims area passed the minimum evaluation criteria and was drilled as FB-14-03 with minor adjustments to the final collar location. The drill hole begins at the southeast limit of the high potential region and intersects its core. The location of FB-14-03 on the southeast periphery of the 3D high potential target region representing the Faber East target is shown in Figure 51.

FB-14-03 was drilled towards a high density anomaly and a high magnetic susceptibility anomaly as depicted in cross-sections within Figure 68 and Figure 69 respectively. Drilling intersected consistent silica-rich iron formation (SIF) for the entire length of the borehole. As expected from physical property investigations, SIF is dense, but not high susceptibility. Background rock types are poorly represented thus differentiation of geophysical signatures of mineralized versus host rock is not possible here. More refinement from future in-fill and step-out delineation drilling is required for characterization of the high potential region at this location.

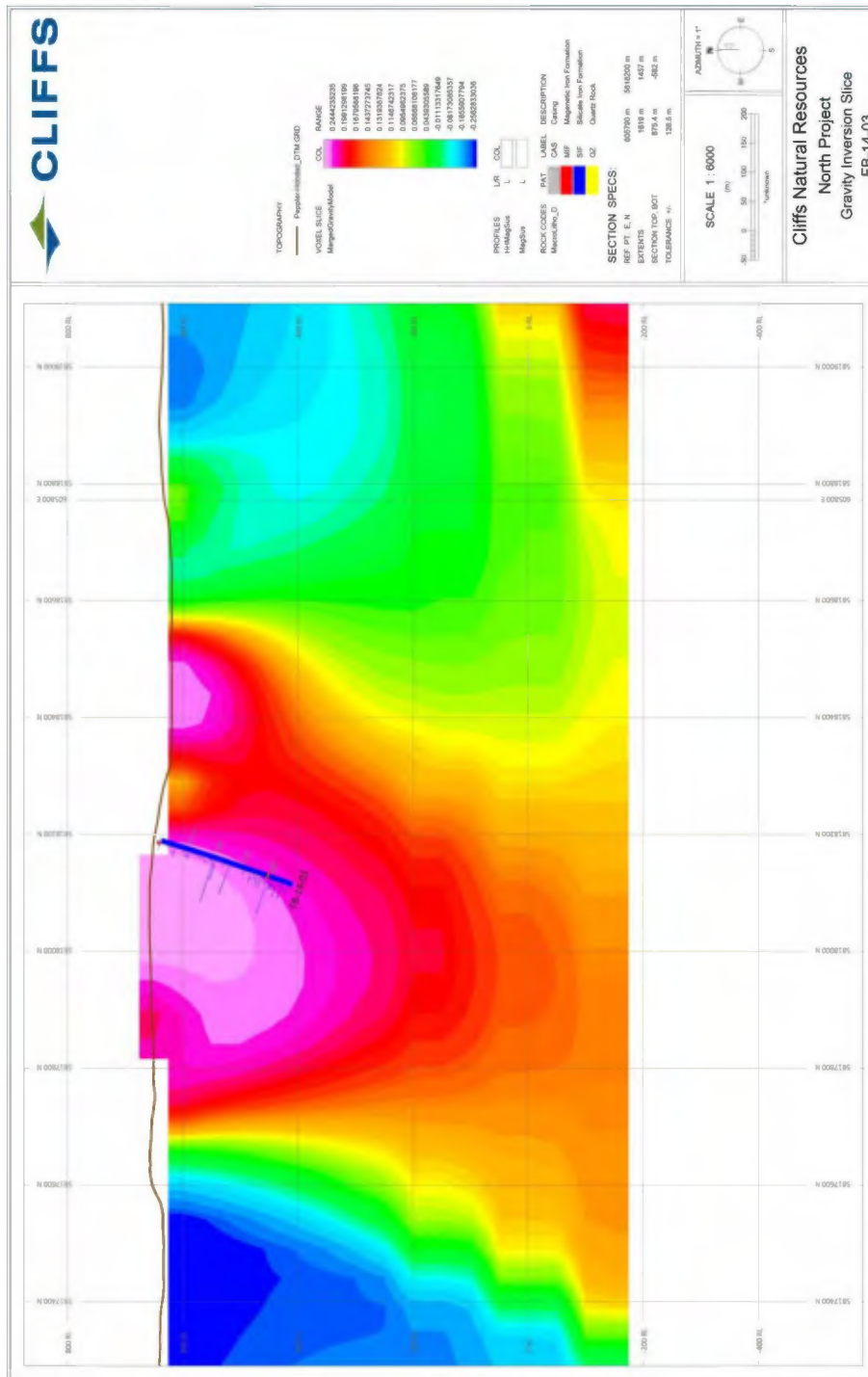


Figure 68. FB-14-03 (DDH7) Density model cross-section with logged geology and handheld magnetic susceptibility data.

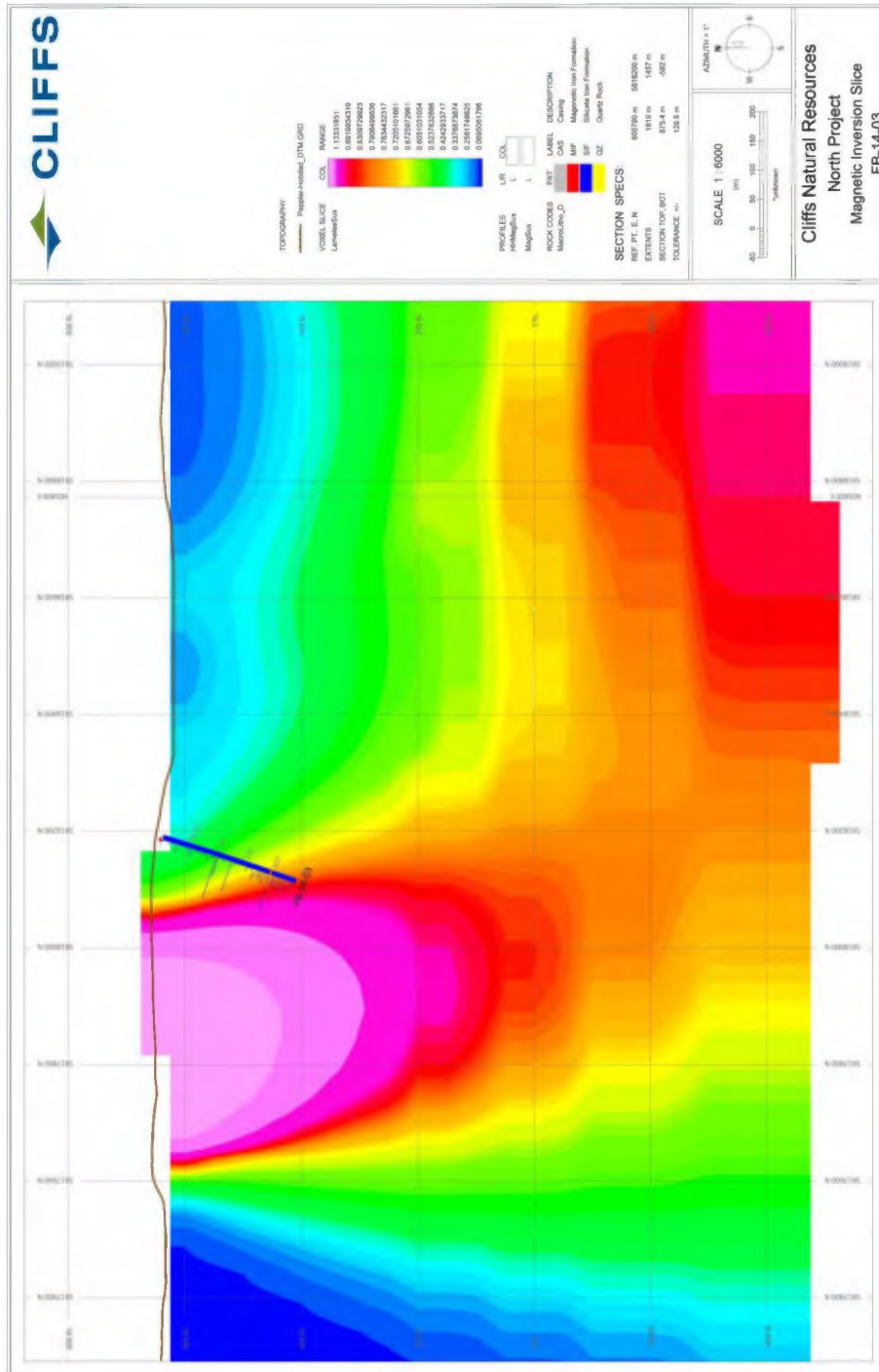


Figure 69. FB-14-03 (DDH7) Magnetic susceptibility model cross-section with logged geology and handheld magnetic susceptibility data.



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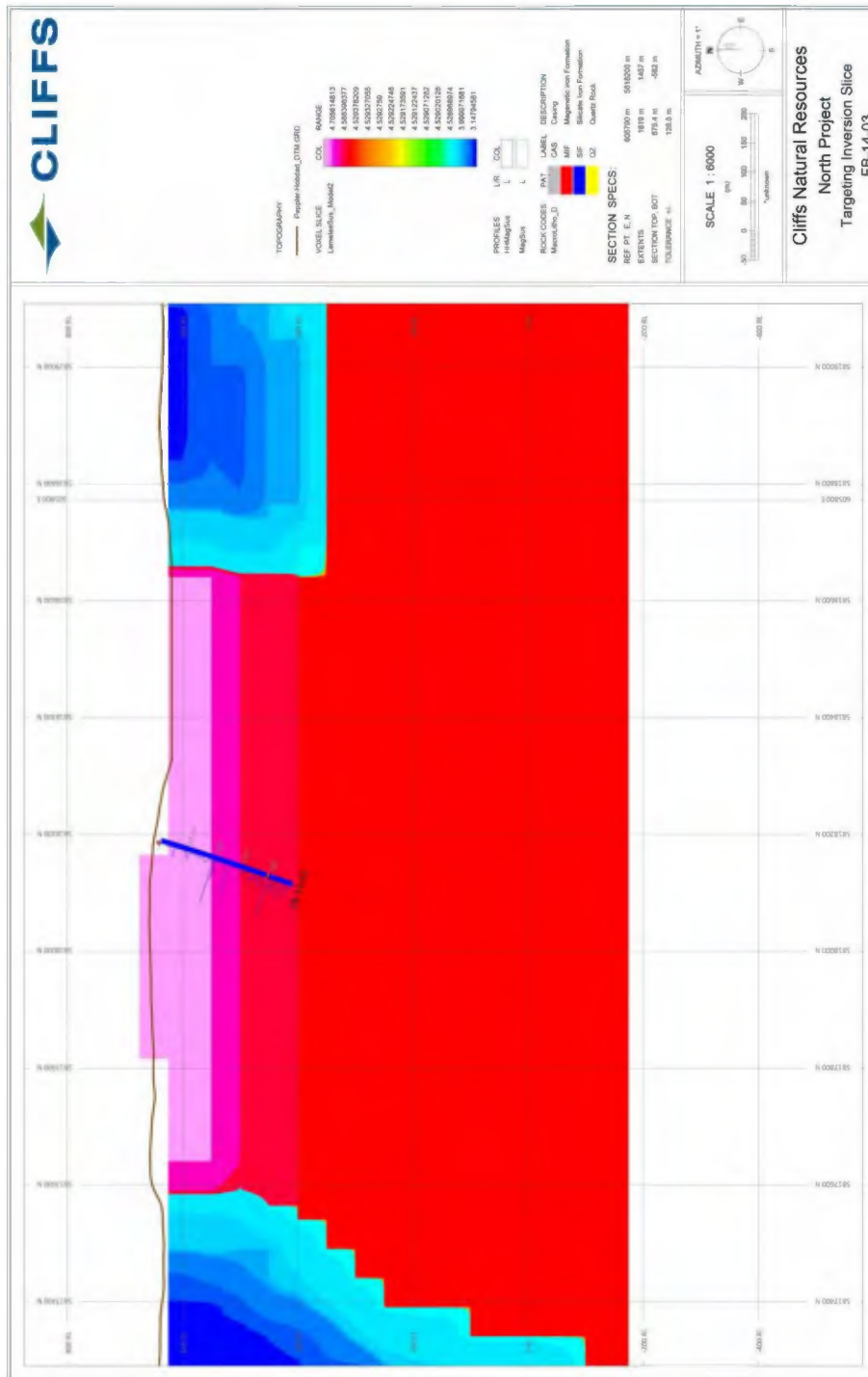


Figure 70. FB-14-03 (DDH7) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

4.4.7. *DDH8 preliminary – terminated*

The target volume associated with DDH8 preliminary target drill hole did not pass the evaluation criteria. The volume of the DDH8 target, as shown in 3D in Figure 51 and in the east-trending cross-section through the 3D mineral potential model in Figure 71, did not pass the evaluation threshold. The volumes of the magnetic susceptibility and density anomalies were not as significant as other existing deposits within the Lamalee-Peppler-Hobdad claims package. This candidate target was terminated from consideration and was not drilled.



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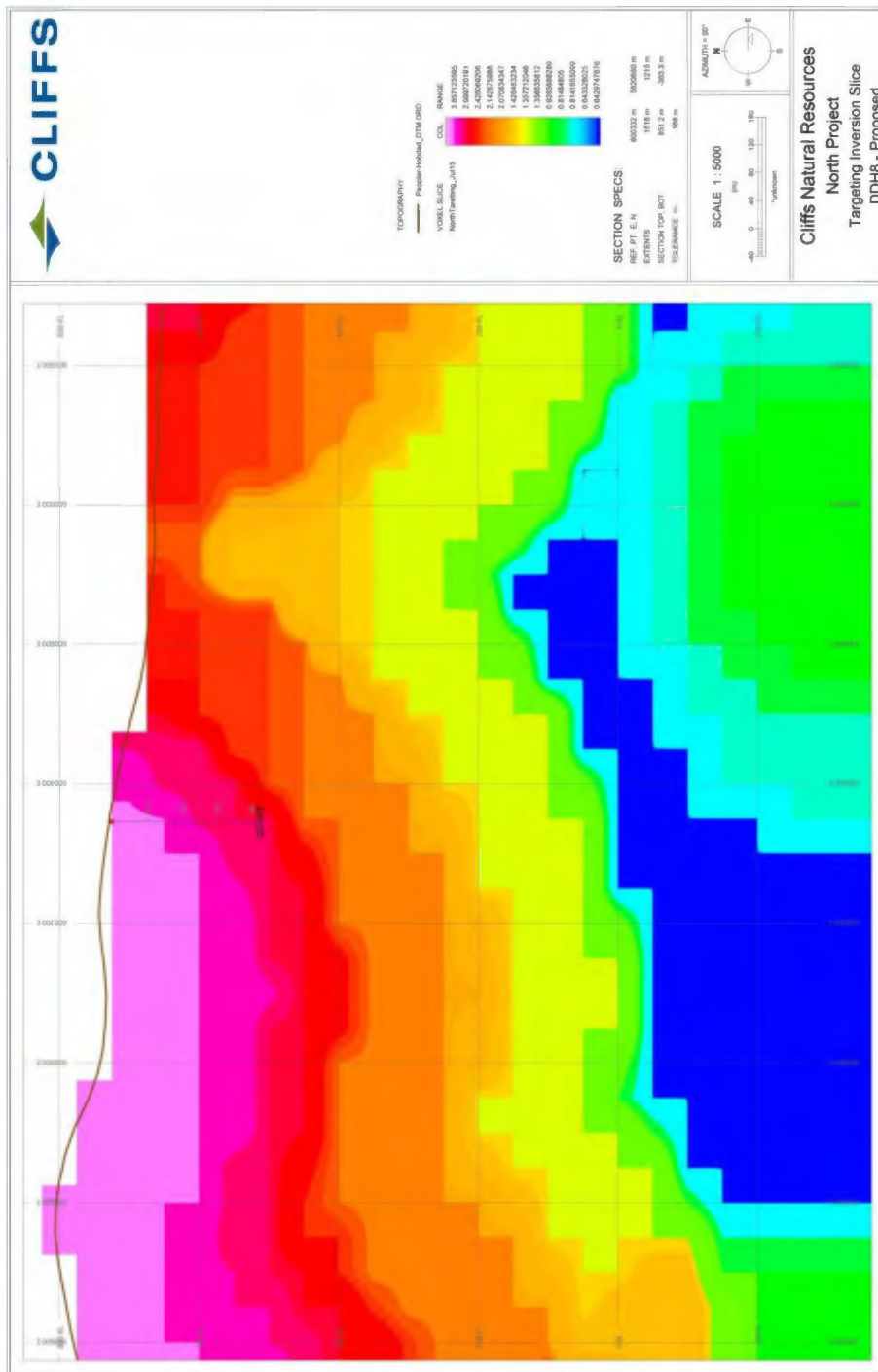


Figure 71. DDH8, mineral potential model cross-section.

#### 4.4.8. *DDH9 preliminary – FB-14-02 final*

The high potential volume associated with preliminary target hole DDH9 passed the minimum evaluation criteria and was drilled as FB-14-02 with slight adjustment to the final collar location. The target collar location was moved slightly north to intersect the bulk of the high potential region at its southeast end while minimizing drill rig logistics for access and set-up. Figure 51 shows the location of FB-14-02 on the southeast portion of the 3D high potential volume correlating with the northern part of the Faber West target.

FB-14-02 was drilled from within a density high toward a density low, and into a magnetic susceptibility high as depicted in Figure 72 and Figure 73 respectively. Drilling continued past the target depth of 200 m to a depth of 293 m as mineralization was encountered and pursued at approximately 200 m. Characterization/differentiation of host-rock and mineralized target volumes was successful through the middle of the 3D targeting volume: marble appears to be dense (contrasting with previous physical property analysis), but not susceptible, while schist and iron ore intersected at depth retain high densities, but are associated with higher susceptibilities. The ability to geophysically characterize hosting and mineralized rocks builds confidence for efficient step-out delineation and in-fill drilling program planning in the future if the Faber West target is developed.







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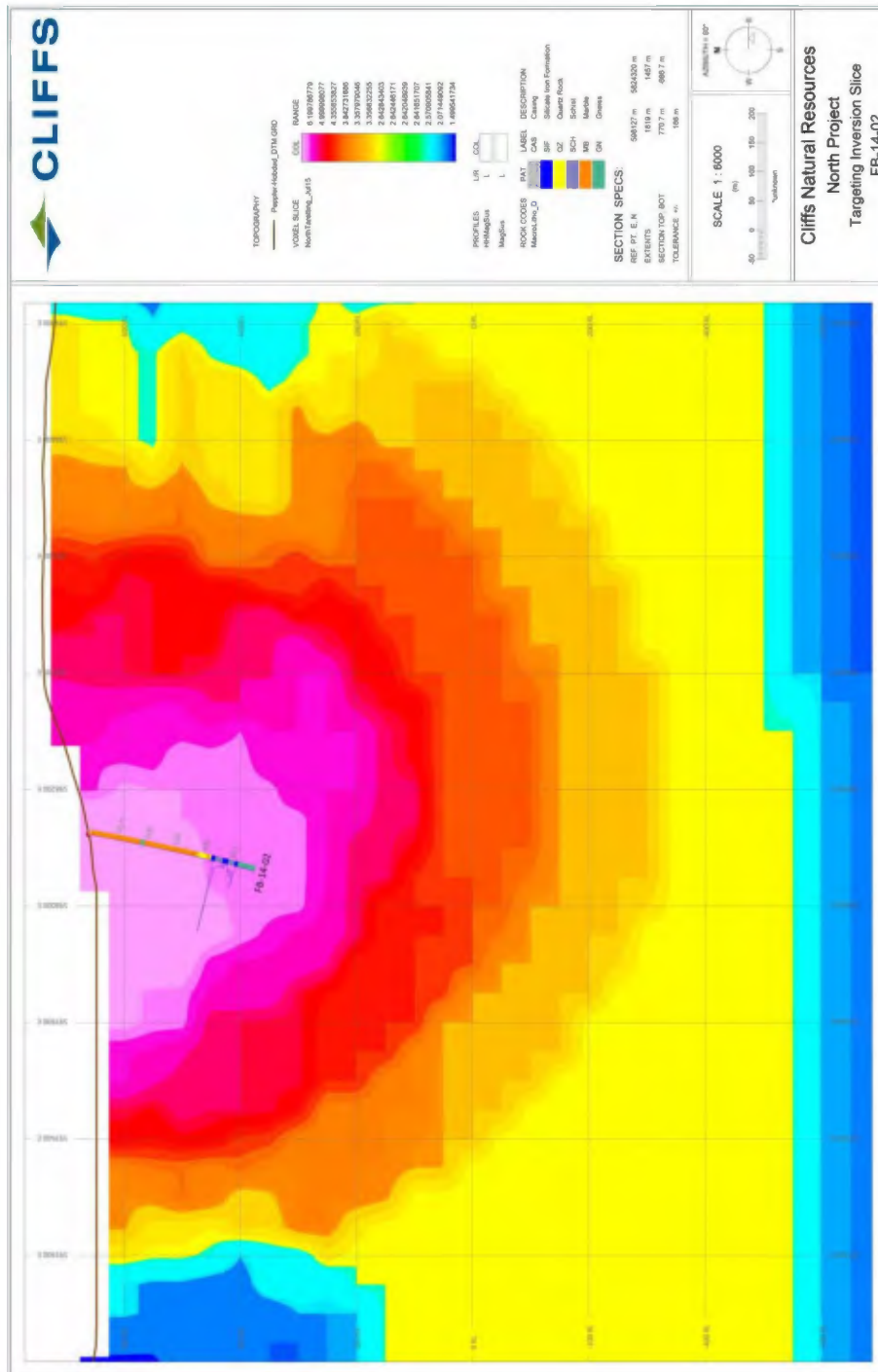


Figure 74. FB-14-02 (DDH9) Mineral potential model cross-section with logged geology and handheld magnetic susceptibility.

4.4.9. *DDH10 preliminary – terminated:*

The high potential target volume associated with DDH10 preliminary target drill hole did not pass the complete evaluation criteria. The volume of the DDH10 target location did pass the evaluation threshold as shown in 3D in Figure 51 and in the east-trending cross-section of the 3D mineral potential model in Figure 75. The volume was similar in size to magnetic susceptibility and density anomalies related to other existing deposits within the Lamalee-Hobdad-Pepler claims package. However, the bulk of this high potential region dips beneath a lake to the north and exists outside of the Cliffs claims package. The portion of this target volume within the Cliffs claims package is shallow and not sufficient to warrant pursuit. This candidate target was terminated from consideration and was not drilled.



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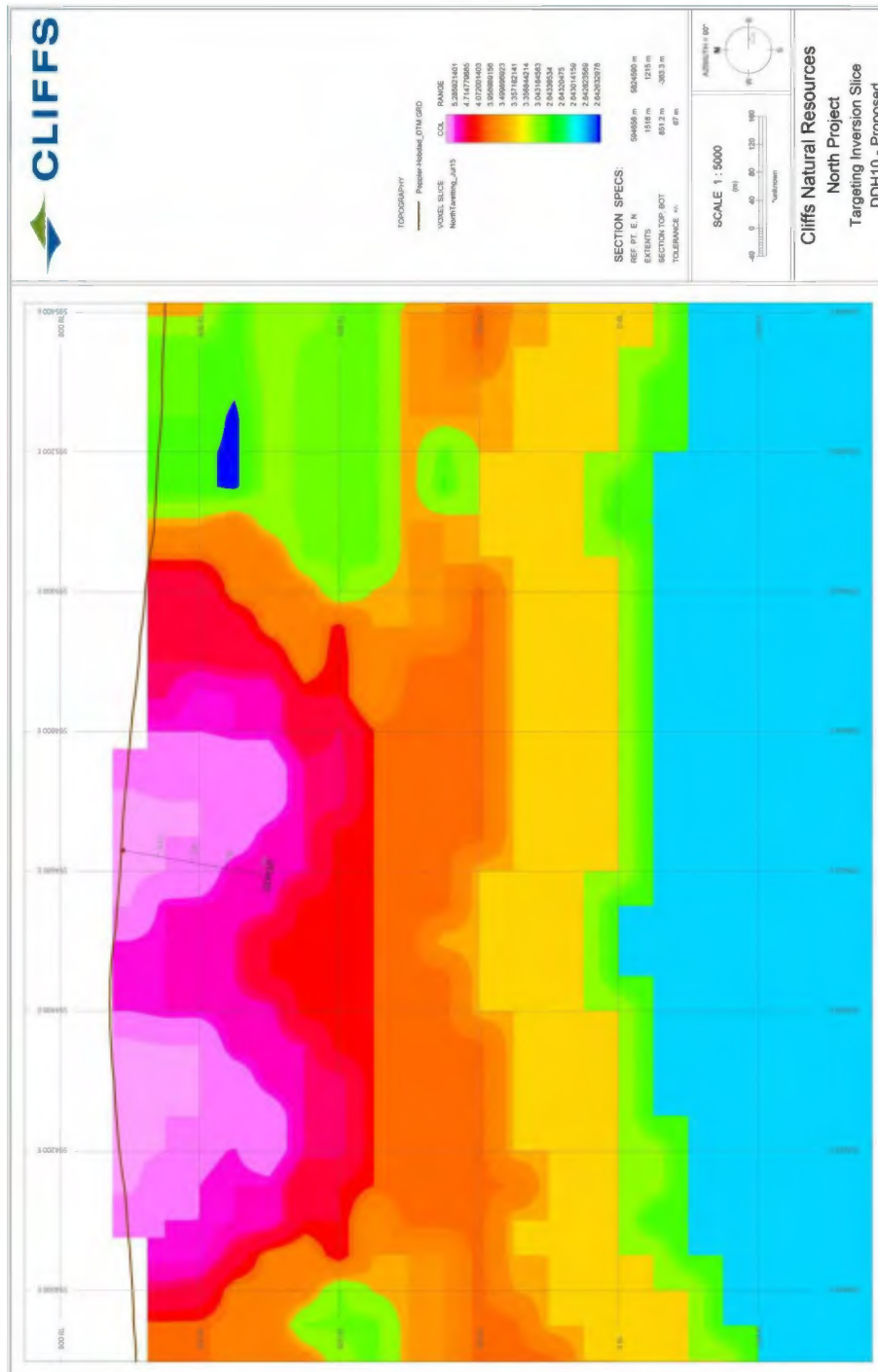


Figure 75. DDH10 mineral potential model cross-section.

## 5. Conclusions and Recommendations

3D targeting for iron ore has been completed over Cliffs Natural Resources' eastern Quebec tenements using aeromagnetic, gravity gradient, borehole logging, and lake sediment geochemistry data. 3D mineral potential modelling was applied to a suite of evidential data layers to find regions where multiple favorable exploration criteria are satisfied. In particular, physical property data from borehole measurements indicated that iron ore should be distinguishable from background rocks by virtue of its elevated susceptibility and density. Therefore targeting emphasized coincident high density and high susceptibility features by assigning high relative weights to these features during the mineral potential modelling process.

The current project succeeded in adding value to Cliffs' exploration programme, through compilation of existing data within a single 3D software platform, and through interpretation of this data in a highly integrated and quantitative manner. Key ingredients for the targeting were 3D density and susceptibility models over the Cliffs' claims area, generated via inversion of airborne magnetic and gravity gradiometer data. The inversions were constrained using borehole physical property data collected at the Lamelee, Hobdad, and Pepler deposits. The inversion models provide valuable information about the depths, sizes and, shapes of the sources of magnetic and gravity responses. Insight regarding the tops of susceptible and dense bodies and their volume informs exploration as well as mining decisions.

3D mineral potential modelling highlighted the known resources at Lamelee, Hobdad, and Pepler, and indicated the spatial extents of other prospective areas that have been less extensively drilled or explored, such as the Pepler West, Lac Jean, and Faber targets. Although mineral potential modelling favored areas of coincident high magnetic susceptibility and density, inversion results showed that parts of known iron ore occurrences are dense but not magnetically susceptible, and as such may not be emphasized in the results. Silica iron ore or hematite-rich iron ore, based on physical

property analysis, may fit this description. High densities unaccompanied by high susceptibilities should be considered of interest. These areas include regions east of Lac Jean, southeast of Peppler and south of Hobdad. Regions that are susceptible but not dense, for example the northern Lac Jean area, or ground immediately east of Peppler, are less likely to be iron ore, and could be magnetite-bearing background rocks such as pyroxenite.

The 2014 drilling programme was planned in light of the inversion and mineral potential modelling results. 3D results output from modelling allow drill orientations to be optimized to better ensure the target of interest is intersected. This also allowed for planning of drillholes to sample background rock, host rocks, and potentially mineralized rock to improve knowledge of geophysical characteristics of each. Ten proposed targets were reviewed and refined by the Cliffs Natural Resources Quebec iron ore working group, which encompassed Cliffs' Natural Resources personnel, Mira Geoscience, DGI Geoscience, Hammer Collaborations, and MapIT consultants. Seven drill holes were drilled with final locations and orientations dictated by results of inversion and mineral potential modelling.

Geophysical inversion and mineral potential modelling methodology could be refined in a number of ways for future exploration within the southern Labrador Trough. Several options are briefly described below.

Constraining magnetic and gravity inversions using borehole data acts to guide the inversion result to achieve values consistent with measured data and logged geology. The scale of the modelling, however, limits the effectiveness of these constraints. The cells adopted for targeting were 50 m cubes, whereas borehole measurements were taken centimeters apart along the drill hole. The measured physical property data could be used much more effectively if combined with geological modelling at the deposit-scale. At local scales it may be possible to resolve, and track in 3D, various types of iron formation, which was not possible at the resolution of the modelling in this project. Other constrained modelling approaches might be considered if modelling was done at the

deposit scale. VPmg can be used to modify the shape of geological contacts. Given a geological starting model (from mapping, drilling, or preliminary inversion modelling), the algorithm updates the geometry of the contacts in a way which improves the fit to the observed data.

It is concluded that there is strong magnetic remanence in the project area, since measured susceptibilities are not nearly high enough to account for the intense magnetic anomalies. The magnetic susceptibilities in the inverted model are artificially high. An advanced inversion strategy, based on deposit scale modelling, could account for this.

Collection of additional physical property data, including magnetic remanence data, would be beneficial for improved understanding of typical physical property characteristics of various iron ore types, as well as of background rock, which was (understandably) not well sampled in the boreholes. Outcrop physical property measurements are recommended. Consistency between hand-held susceptibility data and borehole data was demonstrated, as such, the hand-held magnetic susceptibility meter is recommended as a tool for outcrop sample susceptibility measurements.

Future exploration and mineral potential modelling work within the Lamelee and Hobdad-Peppler mineral claims, or at other properties within the southern Labrador Trough might include more advanced analysis of EM data, which showed some correlation to known mineral occurrences in the project area.

Incorporation of additional criteria for 3D mineral potential modelling, such as detailed structural interpretations, locations of potentially important structural features such as hold hinges, additional EM data, or more densely spaced geochemical data will help further focus exploration and drilling. Mineral potential modelling at a finer scale could be done following completion of more local-scale inversion modelling, if a detailed drill targeting program is planned around a specific deposit. This work employed a knowledge-driven approach to targeting, however a data-driven method can be applied

if a set of training regions or cells is established. Statistical methods, such as weights-of-evidence, will help to identify or confirm relationships between known mineral occurrences and various input or evidential datasets.

The compilation, analysis, and modelling of exploration data within a single 3D environment, such as GOCAD, is beneficial for optimal interpretation of historic and recent data. Integrated modelling and interpretation leads to a superior understanding of spatial relationships existing between various exploration data and known mineral occurrences. This helps geoscientists develop a robust set of exploration criteria that can be used to refine drilling programs, and to identify new areas for exploration.

## 6. Deliverables

**Table 5.** Summary of deliverables

Deliverable	Description
<p>GOCAD projects</p> <ol style="list-style-type: none"> <li>1. Lamelee_Hobdad_Pepler_GOCAD_targeting_project</li> <li>2. Northern_Claims_GOCAD_targeting_project</li> </ol>	<p>Two GOCAD projects are delivered, one containing input data and targeting results for the southern claims (Lamelee, Hobdad, and Pepler), and one containing input data and targeting results for the northern claims.</p>
<p>Inversion models</p> <ol style="list-style-type: none"> <li>1. Hobdad_final_mag_grav_inversions_Aug15_2014</li> <li>2. Lamelee_final_mag_grav_inversions_Aug15_2014</li> <li>3. NorthernClaims_final_mag_grav_inversions_Aug15_2014</li> </ol>	<p>Three sets of inversion models are delivered: inversion results from gravity and density modelling over the Hobdad-Pepler block, over the Lamelee block, and over the Northern Claims block. Inversion results are provided in GOCAD voxel format, in UBC-GIF format, as isosurfaces (dxf and GOCAD surfaces), and Geosoft grid sections (topo-draped, NS, EW)</p>



<p>Targeting results</p> <ol style="list-style-type: none"><li>1. Lamelee_Hobdad_final_targeting_results_Aug15_2014</li><li>2. NorthernClaims_final_targeting_results_Aug15_2014</li></ol>	<p>Two sets of targeting results are provided: results from targeting over the Lamelee, Hobdad, and Pepler claims, and results from targeting over the Northern Claims. Results are contained on a GOCAD voxel grid, and are also provided in UBC-GIF format, and in the form of isosurfaces representing high target potential regions.</p>
<p>PDF Report</p>	<p>The final project report contains details on project objective, inversion and targeting methodology, inversion and targeting results, and preliminary interpretations of 3D models. Also contained in the report is a list of the proposed and finalized drill targets, as well as a discussion of drilling results.</p>

## 7. References

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Fullagar, P.K., Hughes, N., and Paine, J., 2000, Drilling-constrained 3D gravity interpretation, *Exploration Geophysics*, v. 31, p. 17-23.

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Wahl, 2013, Mineral Resource Technical Report, Lamalee Project, Quebec.

**APPENDIX II**

**Summary of Claims Comprising the Pepler-Lam  e Property**

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
<i>Owner: Cliffs Québec Mine de Fer Limitée (88332) 1 %, Quinto Mining Corporation (95800) 9%</i>						
19900	3/May/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
19901	3/May/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
19902	3/May/04	26/Mar/15	52.63	\$48.13	\$1,800.00	\$127.00
19903	3/May/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
19904	3/May/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
19905	3/May/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
19906	3/May/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
19907	3/May/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
19908	3/May/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
19909	3/May/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
19910	3/May/04	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
19911	3/May/04	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
19912	3/May/04	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
19913	3/May/04	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
19914	3/May/04	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
31898	11/Aug/04	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
31899	11/Aug/04	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
31900	11/Aug/04	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
31901	11/Aug/04	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
31902	11/Aug/04	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
31903	11/Aug/04	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
31904	11/Aug/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
31905	11/Aug/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
31906	11/Aug/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
31907	11/Aug/04	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
31908	11/Aug/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
31909	11/Aug/04	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
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31917	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
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31919	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
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31921	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
31922	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
31923	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
31924	11/Aug/04	26/Mar/15	52.60	\$0.00	\$1,800.00	\$127.00
33214	10/Aug/04	26/Mar/15	52.56	\$0.00	\$1,800.00	\$127.00
33215	10/Aug/04	26/Mar/15	52.56	\$0.00	\$1,800.00	\$127.00
33216	10/Aug/04	26/Mar/15	52.56	\$0.00	\$1,800.00	\$127.00
33217	10/Aug/04	26/Mar/15	52.56	\$0.00	\$1,800.00	\$127.00
33218	10/Aug/04	26/Mar/15	52.55	\$0.00	\$1,800.00	\$127.00
33219	10/Aug/04	26/Mar/15	52.55	\$0.00	\$1,800.00	\$127.00
33220	10/Aug/04	26/Mar/15	52.55	\$0.00	\$1,800.00	\$127.00
33221	10/Aug/04	26/Mar/15	52.55	\$0.00	\$1,800.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
33222	10/Aug/04	26/Mar/15	52.54	\$0.00	\$1,800.00	\$127.00
33223	10/Aug/04	26/Mar/15	52.54	\$0.00	\$1,800.00	\$127.00
33224	10/Aug/04	26/Mar/15	52.54	\$0.00	\$1,800.00	\$127.00
43503	8/Oct/04	26/Mar/15	52.50	\$0.00	\$1,800.00	\$127.00
43504	8/Oct/04	26/Mar/15	52.50	\$0.00	\$1,800.00	\$127.00
43505	8/Oct/04	26/Mar/15	52.50	\$277,147.51	\$1,800.00	\$127.00
43506	8/Oct/04	26/Mar/15	52.49	\$0.00	\$1,800.00	\$127.00
43507	8/Oct/04	26/Mar/15	52.49	\$629,837.19	\$1,800.00	\$127.00
43508	8/Oct/04	26/Mar/15	52.49	\$80,243.70	\$1,800.00	\$127.00
43509	8/Oct/04	26/Mar/15	52.48	\$198,082.11	\$1,800.00	\$127.00
43510	8/Oct/04	26/Mar/15	52.48	\$94,603.78	\$1,800.00	\$127.00
43511	8/Oct/04	26/Mar/15	52.48	\$38,913.55	\$1,800.00	\$127.00
59378	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59379	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59380	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59381	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59382	17/Mar/05	26/Mar/15	52.46	\$0.00	\$1,800.00	\$127.00
59383	17/Mar/05	26/Mar/15	52.46	\$0.00	\$1,800.00	\$127.00
59384	17/Mar/05	26/Mar/15	52.46	\$0.00	\$1,800.00	\$127.00
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59386	17/Mar/05	26/Mar/15	52.45	\$0.00	\$1,800.00	\$127.00
59387	17/Mar/05	26/Mar/15	52.45	\$0.00	\$1,800.00	\$127.00
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59400	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59401	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59402	17/Mar/05	26/Mar/15	52.47	\$0.00	\$1,800.00	\$127.00
59403	17/Mar/05	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
59404	17/Mar/05	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
59405	17/Mar/05	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
59406	17/Mar/05	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
59407	17/Mar/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
59408	17/Mar/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
59409	17/Mar/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
59410	17/Mar/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
59411	17/Mar/05	26/Mar/15	52.58	\$0.00	\$1,800.00	\$127.00
59412	17/Mar/05	26/Mar/15	52.58	\$0.00	\$1,800.00	\$127.00
59413	17/Mar/05	26/Mar/15	52.58	\$0.00	\$1,800.00	\$127.00
59414	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00
59415	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00
59416	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
59417	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00
59418	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00
59419	17/Mar/05	26/Mar/15	52.57	\$0.00	\$1,800.00	\$127.00
84268	8/Jul/05	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
84269	8/Jul/05	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
84270	8/Jul/05	26/Mar/15	52.65	\$0.00	\$1,800.00	\$127.00
84271	8/Jul/05	26/Mar/15	52.64	\$0.00	\$1,800.00	\$127.00
84272	8/Jul/05	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
84273	8/Jul/05	26/Mar/15	52.63	\$0.00	\$1,800.00	\$127.00
84274	8/Jul/05	26/Mar/15	52.63	\$160,487.41	\$1,800.00	\$127.00
84275	8/Jul/05	26/Mar/15	52.63	\$239,068.72	\$1,800.00	\$127.00
84276	8/Jul/05	26/Mar/15	52.62	\$0.00	\$1,800.00	\$127.00
84277	8/Jul/05	26/Mar/15	52.62	\$67,168.40	\$1,800.00	\$127.00
84278	8/Jul/05	26/Mar/15	52.62	\$1,728,329.64	\$1,800.00	\$127.00
84279	8/Jul/05	26/Mar/15	52.62	\$525,846.05	\$1,800.00	\$127.00
84280	8/Jul/05	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
84281	8/Jul/05	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
84282	8/Jul/05	26/Mar/15	52.61	\$319,099.50	\$1,800.00	\$127.00
84283	8/Jul/05	26/Mar/15	52.61	\$0.00	\$1,800.00	\$127.00
94887	19/Sep/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
94888	19/Sep/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
94889	19/Sep/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
94890	19/Sep/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
94891	19/Sep/05	26/Mar/15	52.59	\$0.00	\$1,800.00	\$127.00
109903	20/Dec/05	26/Mar/15	52.42	\$0.00	\$1,800.00	\$127.00
109904	20/Dec/05	26/Mar/15	52.41	\$0.00	\$1,800.00	\$127.00
109905	20/Dec/05	26/Mar/15	52.41	\$0.00	\$1,800.00	\$127.00
109906	20/Dec/05	26/Mar/15	52.41	\$0.00	\$1,800.00	\$127.00
109907	20/Dec/05	26/Mar/15	52.41	\$0.00	\$1,800.00	\$127.00
109908	20/Dec/05	26/Mar/15	52.40	\$0.00	\$1,800.00	\$127.00
109909	20/Dec/05	26/Mar/15	52.40	\$0.00	\$1,800.00	\$127.00
109910	20/Dec/05	26/Mar/15	52.40	\$0.00	\$1,800.00	\$127.00
109911	20/Dec/05	26/Mar/15	52.40	\$0.00	\$1,800.00	\$127.00
109912	20/Dec/05	26/Mar/15	52.42	\$0.00	\$1,800.00	\$127.00
109913	20/Dec/05	26/Mar/15	52.42	\$0.00	\$1,800.00	\$127.00
109914	20/Dec/05	26/Mar/15	52.42	\$0.00	\$1,800.00	\$127.00
2005323	6/Apr/06	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2005324	6/Apr/06	26/Mar/15	52.50	\$0.00	\$1,350.00	\$127.00
2005325	6/Apr/06	26/Mar/15	52.49	\$0.00	\$1,350.00	\$127.00
2005326	6/Apr/06	26/Mar/15	52.48	\$0.00	\$1,350.00	\$127.00
2005327	6/Apr/06	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2005328	6/Apr/06	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2005329	6/Apr/06	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2024653	14/Sep/06	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2024654	14/Sep/06	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2024655	14/Sep/06	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2024656	14/Sep/06	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2024657	14/Sep/06	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2024658	14/Sep/06	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2024659	14/Sep/06	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2024660	14/Sep/06	26/Mar/15	52.63	\$0.00	\$1,350.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2024661	14/Sep/06	26/Mar/15	52.63	\$0.00	\$1,350.00	\$127.00
2024662	14/Sep/06	26/Mar/15	52.63	\$0.00	\$1,350.00	\$127.00
2049582	19/Jan/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2049583	19/Jan/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2049584	19/Jan/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2049585	19/Jan/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2049586	19/Jan/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2049587	19/Jan/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2049588	19/Jan/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2049589	19/Jan/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2049600	19/Jan/07	26/Mar/15	52.42	\$0.00	\$1,350.00	\$127.00
2049601	19/Jan/07	26/Mar/15	52.42	\$0.00	\$1,350.00	\$127.00
2049602	19/Jan/07	26/Mar/15	52.42	\$0.00	\$1,350.00	\$127.00
2049603	19/Jan/07	26/Mar/15	52.41	\$0.00	\$1,350.00	\$127.00
2049604	19/Jan/07	26/Mar/15	52.41	\$0.00	\$1,350.00	\$127.00
2049605	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049606	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049607	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049608	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049609	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049610	19/Jan/07	26/Mar/15	52.36	\$0.00	\$1,350.00	\$127.00
2049611	19/Jan/07	26/Mar/15	52.35	\$0.00	\$1,350.00	\$127.00
2049612	19/Jan/07	26/Mar/15	52.35	\$0.00	\$1,350.00	\$127.00
2049613	19/Jan/07	26/Mar/15	52.35	\$0.00	\$1,350.00	\$127.00
2049614	19/Jan/07	26/Mar/15	52.35	\$0.00	\$1,350.00	\$127.00
2115665	7/Aug/07	26/Mar/15	52.51	\$0.00	\$1,350.00	\$127.00
2115666	7/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2115667	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2115668	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2115669	7/Aug/07	26/Mar/15	52.51	\$0.00	\$1,350.00	\$127.00
2115670	7/Aug/07	26/Mar/15	52.50	\$0.00	\$1,350.00	\$127.00
2115671	7/Aug/07	26/Mar/15	52.49	\$0.00	\$1,350.00	\$127.00
2115672	7/Aug/07	26/Mar/15	52.48	\$0.00	\$1,350.00	\$127.00
2115673	7/Aug/07	26/Mar/15	52.47	\$0.00	\$1,350.00	\$127.00
2115674	7/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2115675	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2115676	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2115677	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2115678	7/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116317	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116318	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116319	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116320	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116321	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116322	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116323	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116324	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116325	9/Aug/07	26/Mar/15	52.41	\$0.00	\$1,350.00	\$127.00
2116326	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116327	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116328	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2116329	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116330	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116331	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116332	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116333	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116334	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116335	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116336	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2116337	9/Aug/07	26/Mar/15	52.42	\$0.00	\$1,350.00	\$127.00
2116338	9/Aug/07	26/Mar/15	52.42	\$0.00	\$1,350.00	\$127.00
2116339	9/Aug/07	26/Mar/15	52.41	\$0.00	\$1,350.00	\$127.00
2116340	9/Aug/07	26/Mar/15	52.41	\$0.00	\$1,350.00	\$127.00
2116341	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116342	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116343	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116344	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116345	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116346	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116347	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116348	9/Aug/07	26/Mar/15	52.40	\$0.00	\$1,350.00	\$127.00
2116349	9/Aug/07	26/Mar/15	52.39	\$0.00	\$1,350.00	\$127.00
2116350	9/Aug/07	26/Mar/15	52.39	\$0.00	\$1,350.00	\$127.00
2116351	9/Aug/07	26/Mar/15	52.39	\$0.00	\$1,350.00	\$127.00
2116352	9/Aug/07	26/Mar/15	52.39	\$0.00	\$1,350.00	\$127.00
2116353	9/Aug/07	26/Mar/15	52.38	\$0.00	\$1,350.00	\$127.00
2116354	9/Aug/07	26/Mar/15	52.38	\$0.00	\$1,350.00	\$127.00
2116355	9/Aug/07	26/Mar/15	52.38	\$0.00	\$1,350.00	\$127.00
2116407	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116408	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116409	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116410	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116411	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116412	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116413	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116414	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116415	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116416	9/Aug/07	26/Mar/15	52.46	\$0.00	\$1,350.00	\$127.00
2116417	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116418	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116419	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116420	9/Aug/07	26/Mar/15	52.45	\$0.00	\$1,350.00	\$127.00
2116421	9/Aug/07	26/Mar/15	52.44	\$0.00	\$1,350.00	\$127.00
2116422	9/Aug/07	26/Mar/15	52.43	\$0.00	\$1,350.00	\$127.00
2117893	17/Aug/07	26/Mar/15	52.61	\$0.00	\$1,350.00	\$127.00
2117894	17/Aug/07	26/Mar/15	52.61	\$0.00	\$1,350.00	\$127.00
2117895	17/Aug/07	26/Mar/15	52.61	\$0.00	\$1,350.00	\$127.00
2117896	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2117897	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2117898	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2117899	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2117900	17/Aug/07	26/Mar/15	52.59	\$0.00	\$1,350.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2117901	17/Aug/07	26/Mar/15	52.59	\$0.00	\$1,350.00	\$127.00
2117902	17/Aug/07	26/Mar/15	52.59	\$0.00	\$1,350.00	\$127.00
2117903	17/Aug/07	26/Mar/15	52.59	\$0.00	\$1,350.00	\$127.00
2117904	17/Aug/07	26/Mar/15	52.58	\$0.00	\$1,350.00	\$127.00
2117905	17/Aug/07	26/Mar/15	52.58	\$0.00	\$1,350.00	\$127.00
2117906	17/Aug/07	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2117907	17/Aug/07	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2117908	17/Aug/07	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2117909	17/Aug/07	26/Mar/15	52.65	\$0.00	\$1,350.00	\$127.00
2117910	17/Aug/07	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2117911	17/Aug/07	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2117912	17/Aug/07	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2117913	17/Aug/07	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2117914	17/Aug/07	26/Mar/15	52.64	\$0.00	\$1,350.00	\$127.00
2117915	17/Aug/07	26/Mar/15	52.63	\$0.00	\$1,350.00	\$127.00
2117916	17/Aug/07	26/Mar/15	52.61	\$0.00	\$1,350.00	\$127.00
2117917	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
2117918	17/Aug/07	26/Mar/15	52.60	\$0.00	\$1,350.00	\$127.00
<b>Owner: Cliffs Québec Mine de Fer Limitée (88332) 100 % (responsibl</b>						
2159244	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159245	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159246	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159247	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159248	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159249	6/Jun/08	5/Jun/16	52.67	\$0.00	\$1,350.00	\$127.00
2159250	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
2159251	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
2159252	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
2159253	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
2159254	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
2159255	6/Jun/08	5/Jun/16	52.65	\$0.00	\$1,350.00	\$127.00
2159256	6/Jun/08	5/Jun/16	52.65	\$0.00	\$1,350.00	\$127.00
2159257	6/Jun/08	5/Jun/16	52.65	\$0.00	\$1,350.00	\$127.00
2159258	6/Jun/08	5/Jun/16	52.64	\$0.00	\$1,350.00	\$127.00
2159259	6/Jun/08	5/Jun/16	52.64	\$0.00	\$1,350.00	\$127.00
2159260	6/Jun/08	5/Jun/16	52.63	\$0.00	\$1,350.00	\$127.00
2159261	6/Jun/08	5/Jun/16	52.63	\$0.00	\$1,350.00	\$127.00
2159262	6/Jun/08	5/Jun/16	52.63	\$0.00	\$1,350.00	\$127.00
2159263	6/Jun/08	5/Jun/16	52.62	\$0.00	\$1,350.00	\$127.00
2159264	6/Jun/08	5/Jun/16	52.60	\$0.00	\$1,350.00	\$127.00
2159265	6/Jun/08	5/Jun/16	52.60	\$0.00	\$1,350.00	\$127.00
2159266	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159267	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159268	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159269	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159270	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159271	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159272	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159273	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159274	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159275	6/Jun/08	5/Jun/16	52.57	\$0.00	\$1,350.00	\$127.00



Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2159327	6/Jun/08	5/Jun/16	52.60	\$0.00	\$1,350.00	\$127.00
2159328	6/Jun/08	5/Jun/16	52.60	\$0.00	\$1,350.00	\$127.00
2159329	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159330	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159331	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159332	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159333	6/Jun/08	5/Jun/16	52.59	\$0.00	\$1,350.00	\$127.00
2159334	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159335	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159336	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159337	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159338	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159339	6/Jun/08	5/Jun/16	52.57	\$0.00	\$1,350.00	\$127.00
2159340	6/Jun/08	5/Jun/16	52.52	\$0.00	\$1,350.00	\$127.00
2159341	6/Jun/08	5/Jun/16	52.52	\$0.00	\$1,350.00	\$127.00
2159342	6/Jun/08	5/Jun/16	52.51	\$0.00	\$1,350.00	\$127.00
2159343	6/Jun/08	5/Jun/16	52.51	\$0.00	\$1,350.00	\$127.00
2159344	6/Jun/08	5/Jun/16	52.50	\$0.00	\$1,350.00	\$127.00
2159345	6/Jun/08	5/Jun/16	52.48	\$0.00	\$1,350.00	\$127.00
2159346	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159347	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159348	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159349	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159350	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159351	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159352	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159353	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159354	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159355	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159356	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159357	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159358	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159359	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159360	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159361	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159362	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159363	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159364	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159365	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159366	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159367	6/Jun/08	5/Jun/16	52.44	\$0.00	\$1,350.00	\$127.00
2159368	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159369	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159370	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159371	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159372	6/Jun/08	5/Jun/16	52.42	\$0.00	\$1,350.00	\$127.00
2159373	6/Jun/08	5/Jun/16	52.42	\$0.00	\$1,350.00	\$127.00
2159374	6/Jun/08	5/Jun/16	52.41	\$0.00	\$1,350.00	\$127.00
2159375	6/Jun/08	5/Jun/16	52.41	\$0.00	\$1,350.00	\$127.00
2159445	6/Jun/08	5/Jun/16	52.41	\$0.00	\$1,350.00	\$127.00
2159446	6/Jun/08	5/Jun/16	52.41	\$0.00	\$1,350.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2159453	6/Jun/08	5/Jun/16	52.40	\$0.00	\$1,350.00	\$127.00
2159454	6/Jun/08	5/Jun/16	52.40	\$0.00	\$1,350.00	\$127.00
2159460	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159461	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159462	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159463	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159464	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159465	6/Jun/08	5/Jun/16	52.39	\$0.00	\$1,350.00	\$127.00
2159470	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159471	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159472	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159473	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159474	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159475	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159476	6/Jun/08	5/Jun/16	52.38	\$0.00	\$1,350.00	\$127.00
2159484	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159485	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159486	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159487	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159488	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159489	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159490	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159491	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159492	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159493	6/Jun/08	5/Jun/16	52.37	\$0.00	\$1,350.00	\$127.00
2159500	6/Jun/08	5/Jun/16	52.36	\$0.00	\$1,350.00	\$127.00
2159501	6/Jun/08	5/Jun/16	52.36	\$0.00	\$1,350.00	\$127.00
2159502	6/Jun/08	5/Jun/16	52.36	\$0.00	\$1,350.00	\$127.00
2159506	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159507	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159508	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159509	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159510	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159511	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159512	6/Jun/08	5/Jun/16	52.35	\$0.00	\$1,350.00	\$127.00
2159513	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159514	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159515	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159516	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159517	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159518	6/Jun/08	5/Jun/16	52.34	\$0.00	\$1,350.00	\$127.00
2159519	6/Jun/08	5/Jun/16	52.33	\$0.00	\$1,350.00	\$127.00
2159520	6/Jun/08	5/Jun/16	52.33	\$0.00	\$1,350.00	\$127.00
2159856	6/Jun/08	5/Jun/16	52.62	\$0.00	\$1,350.00	\$127.00
2159857	6/Jun/08	5/Jun/16	52.53	\$0.00	\$1,350.00	\$127.00
2159858	6/Jun/08	5/Jun/16	52.52	\$0.00	\$1,350.00	\$127.00
2159859	6/Jun/08	5/Jun/16	52.52	\$0.00	\$1,350.00	\$127.00
2159860	6/Jun/08	5/Jun/16	52.50	\$0.00	\$1,350.00	\$127.00
2159861	6/Jun/08	5/Jun/16	52.49	\$0.00	\$1,350.00	\$127.00
2159862	6/Jun/08	5/Jun/16	52.47	\$0.00	\$1,350.00	\$127.00
2159863	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00

Claim #	Recording Date	Expiry Date	Area (ha)	Banked Credits	Required Work	Rent
2159864	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159865	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159866	6/Jun/08	5/Jun/16	52.42	\$0.00	\$1,350.00	\$127.00
2159867	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159868	6/Jun/08	5/Jun/16	52.43	\$0.00	\$1,350.00	\$127.00
2159869	6/Jun/08	5/Jun/16	52.42	\$0.00	\$1,350.00	\$127.00
2159870	6/Jun/08	5/Jun/16	52.58	\$0.00	\$1,350.00	\$127.00
2159871	6/Jun/08	5/Jun/16	52.64	\$0.00	\$1,350.00	\$127.00
2159872	6/Jun/08	5/Jun/16	52.66	\$0.00	\$1,350.00	\$127.00
		<b>Total:</b>	<b>24474.27</b>	<b>\$4,358,875.69</b>	<b>\$690,750.00</b>	<b>\$59,182.00</b>

**APPENDIX III**

**Drill Hole Logs: 2014 Pepler-Lam  e Programme**



Cliffs Eastern Iron Ore Project Database

HOLEID:	PL14-01	Project :	Peppler
Easting:	595097	Depth:	252
Norhting:	5800748	Azimuth:	270
Elevation:	590	Dip:	-75
STARTDATE:	7-Jul-2014	CasDepth:	9
ENDDATE:	10-Jul-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	19901		
Water source :	Stream, 595100E5800781N		
CollarComments:	Hole is making water.		
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-01	9	19.1	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : White with green patches locally.											
PL14-01	19.1	40.3	QZ	quartzite (>90% qz + Ca-Fe silicates, + minor Fe oxides)	Banded	medium grained	Hard	1	1		
Comments : Quartzite with hematite and magnetite locally up to 1%.											
PL14-01	40.3	79.8	SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide	Banded	medium grained	Hard	2	15	25	25
Comments : Cm scale bands of qtz/grunerite/actinolite and Magnetite as disseminated grains forming cm scale bands with minor Hematite locally. 1 m coarse grained garnet rich zone at top of unit. Carbonate locally with silicates.											
PL14-01	79.8	94.5	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	medium grained	Hard	2	20	10	5
Comments : Magnetite as medium grained cm scale bands with minor Hematite locally.											
PL14-01	94.5	118.25	MHIF	magnetite>hematite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Hard	20	20	5	2
Comments : Magnetite and Hematite as cm scale bands with minor Fe silicates locally.											
PL14-01	118.25	129.25	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard	2	25	5	2
Comments : Cm scale bands of Magnetite with minor Fe silicates locally. Carbonates common, locally up to 10%. Coarse grained garnet locally forming cm scale bands.											
PL14-01	129.25	144.55	SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide	Banded	fine to medium grained	Hard		5	35	20
Comments : Cm scale bands of Fe silicates with carbonates common, locally up to 10%. Coarse grained garnet locally forming cm scale bands often with biotite and locally minor pyrite.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-01	144.55	154.23	SCH	magnetite carbonate schist	Disseminated	medium grained	Medium		5		10
Comments : Carbonate/biotite schist with 5% fine to medium grained magnetite. Coarse grained garnet locally for last 3m of unit.											
PL14-01	154.23	159	SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide	Disseminated	fine to medium grained	Hard		2	15	40
Comments : Very fine grained quartz with cm scale patches of Actinolie/Grunerite. Magnetite/carbonate schist zones within this unit plus cm scale garnet rich bands locally. Unit is magnetic up to 157m											
PL14-01	159	163.5	GN	Biotite-Gt Gneiss	Disseminated	fine to medium grained	Medium		2	15	40
Comments : Biotite-Garnet-Gneiss											
PL14-01	163.5	164.3	SIF	Quartzite (50-90% qz) + Ca-Fe silicates, + minor Fe oxides)	Banded	fine to medium grained	Medium			10	35
Comments : Quartzite with Fe silicates.											
PL14-01	164.3	165.4	GN	Biotite-Gt Gneiss	Disseminated	fine to medium grained	Medium				
Comments : Biotite-Garnet-Gneiss											
PL14-01	165.4	166.2	SIF	Fe-Ca silicates >50% w/ qzt, marble, + minor Fe oxide	Disseminated	fine to medium grained	Medium		1	5	60
Comments : Silicate IF with >50% actinolite, minor magnetite.											
PL14-01	166.2	168.2	GN	hornblende-biotite-garnet gneiss (+ coronite)	Disseminated	fine to medium grained	Medium				
Comments : Horneblende-Biotite-garnet-Gneiss											
PL14-01	168.2	170.3	GN	Gneiss	Disseminated	fine to medium grained	Medium				
Comments : Quartz-Feldspar-Biotite-Gneiss											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-01	170.3	181.47	GN	hornblende-biotite-garnet gneiss (+ coronite)	Disseminated	fine to medium grained	Medium				
Comments : Horneblende-Biotite-Garnet-Gneiss											
PL14-01	181.47	188.4	SCH	magnetite schist	Disseminated	fine grained	Medium		5		5
Comments : Green, fine grained, minor carbonate locally along fractures, fine graine disseminate magnetite.											
PL14-01	188.4	202.4	SIF	Silicate-Carbonate IF	Banded	fine to medium grained	Hard		5	20	30
Comments : Cm scale bands of quartz/actinolite/grunerite and carbonate. Magnetite as fine to medium grains forming wispy bands usually 1-4cm wide. Locally Biotite/Garnet zones 5-10 cm wide.											
PL14-01	202.4	206.46	GN	Biotite-Gt Gneiss	Banded	medium grained	Hard				
Comments : Biotite-Garnet-Gneiss											
PL14-01	206.46	211.05	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : White massive marble.											
PL14-01	211.05	217.6	GN	biotite-garnet-quartz-plagioclase gneiss	Banded	medium grained	Hard				
Comments : 20-40 cm zones of marble near lower contact.											
PL14-01	217.6	228.5	QZ	Quartz Rock	Banded	medium grained	Hard				
Comments : White to locally greenish, coarse grained biotite locally. Marble with coarse grained Biotite at lower contact.											
PL14-01	228.5	238.47	SCH	magnetite schist	Disseminated	medium grained	Soft		10		
Comments : Quartz-Mica-Magnetite-Schist. Magnetite as fine to medium grained, locally forming bands. minor carbonate as fracture filling.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-01	238.47	241.9	SIF	Silicate-Carbonate IF	Banded	medium grained	Medium		3	35	40
Comments : Silicate-Carbonate-IF, minor magnetite.											
PL14-01	241.9	249	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Banded	medium grained	Medium				
Comments : White, massive marble with greenish hue locally, interlayered with 10-40 cm wide Biotite-Quartz-garnet-Gneiss.											

HOLEID	FROM	TO	Angle	Code	Comments
PL14-01	19.1	19.2	85	Banded	Contact
PL14-01	33.1	33.2	85	Banded	
PL14-01	43	43.3	75	Banded	
PL14-01	51	51.5	75	Banded	
PL14-01	61	61.5	75	Banded	
PL14-01	71.5	72	75	Banded	
PL14-01	80	80.5	75	Banded	
PL14-01	90	90.5	70	Banded	
PL14-01	100	100.5	72	Banded	
PL14-01	110	120	72	Banded	
PL14-01	125	126	75	Banded	
PL14-01	132	133	75	Banded	
PL14-01	145	146	75	schistosity	
PL14-01	167	168	78	schistosity	
PL14-01	171	175	76	schistosity	
PL14-01	181.5	182	68	schistosity	
PL14-01	190.5	191	74	Banded	
PL14-01	201	202	75	Banded	
PL14-01	212	213	70	Banded	
PL14-01	228.49	228.5	28	foliation	Contact
PL14-01	231	232	58	Banded	
PL14-01	241.9	241.91	60	foliation	Contact



HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
PL14-01	34.3	40.3	080001	QZT	-0.005	-0.005	0.003	5.24	1.04	2.77	0.15	18.71	28.83	0.32	0.14	0.04	-0.01	0.003	99.63	1.94
PL14-01	40.3	46.3	080002	SIF	-0.005	-0.005	0.004	68.44	6.63	11.01	0.226	4.24	5.18	1.93	0.62	0.16	0.02	0.012	100.7	7.7
PL14-01	46.3	52.3	080003	SIF	-0.005	-0.005	-0.003	46.07	0.6	37.01	1.589	6.14	5.06	0.14	0.05	0.1	-0.01	-0.003	100.2	25.9
PL14-01	52.3	58.3	080004	SIF	-0.005	-0.005	0.007	44.75	0.05	30.12	1.004	7.76	10.33	0.06	-0.01	-0.01	-0.01	-0.003	100.4	21.1
PL14-01	58.3	64.3	080005	SIF	-0.005	-0.005	-0.003	48.76	0.12	28.08	1.767	7.41	8.87	0.09	-0.01	-0.01	-0.01	-0.003	100.9	19.6
PL14-01	64.3	70.3	080006	SIF	-0.005	-0.005	0.006	45.5	-0.01	34.55	1.596	7.24	7.16	0.08	-0.01	0.02	-0.01	-0.003	100.1	24.2
PL14-01	70.3	76.3	080007	SIF	-0.005	-0.005	0.01	45.32	-0.01	33.44	1.576	7.16	7.92	0.09	-0.01	-0.01	-0.01	-0.003	100.3	23.4
PL14-01	76.3	79.8	080008	SIF	-0.005	-0.005	0.006	48.73	-0.01	32.47	1.063	6.82	9.82	0.07	0.02	-0.01	-0.01	0.005	100.9	22.7
PL14-01	79.8	85.8	080009	MIF	-0.005	-0.005	0.004	48.11	0.29	46.47	0.512	2.25	2.94	0.04	0.11	0.06	-0.01	-0.003	100.1	32.5
PL14-01	85.8	91.8	080010	MIF	0.006	-0.005	0.012	47.36	0.27	44.75	0.661	3.15	3.49	0.18	0.27	0.09	0.01	0.005	100.9	31.3
PL14-01	91.8	94.5	080011	MIF	-0.005	-0.005	0.012	39.82	0.11	49.72	2.044	2.11	4.81	0.06	0.07	0.04	0.01	-0.003	100.7	34.8
PL14-01	94.5	100.5	080012	MHIF	0.007	-0.005	0.005	33.74	0.5	53.83	2.933	2.36	3.58	0.05	0.4	0.08	-0.01	0.005	100.1	37.6
PL14-01	100.5	106.5	080014	MHIF	-0.005	-0.005	-0.003	40.28	0.22	49.73	2.524	1.66	3.03	0.1	0.31	0.07	-0.01	0.004	100.1	34.8
PL14-01	106.5	112.5	080015	MHIF	0.006	-0.005	-0.003	35.2	0.03	51.23	3.978	2.28	4.24	0.03	0.15	0.05	-0.01	-0.003	100.6	35.8
PL14-01	112.5	118.25	080016	MHIF	0.006	-0.005	-0.003	40.13	-0.01	45.06	4.645	2.65	4.22	0.07	0.09	0.03	-0.01	-0.003	100.6	31.5
PL14-01	118.25	124.25	080017	MIF	0.006	-0.005	0.007	48.09	-0.01	37.27	2.193	3.59	5.82	-0.01	0.53	0.08	-0.01	0.005	100.4	26.1
PL14-01	124.25	129.25	080018	MIF	0.005	-0.005	0.018	49.24	0.24	42.75	0.764	2.02	3.76	0.14	0.42	0.07	0.01	0.007	100.8	29.9
PL14-01	129.25	135.25	080019	SIF	-0.005	-0.005	0.015	44.04	1.52	20.89	1.061	8.3	15.45	0.13	1.36	0.61	0.03	0.019	100.1	14.6
PL14-01	135.25	141.25	080021	SIF	0.007	-0.005	0.024	35.84	3.33	26.14	0.684	8.15	13.53	1.21	2.96	1.09	0.08	0.038	100.1	18.3
PL14-01	141.25	144.55	080022	SIF	-0.005	-0.005	0.003	54.27	6.58	15.48	0.289	4.88	7.53	4.36	0.58	0.75	0.02	0.006	99.27	10.8
PL14-01	144.55	150.55	080023	MC_SCH	-0.005	-0.005	0.017	37.5	6.2	18	0.617	7.75	15.59	3.93	0.8	2.3	0.01	0.01	99.69	12.6

HOLEID	DEPTH	MagSus
PL14-01	10	0.73
PL14-01	12	0.019
PL14-01	14	0.021
PL14-01	16	0.022
PL14-01	18	0.015
PL14-01	20	0.007
PL14-01	22	0.01
PL14-01	24	0.063
PL14-01	26	0.101
PL14-01	28	0.033
PL14-01	30	0.069
PL14-01	32	0.02
PL14-01	34	0.077
PL14-01	36	0.07
PL14-01	38	0.815
PL14-01	40	0.132
PL14-01	42	0.54
PL14-01	44	0.847
PL14-01	46	9.347
PL14-01	48	90.65
PL14-01	50	644.2
PL14-01	52	8.192
PL14-01	54	3.254
PL14-01	56	6.13
PL14-01	58	1.102
PL14-01	60	11.16
PL14-01	62	1.098
PL14-01	64	2.3
PL14-01	66	7.022

HOLEID	DEPTH	MagSus
PL14-01	68	17.75
PL14-01	70	6.555
PL14-01	72	249.5
PL14-01	74	171.4
PL14-01	76	179.7
PL14-01	78	451.2
PL14-01	80	2952
PL14-01	82	4194
PL14-01	84	1738
PL14-01	86	595.9
PL14-01	88	2168
PL14-01	90	2461
PL14-01	92	3513
PL14-01	94	3566
PL14-01	96	49.94
PL14-01	98	3011
PL14-01	100	1321
PL14-01	102	2220
PL14-01	104	3723
PL14-01	106	782.6
PL14-01	108	981.1
PL14-01	110	73.06
PL14-01	112	337.2
PL14-01	114	8.634
PL14-01	116	169.9
PL14-01	118	402.4
PL14-01	120	875.1
PL14-01	122	1487
PL14-01	124	851.6
PL14-01	126	708.1
PL14-01	128	1002

HOLEID	DEPTH	MagSus
PL14-01	130	79.6
PL14-01	132	145.8
PL14-01	134	109.9
PL14-01	136	52.33
PL14-01	138	391
PL14-01	140	361
PL14-01	142	117
PL14-01	144	83.2
PL14-01	146	152
PL14-01	148	109
PL14-01	150	189.3
PL14-01	152	139.8
PL14-01	154	102.4
PL14-01	156	39.84
PL14-01	158	5.524
PL14-01	160	0.606
PL14-01	162	0.188
PL14-01	164	1.029
PL14-01	166	2.796
PL14-01	168	1.041
PL14-01	170	0.25
PL14-01	172	1.645
PL14-01	174	1.388
PL14-01	176	1.128
PL14-01	178	1.417
PL14-01	180	1.226
PL14-01	182	540.2
PL14-01	184	292.2
PL14-01	186	21.01
PL14-01	188	365.6
PL14-01	190	4.026

HOLEID	DEPTH	MagSus
PL14-01	192	3.991
PL14-01	194	2.582
PL14-01	196	5.746
PL14-01	198	3.97
PL14-01	200	24.4
PL14-01	202	0.53
PL14-01	204	0.157
PL14-01	206	0.472
PL14-01	208	0.261
PL14-01	210	0.329
PL14-01	212	0.446
PL14-01	214	0.611
PL14-01	216	0.393
PL14-01	218	0.008
PL14-01	220	0.029
PL14-01	222	0.015
PL14-01	224	0.016
PL14-01	226	0.816
PL14-01	228	4.285
PL14-01	230	387.1
PL14-01	232	449.9
PL14-01	234	497.3
PL14-01	236	300.6
PL14-01	238	130.8
PL14-01	240	3.925
PL14-01	242	1.046
PL14-01	244	0.355
PL14-01	246	1.557
PL14-01	248	4.17



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-01	9	12	3	2.65	88.33	2.62	98.87	
PL14-01	12	15	3	3	100.00	2.93	97.67	
PL14-01	15	18	3	2.96	98.67	2.91	98.31	
PL14-01	18	21	3	2.84	94.67	2.77	97.54	
PL14-01	21	24	3	2.77	92.33	2.65	95.67	
PL14-01	24	27	3	2.85	95.00	2.73	95.79	
PL14-01	27	30	3	2.72	90.67	2.72	100.00	
PL14-01	30	33	3	1.17	39.00	1.17	100.00	
PL14-01	33	36	3	3	100.00	2.83	94.33	
PL14-01	36	39	3	3	100.00	2.95	98.33	
PL14-01	39	42	3	2.74	91.33	2.55	93.07	
PL14-01	42	45	3	2.93	97.67	2.85	97.27	
PL14-01	45	48	3	2.98	99.33	2.93	98.32	
PL14-01	48	51	3	3	100.00	2.89	96.33	
PL14-01	51	54	3	2.9	96.67	2.9	100.00	
PL14-01	54	57	3	2.95	98.33	2.95	100.00	
PL14-01	57	60	3	3	100.00	3	100.00	
PL14-01	60	63	3	2.93	97.67	2.9	98.98	
PL14-01	63	66	3	3	100.00	3	100.00	
PL14-01	66	69	3	3	100.00	2.82	94.00	
PL14-01	69	72	3	3	100.00	3	100.00	
PL14-01	72	75	3	3	100.00	3	100.00	
PL14-01	75	78	3	3	100.00	3	100.00	
PL14-01	78	81	3	3	100.00	2.91	97.00	
PL14-01	81	84	3	3	100.00	3	100.00	
PL14-01	84	87	3	3	100.00	2.83	94.33	
PL14-01	87	90	3	3	100.00	3	100.00	
PL14-01	90	93	3	3	100.00	2.92	97.33	
PL14-01	93	96	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-01	96	99	3	3	100.00	3	100.00	
PL14-01	99	102	3	3	100.00	3	100.00	
PL14-01	102	105	3	3	100.00	3	100.00	
PL14-01	105	108	3	3	100.00	3	100.00	
PL14-01	108	111	3	3	100.00	3	100.00	
PL14-01	111	114	3	2.96	98.67	2.96	100.00	
PL14-01	114	117	3	3	100.00	3	100.00	
PL14-01	117	120	3	3	100.00	3	100.00	
PL14-01	120	123	3	2.97	99.00	2.97	100.00	
PL14-01	123	126	3	2.94	98.00	2.94	100.00	
PL14-01	126	129	3	2.98	99.33	2.93	98.32	
PL14-01	129	132	3	3	100.00	2.95	98.33	
PL14-01	132	135	3	3	100.00	3	100.00	
PL14-01	135	138	3	3	100.00	3	100.00	
PL14-01	138	141	3	3	100.00	3	100.00	
PL14-01	141	144	3	3	100.00	2.82	94.00	
PL14-01	144	147	3	2.95	98.33	2.95	100.00	
PL14-01	147	150	3	2.97	99.00	2.83	95.29	
PL14-01	150	153	3	3	100.00	3	100.00	
PL14-01	153	156	3	2.96	98.67	2.96	100.00	
PL14-01	156	159	3	2.97	99.00	2.82	94.95	
PL14-01	159	162	3	3	100.00	3	100.00	
PL14-01	162	165	3	3	100.00	3	100.00	
PL14-01	165	168	3	3	100.00	3	100.00	
PL14-01	168	171	3	3	100.00	3	100.00	
PL14-01	171	174	3	2.97	99.00	2.97	100.00	
PL14-01	174	177	3	3	100.00	3	100.00	
PL14-01	177	180	3	3	100.00	3	100.00	
PL14-01	180	183	3	3	100.00	2.91	97.00	
PL14-01	183	186	3	2.92	97.33	2.66	91.10	
PL14-01	186	189	3	2.98	99.33	2.9	97.32	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-01	189	192	3	2.94	98.00	2.94	100.00	
PL14-01	192	195	3	3	100.00	3	100.00	
PL14-01	195	198	3	2.96	98.67	2.92	98.65	
PL14-01	198	201	3	3	100.00	3	100.00	
PL14-01	201	204	3	3	100.00	3	100.00	
PL14-01	204	207	3	3	100.00	3	100.00	
PL14-01	207	210	3	3	100.00	3	100.00	
PL14-01	210	213	3	3	100.00	2.91	97.00	
PL14-01	213	216	3	3	100.00	2.77	92.33	
PL14-01	216	219	3	2.97	99.00	2.97	100.00	
PL14-01	219	222	3	2.94	98.00	2.94	100.00	
PL14-01	222	225	3	3	100.00	3	100.00	
PL14-01	225	228	3	3	100.00	3	100.00	
PL14-01	228	231	3	3	100.00	2.85	95.00	
PL14-01	231	234	3	2.64	88.00	2.53	95.83	
PL14-01	234	237	3	3	100.00	2.86	95.33	
PL14-01	237	240	3	3	100.00	2.75	91.67	
PL14-01	240	243	3	3	100.00	3	100.00	
PL14-01	243	246	3	3	100.00	2.71	90.33	
PL14-01	246	249	3	3	100.00	2.89	96.33	



HOLEID	DEPTH	AZIMUTH	DIP
PL14-01	0	270	-70.43
PL14-01	0	270	-75
PL14-01	4	271.26	-70.33
PL14-01	8	271.06	-70.44
PL14-01	12	270.96	-70.43
PL14-01	16	270.95	-70.44
PL14-01	20	270.65	-70.4
PL14-01	24	271.18	-70.4
PL14-01	28	271.02	-70.23
PL14-01	32	271.42	-70.06
PL14-01	36	271.98	-69.95
PL14-01	40	272.67	-69.93
PL14-01	44	273.64	-69.89
PL14-01	48	273.97	-69.86
PL14-01	52	274.53	-69.81
PL14-01	56	274.8	-69.81
PL14-01	60	275.31	-69.84
PL14-01	64	276.22	-69.86
PL14-01	68	276.79	-69.81
PL14-01	72	277.74	-69.8
PL14-01	76	278.58	-69.78
PL14-01	80	279.5	-69.75
PL14-01	84	280.18	-69.76
PL14-01	88	280.45	-69.74
PL14-01	92	280.97	-69.73
PL14-01	96	281.14	-69.68
PL14-01	100	281.51	-69.62
PL14-01	104	281.38	-69.44
PL14-01	108	281.76	-69.39

HOLEID	DEPTH	AZIMUTH	DIP
PL14-01	112	281.57	-69.33
PL14-01	116	281.31	-69.29
PL14-01	120	281.44	-69.25
PL14-01	124	281.47	-69.23
PL14-01	128	281.2	-69.18
PL14-01	132	281.11	-69.16
PL14-01	136	281.08	-69.15
PL14-01	140	281.07	-69.11
PL14-01	144	281.05	-69.03
PL14-01	148	281.13	-68.97
PL14-01	152	281.3	-68.93
PL14-01	156	281.34	-68.8
PL14-01	160	281.68	-68.75
PL14-01	164	282.09	-68.68
PL14-01	168	282.77	-68.68
PL14-01	172	283.01	-68.63
PL14-01	176	283.7	-68.57
PL14-01	180	284.02	-68.53
PL14-01	184	284.71	-68.49
PL14-01	188	285.17	-68.51
PL14-01	192	284.95	-68.42
PL14-01	196	285.82	-68.42
PL14-01	200	286.17	-68.35
PL14-01	204	286.77	-68.23
PL14-01	208	287.2	-68.21
PL14-01	212	287.6	-68.13
PL14-01	216	288.37	-68.06
PL14-01	220	288.92	-68.08
PL14-01	224	288.67	-68.04
PL14-01	228	288.68	-68
PL14-01	232	289.34	-67.98

HOLEID	DEPTH	AZIMUTH	DIP
PL14-01	236	289.66	-67.9
PL14-01	240	289.8	-67.82
PL14-01	244	290.48	-67.66
PL14-01	248	290.8	-67.46
PL14-01	249	270	-75
PL14-01	252	290.88	-67.36



Cliffs Eastern Iron Ore Project Database

HOLEID:	PL14-02	Project :	Peppler
Easting:	590926	Depth:	281
Norhting:	5799447	Azimuth:	0
Elevation:	591	Dip:	-70
STARTDATE:	12-Jul-2014	CasDepth:	57
ENDDATE:	18-Jul-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	2024658		
Water source :	Lake, 591055E5799484N		
CollarComments:	Casing was lost down the hole. Rods got stuck and had to be cut. Items lost down hole besides 57m of casing were:6-NQ rods, 1-NW Shoe bit and adapter, 1-outer Tube, bit shell.		
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-02	57	115	GN	K-spar quartz biotite gneiss	Banded	coarse grained	Soft				
Comments : Kspar-Quartz-Biotite-Gneiss, highly weathered, soft mush to 101m, mica rich, can break by hand to 115m.											
PL14-02	119.7	142.9	QZ	quartz rock IF	Massive	fine grained	Hard	2	3		
Comments : Quartz Rock IF, smokey quartz, highly fractured, limonite locally on fractures and filling mm scale vugs that form cm scale bands.											
PL14-02	142.9	194	FLT	Fault	Massive	fine grained	Soft				
Comments : Red to brown to tan colored clay, quartz rock IF locally up to 10 cm . At 164m starts to be magnetic.											
PL14-02	194	206	QZ	magnetite quartzite	Banded	fine grained	Hard	3	10		
Comments : Magnetite Quartzite, red to brown to tan colored clay with hard sections of smokey quartz with cm scale magnetite bands locally. Minor hematite locally. Still part of fault zone here.											
PL14-02	206	224	SCH	magnetite schist	Banded	fine grained	Soft	2	5		3
Comments : Magnetite-Schist, grey to white-green-black colored schist. Epidote locally, very soft. Minor Fe silicates locally. Magnetite/hematite locally as fine disseminated grains. Gabbro?											
PL14-02	224	226.5	FLT	Fault	Massive	fine grained	Soft	3	3		
Comments : Reddish brown to orange colored clay. Quartzite core locally.											
PL14-02	226.5	230.25	QZ	quartz rock IF	Massive	fine grained	Hard	2	5		
Comments : Quartz Rock IF, smokey quartz, highly fractured.											
PL14-02	230.25	235.4	FLT	Fault	Massive	fine grained	Soft	3	5		
Comments : Brown to orange clay with quartz/magnetite/hematite schist sections.											
PL14-02	235.4	256.2	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Soft	5	20		
Comments : Magnetite IF, locally very soft and sandy, minor cm scale clay seams locally.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
PL14-02	256.2	274.2	HMIF	hematite>magnetite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Soft	50	20		
Comments : Hematite-Magnetite IF, massive hematite locally, locally very soft.											
PL14-02	274.2	278.4	MHIF	magnetite>hematite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Soft	20	30		
Comments : Magnetite-hematite IF, banded, locally very soft and rusty (limonite).											
PL14-02	278.4	281	MHIF	magnetite>hematite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Soft	5	20		
Comments : Magnetite-hematite IF, banded, locally very soft and rusty (limonite). Fault gouge locally, very broken core.											



HOLEID	FROM	TO	Angle	Code	Comments
PL14-02	59	60	55	Banded	
PL14-02	70	71	50	Banded	
PL14-02	88	89	45	Banded	
PL14-02	101	102	52	Banded	
PL14-02	111	112	42	Banded	
PL14-02	122	123	52	Banded	
PL14-02	133.5	134	55	Banded	
PL14-02	158	158.4	59	Banded	
PL14-02	197	197.2	55	Banded	
PL14-02	209	210	52	schistosity	
PL14-02	221	221.5	46	schistosity	
PL14-02	226.5	227.5	45	Banded	
PL14-02	238.5	239	55	Banded	



HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
PL14-02	194	200	080024	MQZT	-0.005	-0.005	0.013	59.36	0.09	34.87	1.202	0.11	0.04	0.06	0.01	0.13	-0.01	-0.003	100.4	24.4
PL14-02	200	206	080025	MQZT	0.006	-0.005	0.173	49.8	0.22	40.02	3.005	0.15	0.12	0.15	0.08	0.32	0.03	-0.003	100.8	28
PL14-02	206	212	080026	M_SCH	0.018	0.022	0.097	37.81	3.2	23.07	0.481	15.79	7.54	0.14	4.45	1.03	0.11	0.08	100.4	16.1
PL14-02	212	218	080027	M_SCH	0.017	0.022	0.108	37.09	3.44	23.96	0.501	16.21	8.73	0.05	4.64	0.94	0.11	0.086	100.5	16.8
PL14-02	218	224	080028	M_SCH	0.021	0.031	0.113	32.57	4.72	28.21	1.311	14.35	7.09	0.19	5.43	1.02	0.12	0.1	100.4	19.7
PL14-02	224	226.5	080029	FLT	0.03	0.04	0.143	18.92	7.38	45.89	1.425	1.8	0.76	0.1	9.96	1.09	0.22	0.181	100.1	32.1
PL14-02	226.5	230.25	080030	QZIF	0.006	-0.005	0.027	62.23	0.52	31.87	0.765	0.15	0.08	0.09	0.82	0.19	0.03	0.014	100.4	22.3
PL14-02	230.25	235.4	080031	FLT	-0.005	-0.005	0.015	46.08	0.37	48.47	0.43	0.06	0.03	0.11	0.46	0.1	-0.01	0.007	99.78	33.9
PL14-02	235.4	241.4	080033	MIF	-0.005	-0.005	0.008	56.57	-0.01	39.75	0.998	0.04	0.06	0.15	0.12	0.05	-0.01	-0.003	99.83	27.8
PL14-02	241.4	247.4	080034	MIF	-0.005	-0.005	0.004	51.12	-0.01	46.06	0.898	-0.01	0.02	0.11	0.06	0.03	-0.01	-0.003	100.4	32.2
PL14-02	247.4	253.4	080035	MIF	-0.005	-0.005	0.004	50.97	-0.01	46.52	1.447	-0.01	-0.01	-0.01	0.07	0.02	-0.01	-0.003	100.6	32.5
PL14-02	253.4	256.2	080036	MIF	-0.005	-0.005	0.006	49.43	0.19	47.54	1.429	0.02	0.02	0.17	0.36	0.04	-0.01	-0.003	100.4	33.2
PL14-02	256.2	262.2	080037	HMIF	-0.005	-0.005	0.015	46.76	0.06	49.94	2.542	0.02	0.02	0.08	0.11	0.02	-0.01	-0.003	100.3	34.9
PL14-02	262.2	268.2	080038	HMIF	0.006	-0.005	0.007	44.19	-0.01	48.15	7.072	0.02	0.03	0.14	0.03	0.02	-0.01	-0.003	100.8	33.7
PL14-02	268.2	274.2	080039	HMIF	0.007	-0.005	0.007	38.98	-0.01	50.91	9.705	-0.01	0.03	0.07	0.03	0.03	-0.01	-0.003	100.9	35.6
PL14-02	274.2	278.4	080041	MHIF	0.007	-0.005	0.025	39.56	-0.01	56.9	2.05	-0.01	0.01	0.06	0.02	0.05	0.02	-0.003	100.9	39.8
PL14-02	278.4	281	080042	MHIF	0.008	-0.005	0.013	49.41	0.09	46.15	1.866	0.01	0.02	0.1	0.04	0.11	-0.01	-0.003	100.4	32.3



HOLEID	DEPTH	MagSus
PL14-02	56	0.196
PL14-02	58	0.337
PL14-02	60	0.238
PL14-02	62	0.259
PL14-02	64	0.263
PL14-02	66	0.36
PL14-02	68	0.394
PL14-02	70	0.392
PL14-02	72	0.364
PL14-02	74	0.303
PL14-02	76	0.292
PL14-02	78	0.402
PL14-02	80	0.213
PL14-02	82	0.284
PL14-02	84	0.27
PL14-02	86	0.256
PL14-02	88	0.278
PL14-02	90	0.233
PL14-02	92	0.268
PL14-02	94	0.252
PL14-02	96	0.144
PL14-02	98	0.053
PL14-02	100	0.183
PL14-02	102	0.015
PL14-02	104	0.156
PL14-02	106	0.019
PL14-02	108	0.168
PL14-02	110	0.125
PL14-02	112	0.01

HOLEID	DEPTH	MagSus
PL14-02	114	0.042
PL14-02	116	0.02
PL14-02	118	0.03
PL14-02	120	0.017
PL14-02	122	0.015
PL14-02	124	0.029
PL14-02	126	0.128
PL14-02	128	1.203
PL14-02	130	0.024
PL14-02	132	0.016
PL14-02	134	0.662
PL14-02	136	0.042
PL14-02	138	0.052
PL14-02	140	3.255
PL14-02	142	0.017
PL14-02	144	0.114
PL14-02	146	0.421
PL14-02	148	0.223
PL14-02	150	2.484
PL14-02	152	5.881
PL14-02	154	4.086
PL14-02	156	10.09
PL14-02	158	5.413
PL14-02	160	11.32
PL14-02	162	34.43
PL14-02	164	1.619
PL14-02	166	2.897
PL14-02	168	2.085
PL14-02	170	1.04
PL14-02	172	48.56
PL14-02	174	1.593

HOLEID	DEPTH	MagSus
PL14-02	176	0.983
PL14-02	178	30.92
PL14-02	180	21.25
PL14-02	182	5.134
PL14-02	184	18.47
PL14-02	186	4.696
PL14-02	188	38.59
PL14-02	190	2.611
PL14-02	192	139.3
PL14-02	194	0.706
PL14-02	196	286.2
PL14-02	198	168.5
PL14-02	200	137.8
PL14-02	202	69.37
PL14-02	204	1.304
PL14-02	206	7.325
PL14-02	208	102.3
PL14-02	210	152.1
PL14-02	212	154.2
PL14-02	214	165
PL14-02	216	140.5
PL14-02	218	193.5
PL14-02	220	113.5
PL14-02	222	99.38
PL14-02	224	21.61
PL14-02	226	8.866
PL14-02	228	2.577
PL14-02	230	1.347
PL14-02	232	2.521
PL14-02	234	7.116
PL14-02	236	1.141

HOLEID	DEPTH	MagSus
PL14-02	238	1.565
PL14-02	240	8.748
PL14-02	242	11.98
PL14-02	244	6.387
PL14-02	246	2.294
PL14-02	248	4.778
PL14-02	250	28.18
PL14-02	252	8.161
PL14-02	254	22.97
PL14-02	256	12.9
PL14-02	258	496.8
PL14-02	260	192.2
PL14-02	262	440.8
PL14-02	264	179.9
PL14-02	266	227.8
PL14-02	268	259.2
PL14-02	270	66.84
PL14-02	272	749.4
PL14-02	274	1021
PL14-02	276	15.95
PL14-02	278	5.016
PL14-02	280	6.552



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-02	42	47	5	2.07	41.40	0	0.00	
PL14-02	47	50	3	0.7	23.33	0	0.00	
PL14-02	50	53	3	0.9	30.00	0	0.00	
PL14-02	53	56	3	1.1	36.67	0	0.00	
PL14-02	56	59	3	1.9	63.33	0	0.00	
PL14-02	59	62	3	1.98	66.00	0	0.00	
PL14-02	62	65	3	1.67	55.67	0	0.00	
PL14-02	68	71	3	3	100.00	0	0.00	
PL14-02	71	74	3	2.7	90.00	0	0.00	
PL14-02	74	77	3	2.62	87.33	0	0.00	
PL14-02	77	80	3	1.7	56.67	0	0.00	
PL14-02	80	83	3	2.2	73.33	0	0.00	
PL14-02	83	86	3	2.37	79.00	0	0.00	
PL14-02	86	89	3	2.2	73.33	0	0.00	
PL14-02	89	92	3	2.37	79.00	0	0.00	
PL14-02	92	95	3	3	100.00	0	0.00	
PL14-02	95	98	3	1.78	59.33	0	0.00	
PL14-02	98	101	3	3	100.00	0	0.00	
PL14-02	101	104	3	3	100.00	0	0.00	
PL14-02	104	107	3	3	100.00	0	0.00	
PL14-02	107	110	3	3	100.00	0	0.00	
PL14-02	110	113	3	3	100.00	0	0.00	
PL14-02	113	116	3	2.45	81.67	0	0.00	
PL14-02	116	119	3	1.05	35.00	0	0.00	
PL14-02	119	122	3	3	100.00	0.7	23.33	
PL14-02	122	125	3	3	100.00	1.92	64.00	
PL14-02	125	128	3	2.56	85.33	1.85	72.27	
PL14-02	128	131	3	2.6	86.67	1.43	55.00	
PL14-02	131	134	3	2.68	89.33	0.85	31.72	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-02	134	137	3	2.6	86.67	0	0.00	
PL14-02	137	140	3	1.38	46.00	0	0.00	
PL14-02	140	143	3	1.18	39.33	0	0.00	
PL14-02	143	146	3	1.72	57.33	0	0.00	
PL14-02	146	149	3	2.38	79.33	0	0.00	
PL14-02	149	152	3	1.4	46.67	0	0.00	
PL14-02	152	155	3	1.2	40.00	0	0.00	
PL14-02	155	158	3	1	33.33	0	0.00	
PL14-02	158	161	3	2.4	80.00	0	0.00	
PL14-02	161	164	3	1.3	43.33	0	0.00	
PL14-02	164	167	3	1.67	55.67	0	0.00	
PL14-02	167	170	3	2.67	89.00	0	0.00	
PL14-02	170	173	3	1.2	40.00	0	0.00	
PL14-02	173	176	3	1.49	49.67	0	0.00	
PL14-02	176	179	3	1.02	34.00	0	0.00	
PL14-02	179	182	3	1.46	48.67	0	0.00	
PL14-02	182	185	3	0.46	15.33	0	0.00	
PL14-02	185	188	3	1.5	50.00	0	0.00	
PL14-02	188	191	3	1.9	63.33	0	0.00	
PL14-02	191	194	3	1.63	54.33	0	0.00	
PL14-02	194	197	3	1.4	46.67	0	0.00	
PL14-02	197	200	3	1.11	37.00	0	0.00	
PL14-02	200	203	3	1.25	41.67	0	0.00	
PL14-02	203	206	3	0.35	11.67	0	0.00	
PL14-02	206	209	3	2.64	88.00	0	0.00	
PL14-02	209	212	3	3	100.00	0.73	24.33	
PL14-02	212	215	3	3	100.00	2.54	84.67	
PL14-02	215	218	3	2.74	91.33	1.83	66.79	
PL14-02	218	221	3	2.82	94.00	0	0.00	
PL14-02	221	224	3	2.58	86.00	0	0.00	
PL14-02	224	227	3	2.51	83.67	0	0.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
PL14-02	227	230	3	2.57	85.67	0	0.00	
PL14-02	230	233	3	1.58	52.67	0	0.00	
PL14-02	233	236	3	2.62	87.33	0	0.00	
PL14-02	236	239	3	2.36	78.67	1.09	46.19	
PL14-02	239	242	3	3	100.00	2.1	70.00	
PL14-02	242	245	3	3	100.00	1.96	65.33	
PL14-02	245	248	3	2.91	97.00	2.29	78.69	
PL14-02	248	251	3	2.79	93.00	1.14	40.86	
PL14-02	251	254	3	3	100.00	1.36	45.33	
PL14-02	254	257	3	2.47	82.33	0.73	29.55	
PL14-02	257	260	3	2.81	93.67	1.52	54.09	
PL14-02	260	263	3	3	100.00	1.89	63.00	
PL14-02	263	266	3	2.56	85.33	1.87	73.05	
PL14-02	266	269	3	2.28	76.00	1.87	82.02	
PL14-02	269	272	3	2.77	92.33	1.33	48.01	
PL14-02	272	275	3	2.88	96.00	1.91	66.32	
PL14-02	275	278	3	2.92	97.33	2.27	77.74	
PL14-02	278	281	3	2.8	93.33	1.1	39.29	



HOLEID	DEPTH	AZIMUTH	DIP
PL14-02	0	0	-70
PL14-02	0	0	-70.02
PL14-02	4	359.38	-69.79
PL14-02	8	359.34	-70.25
PL14-02	12	359.47	-70.85
PL14-02	16	359.36	-70.89
PL14-02	20	359.03	-70.84
PL14-02	24	358.65	-70.74
PL14-02	28	358.28	-70.74
PL14-02	32	357.81	-70.79
PL14-02	36	357.36	-70.7
PL14-02	40	357.28	-70.75
PL14-02	44	357.42	-70.86
PL14-02	48	358.06	-70.7
PL14-02	52	358.67	-70.79
PL14-02	56	358.25	-71.06
PL14-02	60	358.57	-70.83
PL14-02	64	358.92	-70.51
PL14-02	68	359.26	-70.36
PL14-02	72	359.48	-70.98
PL14-02	76	359.83	-71.2
PL14-02	80	0.21	-70.97
PL14-02	84	0.72	-70.7
PL14-02	88	1.61	-70.42
PL14-02	92	2.39	-70.09
PL14-02	96	2.1	-69.87
PL14-02	100	2.24	-70.42
PL14-02	104	1.72	-70.82
PL14-02	108	1.96	-70.77

HOLEID	DEPTH	AZIMUTH	DIP
PL14-02	112	2.29	-70.19
PL14-02	116	2.21	-70.08
PL14-02	120	2.2	-70.32
PL14-02	124	2.45	-70.32
PL14-02	128	2.18	-70.15
PL14-02	132	1.94	-70.12
PL14-02	136	2.01	-70.15
PL14-02	140	2.14	-70.17
PL14-02	144	2.7	-70.16
PL14-02	148	2.53	-70.11
PL14-02	152	2.63	-70.08
PL14-02	156	2.66	-70.04
PL14-02	160	2.38	-69.88
PL14-02	164	2.09	-69.88
PL14-02	168	2.14	-69.75
PL14-02	172	2.26	-69.59
PL14-02	176	2.27	-69.44
PL14-02	180	2.02	-69.26
PL14-02	184	1.7	-69.07
PL14-02	188	1.36	-69.02
PL14-02	192	1.13	-68.92
PL14-02	196	0.75	-68.59
PL14-02	200	359.73	-68.45
PL14-02	204	359.21	-68.37
PL14-02	208	359.14	-68.33
PL14-02	212	359.21	-68.32
PL14-02	216	359.54	-68.23
PL14-02	220	359.75	-68.34
PL14-02	224	359.88	-68.42
PL14-02	228	0.2	-68.48
PL14-02	232	0.29	-68.44

HOLEID	DEPTH	AZIMUTH	DIP
PL14-02	236	0.42	-68.38
PL14-02	240	1.01	-68.4
PL14-02	244	1.31	-68.2
PL14-02	248	1.76	-68.18
PL14-02	252	2.53	-68.35
PL14-02	256	3.07	-68.39
PL14-02	260	3.15	-68.34
PL14-02	264	3.56	-68.35
PL14-02	268	3.63	-68.26
PL14-02	272	4.07	-68.27
PL14-02	276	4.18	-68.23
PL14-02	280	4.15	-68.13



Cliffs Eastern Iron Ore Project Database

HOLEID:	HH-14-01	Project :	Hobdab
Easting:	604787	Depth:	320
Norhting:	5800710	Azimuth:	270
Elevation:	630	Dip:	-70
STARTDATE:	19-Jul-2014	CasDepth:	3
ENDDATE:	22-Jul-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	84275		
Water source :	Ditch by road, 604835E5800660N		
CollarComments:			
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
HH-14-01	3	13.5	GN	Gneiss	Banded	medium grained	Medium				
Comments : Banded Quartz-Feldspar-Biotite-Gneiss											
HH-14-01	13.5	15.6	DK	Felsic dyke or intrusive	Massive	medium grained	Hard				
Comments : Pink to beige colored felsic dyke.											
HH-14-01	15.6	279.7	GN	Gneiss	Banded	medium grained	Medium				
Comments : Quartz-plagioclase-bioite-gneiss. Minor garnet locally from 160m. Locally cm scale zones of amphibolite.											
HH-14-01	279.7	283.9	DK	Felsic dyke or intrusive	Massive	medium grained	Hard				
Comments : Pink to beige colored granitic, felsic dyke.											
HH-14-01	283.9	320	GN	biotite-quartz-plagioclase gneiss; Bio>10%, minor garnets	Banded	medium grained	Medium				
Comments : Biotite-Quartz-Plagioclase-Gneiss, minor garnet.											

HOLEID	FROM	TO	Angle	Code	Comments
HH-14-01	10	11	32	Banded	
HH-14-01	20	21	42	Banded	
HH-14-01	30	31	55	Banded	
HH-14-01	40	41	40	Banded	
HH-14-01	50	50.5	27	Banded	
HH-14-01	59	60	37	Banded	
HH-14-01	70	71	34	Banded	
HH-14-01	80	80.5	36	Banded	
HH-14-01	90	91	43	Banded	
HH-14-01	100	101	32	Banded	
HH-14-01	110	111	34	Banded	
HH-14-01	120	121	46	Banded	
HH-14-01	130	131	48	Banded	
HH-14-01	140	141	10	Banded	
HH-14-01	149	150	55	Banded	
HH-14-01	160	161	50	Banded	
HH-14-01	169	170	58	Banded	
HH-14-01	179	180	49	Banded	
HH-14-01	189	190	53	Banded	
HH-14-01	198.25	198.28	50	gouge	Breccia zone from 198.25 to 198.86m
HH-14-01	200	201	55	Banded	
HH-14-01	210	211	50	Banded	
HH-14-01	220	221	49	Banded	
HH-14-01	230	231	61	Banded	
HH-14-01	239	240	42	Banded	
HH-14-01	249.73	249.76	45	gouge	Breccia zone from 249.73 to 249.9m
HH-14-01	249.81	249.85	45	gouge	
HH-14-01	251	252	45	Banded	
HH-14-01	260	261	43	Banded	

HOLEID	FROM	TO	Angle	Code	Comments
HH-14-01	269	270	44	Banded	
HH-14-01	278	279	56	Banded	
HH-14-01	289	290	46	Banded	
HH-14-01	302	303	44	Banded	
HH-14-01	309	310	42	Banded	
HH-14-01	319	320	38	Banded	

HOLEID	DEPTH	MagSus
HH-14-01	4	0.752
HH-14-01	6	0.627
HH-14-01	8	1.481
HH-14-01	10	2.076
HH-14-01	12	7.788
HH-14-01	14	0.381
HH-14-01	16	0.374
HH-14-01	18	0.158
HH-14-01	20	1.023
HH-14-01	22	1.441
HH-14-01	24	0.994
HH-14-01	26	0.805
HH-14-01	28	0.548
HH-14-01	30	0.419
HH-14-01	32	0.473
HH-14-01	34	0.836
HH-14-01	36	0.626
HH-14-01	38	0.725
HH-14-01	40	0.986
HH-14-01	42	1.494
HH-14-01	44	1.592
HH-14-01	46	1.477
HH-14-01	48	0.864
HH-14-01	50	0.629
HH-14-01	52	2.271
HH-14-01	54	4.842
HH-14-01	56	1.999
HH-14-01	58	1.531
HH-14-01	60	1.265

HOLEID	DEPTH	MagSus
HH-14-01	62	4.137
HH-14-01	64	0.645
HH-14-01	66	1.478
HH-14-01	68	0.693
HH-14-01	70	4.325
HH-14-01	72	0.536
HH-14-01	74	1.022
HH-14-01	76	1.489
HH-14-01	78	2.728
HH-14-01	80	5.935
HH-14-01	82	1.136
HH-14-01	84	0.476
HH-14-01	86	1.063
HH-14-01	88	0.885
HH-14-01	90	0.658
HH-14-01	92	0.573
HH-14-01	94	2.549
HH-14-01	96	3.389
HH-14-01	98	4.276
HH-14-01	100	2.642
HH-14-01	102	0.492
HH-14-01	104	2.689
HH-14-01	106	1.469
HH-14-01	108	0.469
HH-14-01	110	0.637
HH-14-01	112	2.216
HH-14-01	114	2.44
HH-14-01	116	1.157
HH-14-01	118	0.232
HH-14-01	120	1.697
HH-14-01	122	0.583

HOLEID	DEPTH	MagSus
HH-14-01	124	0.942
HH-14-01	126	1.273
HH-14-01	128	0.349
HH-14-01	130	0.706
HH-14-01	132	0.999
HH-14-01	134	1.169
HH-14-01	136	1.773
HH-14-01	138	0.815
HH-14-01	140	0.818
HH-14-01	142	2.199
HH-14-01	144	0.961
HH-14-01	146	1.225
HH-14-01	148	0.531
HH-14-01	150	0.611
HH-14-01	152	0.02
HH-14-01	154	0.418
HH-14-01	156	0.607
HH-14-01	158	0.507
HH-14-01	160	0.629
HH-14-01	162	0.429
HH-14-01	164	0.231
HH-14-01	166	0.496
HH-14-01	168	0.315
HH-14-01	170	0.481
HH-14-01	172	0.668
HH-14-01	174	0.633
HH-14-01	176	0.174
HH-14-01	178	1.722
HH-14-01	180	0.327
HH-14-01	182	0.268
HH-14-01	184	0.939

HOLEID	DEPTH	MagSus
HH-14-01	186	0.281
HH-14-01	188	0.555
HH-14-01	190	0.507
HH-14-01	192	0.436
HH-14-01	194	5.539
HH-14-01	196	0.487
HH-14-01	198	0.741
HH-14-01	200	0.381
HH-14-01	202	0.829
HH-14-01	204	0.4
HH-14-01	206	1.254
HH-14-01	208	3.813
HH-14-01	210	3.404
HH-14-01	212	1.843
HH-14-01	214	1.156
HH-14-01	216	0.526
HH-14-01	218	2.98
HH-14-01	220	2.193
HH-14-01	222	0.856
HH-14-01	224	1.281
HH-14-01	226	33.88
HH-14-01	228	1.78
HH-14-01	230	0.711
HH-14-01	232	0.842
HH-14-01	234	4.572
HH-14-01	236	1.2
HH-14-01	238	3.561
HH-14-01	240	1.15
HH-14-01	242	0.754
HH-14-01	244	0.533
HH-14-01	246	1.191

HOLEID	DEPTH	MagSus
HH-14-01	248	0.639
HH-14-01	250	1.188
HH-14-01	252	1.538
HH-14-01	254	2.171
HH-14-01	256	1.475
HH-14-01	258	1.397
HH-14-01	260	0.706
HH-14-01	262	3.546
HH-14-01	264	4.833
HH-14-01	266	1.237
HH-14-01	268	0.791
HH-14-01	270	2.333
HH-14-01	272	3.066
HH-14-01	274	0.692
HH-14-01	276	1.42
HH-14-01	278	0.838
HH-14-01	280	0.02
HH-14-01	282	0.046
HH-14-01	284	0.233
HH-14-01	286	0.525
HH-14-01	288	1.328
HH-14-01	290	0.627
HH-14-01	292	0.686
HH-14-01	294	0.833
HH-14-01	296	0.506
HH-14-01	298	0.306
HH-14-01	300	1.565
HH-14-01	302	1.136
HH-14-01	304	1.906
HH-14-01	306	1.033
HH-14-01	308	0.607

HOLEID	DEPTH	MagSus
HH-14-01	310	0.209
HH-14-01	312	0.26
HH-14-01	314	0.638
HH-14-01	316	1.447
HH-14-01	318	3.822
HH-14-01	320	6.763



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
HH-14-01	2	5	3	2.9	96.67	2.64	91.03	
HH-14-01	5	8	3	3	100.00	2.94	98.00	
HH-14-01	8	11	3	3	100.00	2.85	95.00	
HH-14-01	11	14	3	2.87	95.67	2.68	93.38	
HH-14-01	14	17	3	3	100.00	1.73	57.67	
HH-14-01	17	20	3	3	100.00	2.66	88.67	
HH-14-01	20	23	3	2.96	98.67	2.96	100.00	
HH-14-01	23	26	3	3	100.00	2.9	96.67	
HH-14-01	26	29	3	3	100.00	3	100.00	
HH-14-01	29	32	3	2.98	99.33	2.61	87.58	
HH-14-01	32	35	3	3	100.00	2.72	90.67	
HH-14-01	35	38	3	2.92	97.33	2.66	91.10	
HH-14-01	38	41	3	3	100.00	3	100.00	
HH-14-01	41	44	3	3	100.00	2.86	95.33	
HH-14-01	44	47	3	3	100.00	2.62	87.33	
HH-14-01	47	50	3	3	100.00	2.89	96.33	
HH-14-01	50	53	3	2.96	98.67	2.96	100.00	
HH-14-01	53	56	3	3	100.00	2.78	92.67	
HH-14-01	56	59	3	3	100.00	3	100.00	
HH-14-01	59	62	3	3	100.00	3	100.00	
HH-14-01	62	65	3	3	100.00	2.95	98.33	
HH-14-01	65	68	3	3	100.00	3	100.00	
HH-14-01	68	71	3	3	100.00	3	100.00	
HH-14-01	71	74	3	3	100.00	3	100.00	
HH-14-01	74	77	3	3	100.00	2.83	94.33	
HH-14-01	77	80	3	3	100.00	3	100.00	
HH-14-01	80	83	3	3	100.00	3	100.00	
HH-14-01	83	86	3	3	100.00	3	100.00	
HH-14-01	86	89	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
HH-14-01	89	92	3	3	100.00	2.97	99.00	
HH-14-01	92	95	3	3	100.00	2.95	98.33	
HH-14-01	95	98	3	3	100.00	2.88	96.00	
HH-14-01	98	101	3	3	100.00	2.91	97.00	
HH-14-01	101	104	3	3	100.00	2.88	96.00	
HH-14-01	104	107	3	3	100.00	2.57	85.67	
HH-14-01	107	110	3	3	100.00	2.97	99.00	
HH-14-01	110	113	3	3	100.00	2.92	97.33	
HH-14-01	113	116	3	3	100.00	2.82	94.00	
HH-14-01	116	119	3	3	100.00	2.97	99.00	
HH-14-01	119	122	3	3	100.00	3	100.00	
HH-14-01	122	125	3	3	100.00	2.9	96.67	
HH-14-01	125	128	3	3	100.00	2.88	96.00	
HH-14-01	128	131	3	3	100.00	2.89	96.33	
HH-14-01	131	134	3	3	100.00	3	100.00	
HH-14-01	134	137	3	3	100.00	3	100.00	
HH-14-01	137	140	3	3	100.00	3	100.00	
HH-14-01	140	143	3	3	100.00	3	100.00	
HH-14-01	143	146	3	3	100.00	3	100.00	
HH-14-01	146	149	3	3	100.00	3	100.00	
HH-14-01	149	152	3	3	100.00	2.6	86.67	
HH-14-01	152	155	3	3	100.00	3	100.00	
HH-14-01	155	158	3	3	100.00	3	100.00	
HH-14-01	158	161	3	3	100.00	2.59	86.33	
HH-14-01	161	164	3	3	100.00	2.67	89.00	
HH-14-01	164	167	3	3	100.00	2.79	93.00	
HH-14-01	167	170	3	3	100.00	3	100.00	
HH-14-01	170	173	3	3	100.00	2.91	97.00	
HH-14-01	173	176	3	3	100.00	3	100.00	
HH-14-01	176	179	3	3	100.00	3	100.00	
HH-14-01	179	182	3	3	100.00	2.82	94.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
HH-14-01	182	185	3	3	100.00	2.78	92.67	
HH-14-01	185	188	3	3	100.00	3	100.00	
HH-14-01	188	191	3	3	100.00	2.77	92.33	
HH-14-01	191	194	3	3	100.00	2.95	98.33	
HH-14-01	194	197	3	3	100.00	3	100.00	
HH-14-01	197	200	3	3	100.00	2.57	85.67	
HH-14-01	200	203	3	3	100.00	3	100.00	
HH-14-01	203	206	3	3	100.00	2.81	93.67	
HH-14-01	206	209	3	3	100.00	3	100.00	
HH-14-01	209	212	3	3	100.00	3	100.00	
HH-14-01	212	215	3	3	100.00	3	100.00	
HH-14-01	215	218	3	3	100.00	2.55	85.00	
HH-14-01	218	221	3	3	100.00	3	100.00	
HH-14-01	221	224	3	3	100.00	3	100.00	
HH-14-01	224	227	3	3	100.00	3	100.00	
HH-14-01	227	230	3	3	100.00	2.94	98.00	
HH-14-01	230	233	3	3	100.00	3	100.00	
HH-14-01	233	236	3	3	100.00	3	100.00	
HH-14-01	236	239	3	3	100.00	3	100.00	
HH-14-01	239	242	3	3	100.00	3	100.00	
HH-14-01	242	245	3	3	100.00	3	100.00	
HH-14-01	245	248	3	3	100.00	3	100.00	
HH-14-01	248	251	3	3	100.00	2.75	91.67	
HH-14-01	251	254	3	3	100.00	2.9	96.67	
HH-14-01	254	257	3	3	100.00	3	100.00	
HH-14-01	257	260	3	3	100.00	3	100.00	
HH-14-01	260	263	3	3	100.00	3	100.00	
HH-14-01	263	266	3	3	100.00	3	100.00	
HH-14-01	266	269	3	3	100.00	3	100.00	
HH-14-01	269	272	3	3	100.00	3	100.00	
HH-14-01	272	275	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
HH-14-01	275	278	3	3	100.00	3	100.00	
HH-14-01	278	281	3	3	100.00	3	100.00	
HH-14-01	281	284	3	3	100.00	3	100.00	
HH-14-01	284	287	3	3	100.00	3	100.00	
HH-14-01	287	290	3	3	100.00	3	100.00	
HH-14-01	290	293	3	3	100.00	3	100.00	
HH-14-01	293	296	3	3	100.00	3	100.00	
HH-14-01	296	299	3	3	100.00	2.77	92.33	
HH-14-01	299	302	3	3	100.00	3	100.00	
HH-14-01	302	305	3	3	100.00	3	100.00	
HH-14-01	305	308	3	3	100.00	2.92	97.33	
HH-14-01	308	311	3	3	100.00	3	100.00	
HH-14-01	311	314	3	3	100.00	3	100.00	
HH-14-01	314	317	3	3	100.00	3	100.00	
HH-14-01	317	320	3	3	100.00	3	100.00	

HOLEID	DEPTH	AZIMUTH	DIP
HH-14-01	0	270	-68.57
HH-14-01	0	270	-70
HH-14-01	4	270.58	-67.93
HH-14-01	8	271.37	-67.98
HH-14-01	12	272.2	-67.88
HH-14-01	16	272.73	-67.89
HH-14-01	20	273.41	-68.84
HH-14-01	24	273.81	-67.78
HH-14-01	28	274.34	-67.74
HH-14-01	32	274.64	-67.71
HH-14-01	36	274.74	-67.68
HH-14-01	40	274.54	-67.69
HH-14-01	44	274.24	-67.71
HH-14-01	48	274.15	-67.72
HH-14-01	52	273.24	-67.72
HH-14-01	56	272.6	-67.71
HH-14-01	60	272.42	-67.71
HH-14-01	64	271.94	-67.68
HH-14-01	68	271.47	-67.66
HH-14-01	72	271.37	-67.68
HH-14-01	76	271.05	-67.62
HH-14-01	80	270.85	-67.59
HH-14-01	84	271.04	-67.56
HH-14-01	88	271.3	-67.55
HH-14-01	92	272.15	-67.52
HH-14-01	96	272.92	-67.56
HH-14-01	100	273.5	-67.59
HH-14-01	104	274.21	-67.62
HH-14-01	108	275.15	-67.67

HOLEID	DEPTH	AZIMUTH	DIP
HH-14-01	112	275.8	-67.68
HH-14-01	116	276.82	-67.69
HH-14-01	120	277.99	-67.73
HH-14-01	124	278.89	-67.75
HH-14-01	128	280.01	-67.74
HH-14-01	132	281.02	-67.82
HH-14-01	136	281.86	-67.81
HH-14-01	140	282.96	-67.7
HH-14-01	144	283.51	-67.69
HH-14-01	148	284.47	-67.68
HH-14-01	152	285.55	-67.63
HH-14-01	156	286.13	-67.59
HH-14-01	160	286.39	-67.53
HH-14-01	164	286.65	-67.54
HH-14-01	168	286.65	-67.51
HH-14-01	172	286.95	-67.52
HH-14-01	176	286.88	-67.47
HH-14-01	180	286.31	-67.47
HH-14-01	184	286.3	-67.5
HH-14-01	188	285.7	-67.53
HH-14-01	192	284.95	-67.51
HH-14-01	196	284.48	-67.5
HH-14-01	200	283.9	-67.52
HH-14-01	204	283.49	-67.47
HH-14-01	208	283.06	-67.42
HH-14-01	212	282.38	-67.41
HH-14-01	216	282.17	-67.39
HH-14-01	220	281.61	-67.37
HH-14-01	224	281.21	-67.32
HH-14-01	228	280.85	-67.3
HH-14-01	232	280.47	-67.27

HOLEID	DEPTH	AZIMUTH	DIP
HH-14-01	236	280.27	-67.21
HH-14-01	240	280.38	-67.15
HH-14-01	244	280.16	-67.07
HH-14-01	248	280.21	-67
HH-14-01	252	280.25	-66.98
HH-14-01	256	280.54	-66.92
HH-14-01	260	280.94	-66.91
HH-14-01	264	281.43	-66.92
HH-14-01	268	281.9	-66.88
HH-14-01	272	282.65	-66.91
HH-14-01	276	283.23	-66.93
HH-14-01	280	283.93	-66.96
HH-14-01	284	284.61	-66.99
HH-14-01	288	285.16	-67.02
HH-14-01	292	286.22	-67.01
HH-14-01	296	286.74	-67.01
HH-14-01	300	287.89	-67.04
HH-14-01	304	289.02	-67.04
HH-14-01	308	290.26	-67.02
HH-14-01	312	291.17	-66.99
HH-14-01	316	292.07	-66.96
HH-14-01	320	292.9	-66.91



Cliffs Eastern Iron Ore Project Database

HOLEID:	LJ-14-01	Project :	LakeJean
Easting:	598421	Depth:	252
Norhting:	5806888	Azimuth:	270
Elevation:	600	Dip:	-75
STARTDATE:	24-Jul-2014	CasDepth:	9
ENDDATE:	28-Jul-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	33215		
Water source :	Lake, 598804E5807487N		
CollarComments:	Hole making minor water.		
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
LJ-14-01	9	46.8	GN	Biotite-Gt Gneiss	Banded	medium grained	Medium				
Comments : Biotite-Quartz-Garnet-Gneiss, locally coarse grained garnet up to 2cm. Locally biotite altered to chlorite.											
LJ-14-01	46.8	49.55	DK	Felsic dyke or intrusive	Banded	medium grained	Hard				
Comments : Weakly foliated granitic intrusion.											
LJ-14-01	49.55	83.7	GN	Gneiss	Banded	medium grained	Hard				
Comments : Quartz-plagioclase-Biotite-Gneiss, locally pink K feldspar and muscovite, minor medium grained garnet locally.											
LJ-14-01	83.7	89.75	GN	K-spar+plagioclase-quartz gneiss	Banded	medium grained	Hard				
Comments : Kspar-Plagioclase-Quartz-Gneiss, minor boitite.											
LJ-14-01	89.75	93.3	GN	Gneiss	Banded	medium grained	Medium				
Comments : Quartz-biotite-plagioclase-gneiss, minor muscovite.											
LJ-14-01	93.3	96.34	GN	Felsic Gneiss	Banded	medium grained	Hard				
Comments : Felsic-Gneiss											
LJ-14-01	96.34	98.4	GN	Gneiss	Banded	medium grained	Medium				
Comments : Quartz-Feldspar-Biotite-Gneiss											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
LJ-14-01	98.4	99.22	DK	Felsic dyke or intrusive	Massive	medium grained	Hard				
Comments : Felsic Dyke											
LJ-14-01	99.22	111.9	GN	Gneiss	Banded	medium grained	Medium				
Comments : Quartz-Feldspar-Biotite-Gneiss											
LJ-14-01	111.9	118.4	GN	Felsic Gneiss	Banded	medium grained	Medium				
Comments : Felsic-Gneiss											
LJ-14-01	118.4	128.5	GN	Gneiss	Banded	medium grained	Medium				
Comments : Quartz-Feldspar-Biotite-Gneiss											
LJ-14-01	128.5	131.25	DK	Felsic dyke or intrusive	Massive	medium grained	Hard				
Comments : Felsic Dyke											
LJ-14-01	131.25	137	GN	Gneiss	Banded	medium grained	Medium				
Comments : Minor K-spar locally. From 132.24 to 132.32 15% magnetite and 2% pyrite.											
LJ-14-01	137	140	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard	5	30		3
Comments : Magnetite IF, minor actinolite as cm scale bands locally. Minor carbonate as mm scale veinlets.											
LJ-14-01	140	143	HMIF	hematite>magnetite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Hard	25	15		
Comments : Hematite-Magnetite IF, minor carbonate as mm scale veinlets cross-cutting banding.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
LJ-14-01	143	165.5	HIF	hematite >20%-quartzite (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Hard	40	5	1	3
Comments : Hematite IF, minor actinolite as cm scale banded blebs from 155.5 - 156m. Minor carbonate as mm scale veinlets locally.											
LJ-14-01	165.5	169.4	HMIF	hematite>magnetite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Medium	25	10	1	3
Comments : Hematite-Magnetite IF, amphibolite locally as cm scale bands, minor carbonate as mm scale veinlets locally.											
LJ-14-01	169.4	171.45	QZ	quartz rock	Massive	fine to medium grained	Medium	5	1		2
Comments : White quartz vein with medium to coarse grained hematite blebs locally and at margins.											
LJ-14-01	171.45	210	HMIF	hematite>magnetite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Hard	35	7	3	5
Comments : Hematite as cm scale bands with minor magnetite locally, locally as cm scale coarse grained massive bands. Iron silicates locally as cm scale blebs and discontinuous bands. Minor carbonate as mm scale veinlets and with iron oxides locally. Very hard rock.											
LJ-14-01	210	218.3	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard	2	20	3	15
Comments : Magnetite IF with Fe silicates and minor carbonate.											
LJ-14-01	218.3	221.6	GN	Biotite-Gt Gneiss	Banded	medium grained	Soft				
Comments : Biotite-Garnet-Gneiss, 219.76-219.9m is MIF with 20%magnetite.											
LJ-14-01	221.6	225.7	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Medium	7	25	3	7
Comments : Magnetite IF, minor hematite and minor carbonate locally..											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
LJ-14-01	225.7	236.4	HMIF	hematite>magnetite-quartzite [MT+HM>20%] (minor marble, Ca/Fe silicates)	Banded	fine to medium grained	Medium	20	5	3	7
Comments : Minor carbonate. From 227 to 228m amphibolite unit 20 dtca.											
LJ-14-01	236.4	246.2	QZ	quartz rock IF	Banded	fine grained	Hard	5	1	3	3
Comments : Quartz Rock IF, red hematite on fracture surfaces. 244.2-244.4 breccia zone.											
LJ-14-01	246.2	249.8	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard	3	20	3	7
Comments : Magnetite IF, carbonate locally as mm to cm scale veins.											
LJ-14-01	249.8	252	GN	Biotite-Gt Gneiss	Banded	medium grained	Medium				
Comments : Biotite-Garnet-Feldspar-Gneiss											

HOLEID	FROM	TO	Angle	Code	Comments
LJ-14-01	10	11	34	Banded	
LJ-14-01	20	21	36	Banded	
LJ-14-01	30	31	54	Banded	
LJ-14-01	40	41	34	Banded	
LJ-14-01	50	51	38	Banded	
LJ-14-01	60	61	39	Banded	
LJ-14-01	70	71	36	Banded	
LJ-14-01	79	80	32	Banded	
LJ-14-01	90	91	46	Banded	
LJ-14-01	100	101	42	Banded	
LJ-14-01	110	111	26	Banded	
LJ-14-01	120	121	37	Banded	
LJ-14-01	131.9	131.93	35	gouge	Greenish grey sandy clay gouge, little movement.
LJ-14-01	136.99	137	42	contact	
LJ-14-01	140	141	36	Banded	
LJ-14-01	150	151	33	Banded	
LJ-14-01	152.54	152.55	33	gouge	Green grey clay
LJ-14-01	156.95	157.18	35	fault	Grey sandy clay fault gouge.
LJ-14-01	160	161	34	Banded	
LJ-14-01	171.6	172.6	33	Banded	
LJ-14-01	180	181	38	Banded	
LJ-14-01	190	191	32	Banded	
LJ-14-01	200	201	36	Banded	
LJ-14-01	210	211	34	Banded	
LJ-14-01	218.29	218.3	43	contact	
LJ-14-01	221.59	221.6	38	contact	
LJ-14-01	230	231	28	Banded	
LJ-14-01	234.15	234.2	64	gouge	Red clay
LJ-14-01	240	241	44	foliation	

HOLEID	FROM	TO	Angle	Code	Comments
LJ-14-01	249.79	249.8	26	contact	



HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
LJ-14-01	131.25	137	080043	GN	-0.005	0.005	0.007	66.03	12.36	8.42	0.174	2.43	1.72	4.91	0.88	0.23	0.01	0.008	99.86	5.89
LJ-14-01	137	140	080044	MIF	-0.005	-0.005	0.012	54.65	0.51	43.39	0.039	0.45	0.7	0.14	0.4	0.11	0.01	0.009	100.3	30.3
LJ-14-01	140	143	080045	HMIF	-0.005	-0.005	-0.003	59.21	-0.01	40.66	0.023	0.15	0.43	0.06	0.02	0.11	0.01	-0.003	100.8	28.4
LJ-14-01	143	149	080046	HIF	-0.005	-0.005	-0.003	46.36	-0.01	53.18	0.01	0.05	0.37	0.02	0.01	0.02	-0.01	-0.003	100.3	37.2
LJ-14-01	149	155	080047	HIF	0.005	-0.005	-0.003	49.63	0.1	49.74	0.027	0.29	0.43	0.11	0.02	0.02	-0.01	-0.003	100.6	34.8
LJ-14-01	155	161	080048	HIF	-0.005	-0.005	-0.003	51.38	1.15	45.25	0.046	0.89	0.95	0.28	0.38	0.12	-0.01	0.005	100.9	31.6
LJ-14-01	161	165.5	080049	HIF	-0.005	-0.005	0.009	46.6	0.02	53.72	0.015	0.13	0.13	0.09	0.06	0.04	0.01	-0.003	100.9	37.6
LJ-14-01	165.5	171.45	080051	HMIF	-0.005	-0.005	0.009	60.46	6.27	22.01	0.113	2.69	3.31	1.21	1.79	0.48	0.01	0.024	100.4	15.4
LJ-14-01	171.45	177	080052	HMIF	-0.005	-0.005	-0.003	49.65	-0.01	50.16	0.033	0.08	0.27	0.06	0.04	0.03	-0.01	-0.003	100.5	35.1
LJ-14-01	177	183	080053	HMIF	-0.005	-0.005	-0.003	48.47	-0.01	51.99	0.03	0.06	0.18	0.02	0.01	0.03	0.01	-0.003	100.8	36.4
LJ-14-01	183	189	080054	HMIF	-0.005	-0.005	0.003	51.65	0.7	43.99	0.059	1.19	1.47	0.2	0.25	0.16	0.01	0.008	100.3	30.8
LJ-14-01	189	195	080055	HMIF	-0.005	-0.005	0.005	42.94	0.27	54.5	0.079	0.61	0.91	0.14	0.48	0.19	0.01	0.006	100.5	38.1
LJ-14-01	195	201	080056	HMIF	-0.005	-0.005	0.004	45.54	-0.01	53.26	0.048	0.42	0.62	0.09	0.24	0.07	0.01	-0.003	100.7	37.2
LJ-14-01	201	207	080057	HMIF	-0.005	-0.005	0.003	45.31	-0.01	50.94	0.2	0.94	1.7	0.06	0.01	0.02	-0.01	-0.003	100.4	35.6
LJ-14-01	207	210	080058	HMIF	-0.005	-0.005	0.008	55.26	-0.01	41.26	0.592	1.08	1.28	0.07	-0.01	0.02	-0.01	-0.003	100	28.9
LJ-14-01	210	214	080059	MIF	-0.005	-0.005	-0.003	41.02	-0.01	51.33	0.838	2.63	4.03	0.04	-0.01	0.02	-0.01	-0.003	100.4	35.9
LJ-14-01	214	218.3	080061	MIF	-0.005	-0.005	0.014	46.21	-0.01	44.47	0.927	4.26	4.68	0.03	0.01	0.03	-0.01	-0.003	100.4	31.1
LJ-14-01	218.3	221.6	080062	GNBGt	0.006	-0.005	0.014	47.78	12.74	18.76	0.329	4.93	6.73	1.58	3.5	0.94	0.02	0.049	100.1	13.1
LJ-14-01	221.6	225.7	080063	MIF	-0.005	-0.005	0.004	30.62	-0.01	59.32	4.03	2.52	2.79	0.07	0.03	0.03	-0.01	-0.003	100.2	41.5
LJ-14-01	225.7	231.7	080064	HMIF	-0.005	-0.005	0.028	51.24	1.65	37.31	0.35	4	3.32	0.38	0.52	0.14	0.01	0.007	100.8	26.1
LJ-14-01	231.7	236.4	080065	HMIF	-0.005	-0.005	-0.003	48.34	0.99	40.34	0.23	4.34	2.83	0.16	0.13	0.05	-0.01	0.006	100.5	28.2
LJ-14-01	236.4	242.4	080066	QZIF	-0.005	-0.005	-0.003	93.11	0.35	2.8	0.057	1.28	1.16	0.13	0.02	0.01	-0.01	-0.003	99.77	1.96
LJ-14-01	242.4	246.2	080067	QZIF	-0.005	-0.005	-0.003	90.37	1.87	4.08	0.141	2.2	0.34	0.2	0.09	0.14	0.01	-0.003	100.3	2.85
LJ-14-01	246.2	249.8	080068	MIF	-0.005	-0.005	0.03	55.86	0.89	36.03	0.199	3.33	2.15	0.07	0.17	0.07	0.01	0.005	100.8	25.2
LJ-14-01	249.8	252	080070	GNBGt	0.006	-0.005	0.014	44.59	12.71	19.26	0.52	9.53	4.34	0.79	3.74	1	0.02	0.059	100.7	13.5

HOLEID	DEPTH	MagSus
LJ-14-01	9	0.24
LJ-14-01	11	1.132
LJ-14-01	13	0.481
LJ-14-01	15	1.037
LJ-14-01	17	0.254
LJ-14-01	19	0.452
LJ-14-01	21	0.419
LJ-14-01	23	0.328
LJ-14-01	25	0.504
LJ-14-01	27	0.48
LJ-14-01	29	0.448
LJ-14-01	31	0.573
LJ-14-01	33	1.002
LJ-14-01	35	0.698
LJ-14-01	37	0.413
LJ-14-01	39	0.453
LJ-14-01	41	0.687
LJ-14-01	43	2.929
LJ-14-01	45	0.52
LJ-14-01	47	0.44
LJ-14-01	49	0.021
LJ-14-01	51	0.506
LJ-14-01	53	1.128
LJ-14-01	55	0.694
LJ-14-01	57	0.883
LJ-14-01	59	0.521
LJ-14-01	61	0.573
LJ-14-01	63	0.54
LJ-14-01	65	1.097

HOLEID	DEPTH	MagSus
LJ-14-01	67	0.472
LJ-14-01	69	0.458
LJ-14-01	71	0.344
LJ-14-01	73	0.153
LJ-14-01	75	0.279
LJ-14-01	77	0.484
LJ-14-01	79	0.253
LJ-14-01	81	0.252
LJ-14-01	83	0.372
LJ-14-01	85	0.046
LJ-14-01	87	0.064
LJ-14-01	89	0.18
LJ-14-01	91	0.546
LJ-14-01	93	0.474
LJ-14-01	95	0.145
LJ-14-01	97	0.473
LJ-14-01	99	0.031
LJ-14-01	101	0.411
LJ-14-01	103	0.422
LJ-14-01	105	0.493
LJ-14-01	107	0.494
LJ-14-01	109	0.433
LJ-14-01	111	0.694
LJ-14-01	113	0.123
LJ-14-01	115	0.131
LJ-14-01	117	0.148
LJ-14-01	119	1.129
LJ-14-01	121	0.299
LJ-14-01	123	0.256
LJ-14-01	125	0.472
LJ-14-01	127	0.468

HOLEID	DEPTH	MagSus
LJ-14-01	129	0.181
LJ-14-01	131	2.861
LJ-14-01	133	1.012
LJ-14-01	135	4.712
LJ-14-01	137	507
LJ-14-01	139	709.8
LJ-14-01	141	294.3
LJ-14-01	143	35.15
LJ-14-01	145	25.29
LJ-14-01	147	13.55
LJ-14-01	149	7.468
LJ-14-01	151	67.83
LJ-14-01	153	4.649
LJ-14-01	155	36.22
LJ-14-01	157	57.53
LJ-14-01	159	15.72
LJ-14-01	161	14.12
LJ-14-01	163	3.8
LJ-14-01	165	75.5
LJ-14-01	167	1584
LJ-14-01	169	3.575
LJ-14-01	171	0.714
LJ-14-01	173	67.96
LJ-14-01	175	57.32
LJ-14-01	177	22.75
LJ-14-01	179	28.44
LJ-14-01	181	142.5
LJ-14-01	183	8.743
LJ-14-01	185	13.89
LJ-14-01	187	158.7
LJ-14-01	189	233.6

HOLEID	DEPTH	MagSus
LJ-14-01	191	120.1
LJ-14-01	193	24.2
LJ-14-01	195	7.828
LJ-14-01	197	24.97
LJ-14-01	199	109.7
LJ-14-01	201	11.95
LJ-14-01	203	11.97
LJ-14-01	205	25.04
LJ-14-01	207	251.1
LJ-14-01	209	588.8
LJ-14-01	211	464.9
LJ-14-01	213	2664
LJ-14-01	215	1704
LJ-14-01	217	3456
LJ-14-01	219	18.94
LJ-14-01	221	34.44
LJ-14-01	223	3603
LJ-14-01	225	2165
LJ-14-01	227	1099
LJ-14-01	229	560
LJ-14-01	231	73.21
LJ-14-01	233	2.807
LJ-14-01	235	4.29
LJ-14-01	237	9.82
LJ-14-01	239	34.96
LJ-14-01	241	19.67
LJ-14-01	243	0.604
LJ-14-01	245	19.59
LJ-14-01	247	635.3
LJ-14-01	249	112.1
LJ-14-01	251	5.049



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
LJ-14-01	9	12	3	3	100.00	2.84	94.67	
LJ-14-01	12	15	3	3	100.00	3	100.00	
LJ-14-01	15	18	3	3	100.00	2.91	97.00	
LJ-14-01	18	21	3	3	100.00	2.9	96.67	
LJ-14-01	21	24	3	3	100.00	3	100.00	
LJ-14-01	24	27	3	3	100.00	3	100.00	
LJ-14-01	27	30	3	3	100.00	3	100.00	
LJ-14-01	30	33	3	3	100.00	2.91	97.00	
LJ-14-01	33	36	3	3	100.00	3	100.00	
LJ-14-01	36	39	3	3	100.00	3	100.00	
LJ-14-01	39	42	3	3	100.00	2.77	92.33	
LJ-14-01	42	45	3	3	100.00	3	100.00	
LJ-14-01	45	48	3	3	100.00	2.38	79.33	
LJ-14-01	48	51	3	3	100.00	1.92	64.00	
LJ-14-01	51	54	3	3	100.00	3	100.00	
LJ-14-01	54	57	3	3	100.00	3	100.00	
LJ-14-01	57	60	3	3	100.00	3	100.00	
LJ-14-01	60	63	3	3	100.00	2.73	91.00	
LJ-14-01	63	66	3	3	100.00	3	100.00	
LJ-14-01	66	69	3	3	100.00	2.01	67.00	
LJ-14-01	69	72	3	3	100.00	2.79	93.00	
LJ-14-01	72	75	3	3	100.00	3	100.00	
LJ-14-01	75	78	3	3	100.00	3	100.00	
LJ-14-01	78	81	3	3	100.00	2.24	74.67	
LJ-14-01	81	84	3	3	100.00	2.6	86.67	
LJ-14-01	84	87	3	3	100.00	2.79	93.00	
LJ-14-01	87	90	3	3	100.00	3	100.00	
LJ-14-01	90	93	3	3	100.00	2.85	95.00	
LJ-14-01	93	96	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
LJ-14-01	96	99	3	3	100.00	2.78	92.67	
LJ-14-01	99	102	3	3	100.00	2.75	91.67	
LJ-14-01	102	105	3	3	100.00	2.51	83.67	
LJ-14-01	105	108	3	3	100.00	3	100.00	
LJ-14-01	108	111	3	3	100.00	3	100.00	
LJ-14-01	111	114	3	3	100.00	2.82	94.00	
LJ-14-01	114	117	3	3	100.00	2.83	94.33	
LJ-14-01	117	120	3	3	100.00	3	100.00	
LJ-14-01	120	123	3	3	100.00	3	100.00	
LJ-14-01	123	126	3	3	100.00	2.67	89.00	
LJ-14-01	126	129	3	3	100.00	3	100.00	
LJ-14-01	129	132	3	3	100.00	2.69	89.67	
LJ-14-01	132	135	3	3	100.00	2.7	90.00	
LJ-14-01	135	138	3	3	100.00	2.57	85.67	
LJ-14-01	138	141	3	3	100.00	2.58	86.00	
LJ-14-01	141	144	3	3	100.00	2.44	81.33	
LJ-14-01	144	147	3	3	100.00	2.42	80.67	
LJ-14-01	147	150	3	3	100.00	2.7	90.00	
LJ-14-01	150	153	3	3	100.00	2.84	94.67	
LJ-14-01	153	156	3	3	100.00	2.17	72.33	
LJ-14-01	156	159	3	3	100.00	2.08	69.33	
LJ-14-01	159	162	3	3	100.00	2.88	96.00	
LJ-14-01	162	165	3	3	100.00	2.83	94.33	
LJ-14-01	165	168	3	2.73	91.00	2.63	96.34	
LJ-14-01	168	171	3	3	100.00	2.38	79.33	
LJ-14-01	171	174	3	3	100.00	2.86	95.33	
LJ-14-01	174	177	3	3	100.00	3	100.00	
LJ-14-01	177	180	3	3	100.00	3	100.00	
LJ-14-01	180	183	3	3	100.00	2.87	95.67	
LJ-14-01	183	186	3	3	100.00	2.58	86.00	
LJ-14-01	186	189	3	3	100.00	2.8	93.33	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
LJ-14-01	189	192	3	3	100.00	3	100.00	
LJ-14-01	192	195	3	3	100.00	3	100.00	
LJ-14-01	195	198	3	3	100.00	3	100.00	
LJ-14-01	198	201	3	3	100.00	2.7	90.00	
LJ-14-01	201	204	3	3	100.00	2.62	87.33	
LJ-14-01	204	207	3	3	100.00	3	100.00	
LJ-14-01	207	210	3	3	100.00	2.86	95.33	
LJ-14-01	210	213	3	3	100.00	3	100.00	
LJ-14-01	213	216	3	3	100.00	3	100.00	
LJ-14-01	216	219	3	3	100.00	2.75	91.67	
LJ-14-01	219	222	3	3	100.00	3	100.00	
LJ-14-01	222	225	3	3	100.00	3	100.00	
LJ-14-01	225	228	3	3	100.00	2.65	88.33	
LJ-14-01	228	231	3	3	100.00	2.84	94.67	
LJ-14-01	231	234	3	3	100.00	1.9	63.33	
LJ-14-01	234	237	3	3	100.00	2.28	76.00	
LJ-14-01	237	240	3	3	100.00	2.82	94.00	
LJ-14-01	240	243	3	3	100.00	1.16	38.67	
LJ-14-01	243	246	3	3	100.00	2.02	67.33	
LJ-14-01	246	249	3	3	100.00	2.44	81.33	
LJ-14-01	249	252	3	3	100.00	2.47	82.33	



HOLEID	DEPTH	AZIMUTH	DIP
LJ-14-01	0	270	-75



Cliffs Eastern Iron Ore Project Database

HOLEID:	FB-14-01	Project :	Faber
Easting:	598495	Depth:	350
Norhting:	5818690	Azimuth:	270
Elevation:	630	Dip:	-75
STARTDATE:	30-Jul-2014	CasDepth:	9
ENDDATE:	3-Aug-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	2116336		
Water source :	Stream, 598651E5818753N		
CollarComments:			
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-01	9	20.7	GN	Gneiss	Banded	medium grained	Medium				
Comments : Feldspar-Quartz-Biotite-Gneiss											
FB-14-01	20.7	22.8	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : White massive Marble											
FB-14-01	22.8	25.4	GN	Gneiss	Banded	medium grained	Medium				
Comments : Feldspar-Quartz-Biotite-Gneiss											
FB-14-01	25.4	145.1	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : Marble, white, locally biotite/chlorite and coarse grained. Weakly foliated locally with biotite/chlorite. 119.35-119.73 hornblende/boitite/garnet. From 130 to 145.1m minor quartz as cm scale bands.											
FB-14-01	145.1	149.4	QZ	Quartz Rock	Massive	fine grained	Hard				
Comments : Quartz Rock											
FB-14-01	149.4	159.25	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : Marble, 153.25 to 154.5m is hornblende-biotite-garnet-gneiss(schist). Minor quartz as cm scale bands locally.											
FB-14-01	159.25	167.5	QZ	Quartz Rock	Massive	fine grained	Hard				
Comments : White to grey colored quartz with marble bands locally.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-01	167.5	183.05	GN	biotite-quartz-plagioclase gneiss; Bio>10%, minor garnets	Banded	fine to medium grained	Hard				
Comments : Biotite-Quartz-Plagioclase-Gneiss, locally very siliceous, garnets locally up to 2cm. Marble locally up to 50cm thick zones. Pyrite and chlorite common on fracture surfaces.											
FB-14-01	183.05	187.23	SIF	magnetite silicate iron formation	Disseminated	fine to medium grained	Medium		15	50	20
Comments : Magnetite-Silicate IF, magnetite as fine disseminated grains forming cm scale bands in iron silicates with cm scale quartz bands. Minor carbonate and garnet locally.											
FB-14-01	187.23	187.36	FLT	Fault	Massive	fine grained	Soft				
Comments : Grey-green-black clay fault gouge											
FB-14-01	187.36	188.48	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Banded	fine grained	Medium				
Comments : Marble											
FB-14-01	188.48	191.97	GN	biotite-quartz-plagioclase gneiss; Bio>10%, minor garnets	Banded	fine to medium grained	Medium				
Comments : Biotite-Quartz-Plagioclase-Garnet-Gneiss, garnet up to 4cm locally. Carbonate as cm scale wispy bands locally.											
FB-14-01	191.97	197.53	SIF	Grunerite IF	Disseminated	fine to medium grained	Hard		15	60	10
Comments : Grunerite IF, 15% magnetite as fine disseminated grains forming cm scale bands.											
FB-14-01	197.53	218.9	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard		25	10	5
Comments : Magnetite IF, magnetite as fine disseminated grains forming cm scale bands and medium grained bands. 15% carbonate as discontinuous bands with magnetite.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-01	218.9	238.75	SIF	carbonate silicate iron formation	Disseminated	fine to medium grained	Hard		10	10	5
Comments : Carbonate-Silicate IF, 10% magnetite as fine disseminated grains forming cm scale bands.20% carbonate(marble) as cm scale bands.											
FB-14-01	238.75	249.95	SIF	Grunerite IF	Banded	fine to medium grained	Hard		10	50	5
Comments : Grunerite IF, 10% magnetite as fine disseminated grains forming cm scale bands. 5% carbonate(marble) as cm scale bands. 245.3-245.9m and 247.1-247.5m hornblende-biotite-garnet.											
FB-14-01	249.95	256.45	RX	Garnet Magnetite Pyroxenite.	Disseminated	fine to medium grained	Medium		5		
Comments : Garnet-Magnetite-Pyroxenite, magnetite as fine disseminated grains, 2% disseminated pyrite.											
FB-14-01	256.45	269.1	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Soft		30	5	15
Comments : Magnetite IF, 15% carbonate.											
FB-14-01	269.1	288.8	SCH	magnetite schist	Disseminated	fine to medium grained	Soft		7		
Comments : Magnetite-Schist, biotite, garnet, fine to medium grained disseminated magnetite.											
FB-14-01	288.8	292.05	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Medium		25		15
Comments : Magnetite IF, 5% carbonate.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-01	292.05	320.25	SCH	magnetite schist	Disseminated	fine to medium grained	Medium		7		
Comments : Magnetite-Schist, biotite, garnet, fine to medium grained disseminated magnetite.											
FB-14-01	320.25	327.6	SIF	magnetite carbonate silicate iron formation	Banded	fine to medium grained	Medium		15	5	50
Comments : Magnetite-Carbonate-Silicate IF, 15% magnetite, 50% actinolite, 20% carbonate.											
FB-14-01	327.6	332.3	SIF	quartz rock - carbonate silicate iron formation	Banded	fine to medium grained	Hard		2	10	30
Comments : Quartz Rock-Silicate-Carbonate IF, 30% actinolite, 10% carbonate.											
FB-14-01	332.3	348.95	SCH	Mica Schist	Banded	fine to medium grained	Soft				
Comments : Mica-Schist											
FB-14-01	348.95	350	SIF	quartz rock - carbonate silicate iron formation	Banded	fine to medium grained	Hard		2	5	30
Comments : Quartz Rock-Silicate-Carbonate IF, 30% actinolite, 5% carbonate											

HOLEID	FROM	TO	Angle	Code	Comments
FB-14-01	10	11	86	Banded	
FB-14-01	20	20.5	86	Banded	
FB-14-01	30	31	45	foliation	
FB-14-01	70.5	71	60	Banded	Biotite
FB-14-01	80.5	80.6	55	Banded	Chlorite
FB-14-01	90.3	90.35	50	Banded	Weak biotite banding
FB-14-01	103	104	56	Banded	Weak biotite banding
FB-14-01	122	123	66	Banded	biotite
FB-14-01	131	132	60	Banded	biotite
FB-14-01	139.8	139.88	69	Banded	quartz band
FB-14-01	149.4	149.41	74	contact	
FB-14-01	159.25	159.26	76	contact	
FB-14-01	169.5	170	65	Banded	
FB-14-01	183	184	74	Banded	
FB-14-01	185.78	185.83	74	gouge	Greenish grey to black clay.
FB-14-01	187.23	187.36	70	fault	Greenish grey to black sandy clay.
FB-14-01	192	193	69	Banded	
FB-14-01	200	200.4	74	Banded	
FB-14-01	209	210	68	Banded	
FB-14-01	220	221	72	Banded	
FB-14-01	230	231	74	Banded	
FB-14-01	240	241	74	Banded	
FB-14-01	250	251	64	Banded	
FB-14-01	260	261	82	Banded	
FB-14-01	270	271	69	foliation	
FB-14-01	280	281	77	foliation	
FB-14-01	290	291	80	Banded	
FB-14-01	300	301	74	foliation	
FB-14-01	310	311	65	foliation	

HOLEID	FROM	TO	Angle	Code	Comments
FB-14-01	321	322	60	Banded	
FB-14-01	328	329	50	Banded	
FB-14-01	340	341	60	schistosity	
FB-14-01	349	350	60	Banded	



HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
FB-14-01	177.05	183.05	080071	BQ_GN	-0.005	-0.005	0.003	87.05	2.9	4.25	0.044	1.21	1.79	1.09	0.12	0.32	0.01	-0.003	100.5	2.97
FB-14-01	183.05	187.36	080072	MSIF	0.005	-0.005	0.023	43.33	1.05	40.33	1.895	5.57	4.17	0.29	0.12	0.16	0.01	0.008	100.7	28.2
FB-14-01	187.36	191.97	080073	BQ_GN	-0.005	-0.005	0.009	61.5	7.15	4.96	0.103	5.37	7.81	2.61	0.27	0.12	0.02	0.003	100.1	3.47
FB-14-01	191.97	197.53	080074	GSIF	-0.005	-0.005	0.027	44.63	0.6	42.96	2.022	5.47	3.1	0.2	0.1	0.13	-0.01	0.006	100.4	30
FB-14-01	197.53	203.53	080075	MIF	-0.005	-0.005	0.004	49.77	0.03	39.92	0.5	2.77	4.74	0.07	-0.01	-0.01	-0.01	-0.003	100.1	27.9
FB-14-01	203.53	209.53	080076	MIF	-0.005	-0.005	-0.003	47.94	-0.01	43.17	0.876	3.6	4.13	0.06	0.03	0.02	-0.01	-0.003	100.7	30.2
FB-14-01	209.53	215.53	080077	MIF	-0.005	-0.005	-0.003	42.69	0.01	41.82	0.956	5.96	5.79	0.07	0.02	0.03	-0.01	-0.003	100.5	29.2
FB-14-01	215.53	218.9	080078	MIF	-0.005	-0.005	0.011	58.08	0.09	32.52	0.313	3.16	5.07	0.08	0.01	0.01	-0.01	-0.003	100.5	22.7
FB-14-01	218.9	224.9	080079	CSIF	-0.005	-0.005	-0.003	48.81	0.18	26.82	1.154	7.29	8.2	0.08	0.34	0.09	-0.01	0.007	100.4	18.8
FB-14-01	224.9	230.9	080081	CSIF	-0.005	-0.005	0.005	40.02	0.17	33.34	1.611	7.67	7.97	0.1	0.27	0.09	-0.01	-0.003	100.4	23.3
FB-14-01	230.9	234.9	080082	CSIF	-0.005	-0.005	-0.003	46.4	0.25	21.94	1.511	10.02	11.46	0.11	0.07	0.04	-0.01	-0.003	100.8	15.3
FB-14-01	234.9	238.75	080083	CSIF	0.008	0.007	0.023	35.22	2.09	20.14	0.713	10.29	13.43	0.32	2.06	0.42	0.04	0.032	100.4	14.1
FB-14-01	238.75	244.75	080084	GSIF	-0.005	-0.005	0.019	49.23	0.32	38.97	0.69	4.78	3.46	0.12	0.24	0.07	-0.01	0.005	100	27.2
FB-14-01	244.75	249.95	080085	GSIF	0.006	-0.005	0.014	39.71	5.17	34.88	0.774	7.39	7.86	0.23	0.77	0.16	-0.01	0.017	100	24.4
FB-14-01	249.95	256.45	080086	GMtP	0.014	0.022	0.095	31.51	3.35	22.24	0.673	23.87	2.65	0.24	3.91	0.51	0.09	0.066	100.7	15.6
FB-14-01	256.45	262.45	080087	MIF	0.006	-0.005	0.004	35.17	0.05	53.73	1.476	5.87	3.98	0.16	0.13	0.04	-0.01	-0.003	100.5	37.6
FB-14-01	262.45	269.1	080088	MIF	0.005	-0.005	0.003	35.18	0.06	53.07	1.533	4.58	5.72	0.04	0.09	0.03	-0.01	-0.003	100.8	37.1
FB-14-01	269.1	275.1	080090	M_SCH	0.015	0.02	0.078	32.34	3.86	19.42	0.475	25.27	3.91	0.06	4.16	0.55	0.1	0.073	100.2	13.6
FB-14-01	275.1	281.1	080091	M_SCH	0.016	0.022	0.087	33.45	4.03	20.95	0.281	25.94	3.28	0.05	4.67	0.52	0.1	0.084	100.8	14.6
FB-14-01	281.1	284.8	080092	M_SCH	0.016	0.036	0.084	31.59	3.97	20.46	0.263	26.73	3.6	0.05	4.54	0.52	0.1	0.084	100.5	14.3
FB-14-01	284.8	288.8	080093	M_SCH	0.014	0.031	0.079	32.59	3.67	18.97	0.264	25.52	5.29	0.02	4.24	0.46	0.09	0.075	100.2	13.3
FB-14-01	288.8	292.05	080094	MIF	0.009	0.012	0.03	30.02	0.95	43.89	0.922	9.67	12.02	0.06	1.37	0.29	0.05	0.025	100.8	30.7
FB-14-01	292.05	298.05	080095	M_SCH	0.016	0.021	0.093	32.37	3.31	20.62	0.318	20.33	7.01	0.23	5.47	0.81	0.09	0.079	99.92	14.4
FB-14-01	314.25	320.25	080096	M_SCH	0.014	0.019	0.086	32.52	3.32	21.5	0.342	19.31	7.57	0.41	5.42	0.87	0.09	0.076	100.2	15
FB-14-01	320.25	324.25	080097	MCSIF	0.008	0.008	0.029	33.94	1.27	37.81	1.157	8	10.66	0.07	1.5	0.37	0.03	0.029	100.6	26.4

HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
FB-14-01	324.25	327.6	080098	MCSIF	0.011	0.013	0.047	33.81	2.53	30.17	0.586	13.9	7.39	0.75	3.63	0.62	0.06	0.056	100.7	21.1
FB-14-01	327.6	332.3	080099	QZ_CSIF	-0.005	-0.005	0.006	51.74	1.97	18.63	0.792	5.32	11.58	0.42	0.49	0.94	0.01	0.007	100.1	13



HOLEID	DEPTH	MagSus
FB-14-01	9	0.403
FB-14-01	11	0.461
FB-14-01	13	0.444
FB-14-01	15	0.242
FB-14-01	17	0.136
FB-14-01	19	0.315
FB-14-01	21	0.125
FB-14-01	23	0.176
FB-14-01	25	0.652
FB-14-01	27	0.124
FB-14-01	29	0.07
FB-14-01	31	0.144
FB-14-01	33	0.147
FB-14-01	35	0.066
FB-14-01	37	0.071
FB-14-01	39	0.049
FB-14-01	41	0.035
FB-14-01	43	0.096
FB-14-01	45	0.052
FB-14-01	47	0.024
FB-14-01	49	0.018
FB-14-01	51	0.028
FB-14-01	53	0.048
FB-14-01	55	0.025
FB-14-01	57	0.188
FB-14-01	59	0.305
FB-14-01	61	0.039
FB-14-01	63	0.048
FB-14-01	65	0.328

HOLEID	DEPTH	MagSus
FB-14-01	67	0.061
FB-14-01	69	0.134
FB-14-01	71	0.409
FB-14-01	73	0.048
FB-14-01	75	0.119
FB-14-01	77	0.208
FB-14-01	79	0.201
FB-14-01	81	0.013
FB-14-01	83	0.045
FB-14-01	85	0.142
FB-14-01	87	0.122
FB-14-01	89	0.167
FB-14-01	91	0.169
FB-14-01	93	0.172
FB-14-01	95	0.142
FB-14-01	97	0.128
FB-14-01	99	0.061
FB-14-01	101	0.137
FB-14-01	103	0.136
FB-14-01	105	0.05
FB-14-01	107	0.05
FB-14-01	109	0.182
FB-14-01	111	0.033
FB-14-01	113	0.018
FB-14-01	115	0.04
FB-14-01	117	0.012
FB-14-01	119	0.012
FB-14-01	121	0.025
FB-14-01	123	0.014
FB-14-01	125	0.02
FB-14-01	127	0.02

HOLEID	DEPTH	MagSus
FB-14-01	129	0.064
FB-14-01	131	0.087
FB-14-01	133	0.016
FB-14-01	135	0.014
FB-14-01	137	0.012
FB-14-01	139	0.019
FB-14-01	141	0.021
FB-14-01	143	0.023
FB-14-01	145	0.016
FB-14-01	147	0.063
FB-14-01	149	0.012
FB-14-01	151	0.029
FB-14-01	153	0.131
FB-14-01	155	0.04
FB-14-01	157	0.134
FB-14-01	159	0.191
FB-14-01	161	0.146
FB-14-01	163	0.012
FB-14-01	165	0.031
FB-14-01	167	0.026
FB-14-01	169	0.326
FB-14-01	171	0.262
FB-14-01	173	0.378
FB-14-01	175	0.836
FB-14-01	177	0.251
FB-14-01	179	0.798
FB-14-01	181	5.295
FB-14-01	183	14.04
FB-14-01	185	706.9
FB-14-01	187	64.1
FB-14-01	189	0.465

HOLEID	DEPTH	MagSus
FB-14-01	191	1.902
FB-14-01	193	275.3
FB-14-01	195	562.2
FB-14-01	197	130.9
FB-14-01	199	921.5
FB-14-01	201	1762
FB-14-01	203	1199
FB-14-01	205	367.2
FB-14-01	207	1841
FB-14-01	209	1517
FB-14-01	211	911.5
FB-14-01	213	2073
FB-14-01	215	736.5
FB-14-01	217	809.5
FB-14-01	219	93.11
FB-14-01	221	206.6
FB-14-01	223	327.9
FB-14-01	225	207.6
FB-14-01	227	7.395
FB-14-01	229	93.86
FB-14-01	231	598.5
FB-14-01	233	4.433
FB-14-01	235	2.079
FB-14-01	237	1.988
FB-14-01	239	203.2
FB-14-01	241	379.2
FB-14-01	243	33.17
FB-14-01	245	286.9
FB-14-01	247	605.7
FB-14-01	249	537
FB-14-01	251	171.2

HOLEID	DEPTH	MagSus
FB-14-01	253	129
FB-14-01	255	35.7
FB-14-01	257	2547
FB-14-01	259	4189
FB-14-01	261	3545
FB-14-01	263	5418
FB-14-01	265	2758
FB-14-01	267	3143
FB-14-01	269	2964
FB-14-01	271	241
FB-14-01	273	241.5
FB-14-01	275	67.61
FB-14-01	277	328.7
FB-14-01	279	324
FB-14-01	281	287.8
FB-14-01	283	301
FB-14-01	285	315.6
FB-14-01	287	277.4
FB-14-01	289	828.9
FB-14-01	291	2603
FB-14-01	293	276.9
FB-14-01	295	105.8
FB-14-01	297	50.99
FB-14-01	299	102.7
FB-14-01	301	106.6
FB-14-01	303	142.9
FB-14-01	305	105.5
FB-14-01	307	132.5
FB-14-01	309	187.3
FB-14-01	311	130.7
FB-14-01	313	168.3

HOLEID	DEPTH	MagSus
FB-14-01	315	174.4
FB-14-01	317	275.8
FB-14-01	319	132.4
FB-14-01	321	1193
FB-14-01	323	401.7
FB-14-01	325	1196
FB-14-01	327	2454
FB-14-01	329	18.73
FB-14-01	331	1.735
FB-14-01	333	1.356
FB-14-01	335	0.278
FB-14-01	337	0.37
FB-14-01	339	0.365
FB-14-01	341	2.759
FB-14-01	343	2.48
FB-14-01	345	2.931
FB-14-01	347	8.623
FB-14-01	349	6.62



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-01	8	11	3	3	100.00	2.81	93.67	
FB-14-01	11	14	3	3	100.00	3	100.00	
FB-14-01	14	17	3	3	100.00	3	100.00	
FB-14-01	17	20	3	3	100.00	3	100.00	
FB-14-01	20	23	3	3	100.00	2.85	95.00	
FB-14-01	23	26	3	3	100.00	2.74	91.33	
FB-14-01	26	29	3	3	100.00	2.88	96.00	
FB-14-01	29	32	3	2.8	93.33	2.42	86.43	
FB-14-01	32	35	3	3	100.00	3	100.00	
FB-14-01	35	38	3	3	100.00	3	100.00	
FB-14-01	38	41	3	3	100.00	2.74	91.33	
FB-14-01	41	44	3	3	100.00	2.93	97.67	
FB-14-01	44	47	3	3	100.00	3	100.00	
FB-14-01	47	50	3	3	100.00	3	100.00	
FB-14-01	50	53	3	3	100.00	3	100.00	
FB-14-01	53	56	3	3	100.00	3	100.00	
FB-14-01	56	59	3	3	100.00	2.96	98.67	
FB-14-01	59	62	3	3	100.00	3	100.00	
FB-14-01	62	65	3	3	100.00	3	100.00	
FB-14-01	65	68	3	3	100.00	3	100.00	
FB-14-01	68	71	3	3	100.00	2.85	95.00	
FB-14-01	71	74	3	3	100.00	2.85	95.00	
FB-14-01	74	77	3	3	100.00	2.9	96.67	
FB-14-01	77	80	3	3	100.00	3	100.00	
FB-14-01	80	83	3	3	100.00	3	100.00	
FB-14-01	83	86	3	3	100.00	3	100.00	
FB-14-01	86	89	3	3	100.00	3	100.00	
FB-14-01	89	92	3	3	100.00	2.4	80.00	
FB-14-01	92	95	3	3	100.00	2.77	92.33	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-01	95	98	3	3	100.00	3	100.00	
FB-14-01	98	101	3	3	100.00	3	100.00	
FB-14-01	101	104	3	3	100.00	3	100.00	
FB-14-01	104	107	3	3	100.00	3	100.00	
FB-14-01	107	110	3	3	100.00	2.82	94.00	
FB-14-01	110	113	3	3	100.00	3	100.00	
FB-14-01	113	116	3	3	100.00	3	100.00	
FB-14-01	116	119	3	3	100.00	3	100.00	
FB-14-01	119	122	3	3	100.00	2.83	94.33	
FB-14-01	122	125	3	3	100.00	3	100.00	
FB-14-01	125	128	3	3	100.00	3	100.00	
FB-14-01	128	131	3	3	100.00	3	100.00	
FB-14-01	131	134	3	3	100.00	3	100.00	
FB-14-01	134	137	3	3	100.00	3	100.00	
FB-14-01	137	140	3	3	100.00	3	100.00	
FB-14-01	140	143	3	3	100.00	3	100.00	
FB-14-01	143	146	3	3	100.00	2.81	93.67	
FB-14-01	146	149	3	3	100.00	2.95	98.33	
FB-14-01	149	152	3	3	100.00	3	100.00	
FB-14-01	152	155	3	3	100.00	3	100.00	
FB-14-01	155	158	3	3	100.00	3	100.00	
FB-14-01	158	161	3	3	100.00	2.86	95.33	
FB-14-01	161	164	3	3	100.00	2.92	97.33	
FB-14-01	164	167	3	3	100.00	2.66	88.67	
FB-14-01	167	170	3	3	100.00	2.64	88.00	
FB-14-01	170	173	3	3	100.00	2.72	90.67	
FB-14-01	173	176	3	3	100.00	3	100.00	
FB-14-01	176	179	3	3	100.00	2.95	98.33	
FB-14-01	179	182	3	3	100.00	2.25	75.00	
FB-14-01	182	185	3	3	100.00	3	100.00	
FB-14-01	185	188	3	3	100.00	1.46	48.67	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-01	188	191	3	3	100.00	2.19	73.00	
FB-14-01	191	194	3	2	66.67	2.8	140.00	
FB-14-01	194	197	3	3	100.00	2.86	95.33	
FB-14-01	197	200	3	3	100.00	3	100.00	
FB-14-01	200	203	3	3	100.00	3	100.00	
FB-14-01	203	206	3	3	100.00	3	100.00	
FB-14-01	206	209	3	3	100.00	3	100.00	
FB-14-01	209	212	3	3	100.00	3	100.00	
FB-14-01	212	215	3	3	100.00	3	100.00	
FB-14-01	215	218	3	3	100.00	2.87	95.67	
FB-14-01	218	221	3	3	100.00	3	100.00	
FB-14-01	221	224	3	3	100.00	3	100.00	
FB-14-01	224	227	3	3	100.00	3	100.00	
FB-14-01	227	230	3	3	100.00	3	100.00	
FB-14-01	230	233	3	3	100.00	3	100.00	
FB-14-01	233	236	3	3	100.00	3	100.00	
FB-14-01	236	239	3	3	100.00	3	100.00	
FB-14-01	239	242	3	3	100.00	3	100.00	
FB-14-01	242	245	3	3	100.00	2.8	93.33	
FB-14-01	245	248	3	3	100.00	3	100.00	
FB-14-01	248	251	3	3	100.00	3	100.00	
FB-14-01	251	254	3	3	100.00	3	100.00	
FB-14-01	254	257	3	3	100.00	3	100.00	
FB-14-01	257	260	3	3	100.00	3	100.00	
FB-14-01	260	263	3	3	100.00	3	100.00	
FB-14-01	263	266	3	3	100.00	3	100.00	
FB-14-01	266	269	3	3	100.00	3	100.00	
FB-14-01	269	272	3	3	100.00	3	100.00	
FB-14-01	272	275	3	3	100.00	3	100.00	
FB-14-01	275	278	3	3	100.00	2.89	96.33	
FB-14-01	278	281	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-01	281	284	3	3	100.00	3	100.00	
FB-14-01	284	287	3	3	100.00	3	100.00	
FB-14-01	287	290	3	3	100.00	3	100.00	
FB-14-01	290	293	3	3	100.00	3	100.00	
FB-14-01	293	296	3	3	100.00	3	100.00	
FB-14-01	296	299	3	3	100.00	2.9	96.67	
FB-14-01	299	302	3	3	100.00	2.93	97.67	
FB-14-01	302	305	3	3	100.00	3	100.00	
FB-14-01	305	308	3	3	100.00	3	100.00	
FB-14-01	308	311	3	3	100.00	2.87	95.67	
FB-14-01	311	314	3	3	100.00	2.91	97.00	
FB-14-01	314	317	3	3	100.00	3	100.00	
FB-14-01	317	320	3	3	100.00	3	100.00	
FB-14-01	320	323	3	3	100.00	3	100.00	
FB-14-01	323	326	3	3	100.00	2.79	93.00	
FB-14-01	326	329	3	3	100.00	3	100.00	
FB-14-01	329	332	3	3	100.00	2.46	82.00	
FB-14-01	332	335	3	3	100.00	2.81	93.67	
FB-14-01	335	338	3	3	100.00	2.81	93.67	
FB-14-01	338	341	3	3	100.00	3	100.00	
FB-14-01	341	344	3	3	100.00	3	100.00	
FB-14-01	344	347	3	3	100.00	2.67	89.00	
FB-14-01	347	350	3	3	100.00	2.55	85.00	



HOLEID	DEPTH	AZIMUTH	DIP
FB-14-01	0	270	-73.98
FB-14-01	0	270	-75
FB-14-01	4	269.88	-72.41
FB-14-01	8	271.22	-72.23
FB-14-01	12	272.54	-72.25
FB-14-01	16	273.65	-72.22
FB-14-01	20	274.47	-72.25
FB-14-01	24	275.12	-72.23
FB-14-01	28	275.66	-72.07
FB-14-01	32	276.15	-72.27
FB-14-01	36	275.69	-72.23
FB-14-01	40	275.26	-72.33
FB-14-01	44	274.59	-72.14
FB-14-01	48	274.12	-72.41
FB-14-01	52	273.52	-72.37
FB-14-01	56	272.86	-72.33
FB-14-01	60	272.34	-72.31
FB-14-01	64	271.64	-72.32
FB-14-01	68	271.52	-72.3
FB-14-01	72	271.77	-72.31
FB-14-01	76	272.06	-72.35
FB-14-01	80	273.21	-72.39
FB-14-01	84	273.96	-72.44
FB-14-01	88	274.94	-72.46
FB-14-01	92	276.15	-72.45
FB-14-01	96	277.46	-72.47
FB-14-01	100	278.26	-72.48
FB-14-01	104	278.92	-72.44
FB-14-01	108	279.43	-72.43

HOLEID	DEPTH	AZIMUTH	DIP
FB-14-01	112	279.6	-72.44
FB-14-01	116	279.36	-72.47
FB-14-01	120	279.15	-72.49
FB-14-01	124	278.9	-72.54
FB-14-01	128	278.27	-72.55
FB-14-01	132	277.18	-72.58
FB-14-01	136	276.2	-72.62
FB-14-01	140	275.29	-72.65
FB-14-01	144	274.22	-72.64
FB-14-01	148	273.79	-72.59
FB-14-01	152	272.84	-72.52
FB-14-01	156	272.45	-72.48
FB-14-01	160	271.85	-72.35
FB-14-01	164	271.65	-72.27
FB-14-01	168	271.19	-72.21
FB-14-01	172	271.7	-72.21
FB-14-01	176	272.03	-72.22
FB-14-01	180	272.48	-72.25
FB-14-01	184	272.81	-72.26
FB-14-01	188	273.69	-72.28
FB-14-01	192	274.89	-72.29
FB-14-01	196	276.25	-72.32
FB-14-01	200	277.24	-72.28
FB-14-01	204	278.01	-72.26
FB-14-01	208	278.7	-72.19
FB-14-01	212	279.44	-72.16
FB-14-01	216	279.64	-72.17
FB-14-01	220	279.12	-72.16
FB-14-01	224	278.55	-72.17
FB-14-01	228	278.33	-72.22
FB-14-01	232	277.58	-72.23

HOLEID	DEPTH	AZIMUTH	DIP
FB-14-01	236	277.21	-72.27
FB-14-01	240	276.51	-72.33
FB-14-01	244	275.41	-72.3
FB-14-01	248	274.7	-72.28
FB-14-01	252	273.63	-72.27
FB-14-01	256	272.66	-72.26
FB-14-01	260	272.17	-72.25
FB-14-01	264	271.18	-72.22
FB-14-01	268	270.57	-72.2
FB-14-01	272	269.96	-72.12
FB-14-01	276	269.65	-72.1
FB-14-01	280	269.65	-72.05
FB-14-01	284	269.95	-72.03
FB-14-01	288	270.37	-72.01
FB-14-01	292	270.63	-72.03
FB-14-01	296	271.46	-72.07
FB-14-01	300	272.73	-72.1
FB-14-01	304	273.54	-72.12
FB-14-01	308	274.96	-72.11
FB-14-01	312	275.86	-72.08
FB-14-01	316	276.8	-72
FB-14-01	320	277.98	-71.97
FB-14-01	324	278.7	-71.9
FB-14-01	328	278.99	-72.15



Cliffs Eastern Iron Ore Project Database

HOLEID:	FB-14-02	Project :	Faber
Easting:	598123	Depth:	293
Northing:	5824307	Azimuth:	270
Elevation:	661	Dip:	-80
STARTDATE:	4-Aug-2014	CasDepth:	3
ENDDATE:	7-Aug-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	2159491		
Water source :	Lake, 598100E5824291N		
CollarComments:			
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-02	3	91	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	medium grained	Medium				
Comments : Marble, white, locally banded with quartz, biotite and chlorite.											
FB-14-02	91	97.4	GN	hornblende-biotite-garnet gneiss (+ coronite)	Massive	fine to medium grained	Medium				
Comments : Horneblende-Biotite-Garnet-Gneiss											
FB-14-02	97.4	191.04	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	fine to medium grained	Medium				
Comments : Marble, white, locally banded with quartz, biotite and chlorite.											
FB-14-02	191.04	204	QZ	quartzite (>90% qz + Ca-Fe silicates, + minor Fe oxides)	Massive	fine grained	Hard				
Comments : Quartzite, locally banded.											
FB-14-02	204	208	QZ	Quartz rock mica schist	Banded	fine grained	Hard				
Comments : Quartz Rock-Mica-Schist											
FB-14-02	208	211.28	MB	Duley Fm -- marble (CT+ DL)>75% w/Ca-silicate, minor Fe oxides	Massive	fine to medium grained	Medium				
Comments : Marble											
FB-14-02	211.28	214.5	QZ	Quartz rock mica schist	Banded	fine to medium grained	Hard				
Comments : Quartz Rock-Mica-Schist											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-02	214.5	221.9	SIF	magnetite silicate iron formation	Banded	fine to medium grained	Hard		10	30	10
Comments : Magnetite-Silicate IF, minor carbonate locally.											
FB-14-02	221.9	235.25	SCH	magnetite schist	Banded	fine to medium grained	Medium		5		
Comments : Mica-magnetite-schist. Fine grained disseminated pyrrhotite locally.											
FB-14-02	235.25	245.2	SIF	Silicate-Carbonate IF	Banded	fine to medium grained	Medium		5	30	5
Comments : Silicate-Carbonate IF, 20% carbonate, 5% magnetite as disseminated grains forming cm scale bands - often with carbonate.											
FB-14-02	245.2	247.34	SCH	magnetite schist	Disseminated	fine to medium grained	Medium		5		5
Comments : Magnetite-Schist, biotite, 1-2% fine grained disseminated pyrrhotite.											
FB-14-02	247.34	248.94	GN	hornblende-biotite-garnet gneiss (+ coronite)	Disseminated	coarse grained	Soft				
Comments : Horneblende-Biotite-Garnet-Gneiss, most biotite gone to chlorite. 2-3 cm garnet.											
FB-14-02	248.94	256.04	SCH	magnetite schist	Disseminated	fine to medium grained	Medium		10		3
Comments : Magnetite-Schist, biotite, chlorite, garnet, 10% magnetite.											
FB-14-02	256.04	257.4	SIF	magnetite carbonate silicate iron formation	Banded	fine to medium grained	Hard		15	20	3
Comments : Magnetite-Carbonate-Silicate IF, 15% magnetite, 10% carbonate.											

HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-02	257.4	261.5	SIF	carbonate silicate iron formation	Banded	fine to medium grained	Hard		3	20	10

Comments : Carbonate-Silicate IF, 30% carbonate, 3% magnetite.

FB-14-02	261.5	293	GN	biotite-quartz-plagioclase gneiss; Bio>10%, minor garnets	Banded	fine to medium grained	Medium				
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Comments : Biotite-Quartz-Plagioclase-Gneiss

HOLEID	FROM	TO	Angle	Code	Comments
FB-14-02	10	11	33	Banded	
FB-14-02	19	20	44	Banded	
FB-14-02	23.45	23.7	60	gouge	
FB-14-02	30	31	48	Banded	
FB-14-02	40	41	39	Banded	
FB-14-02	50	51	36	Banded	
FB-14-02	59	60	42	Banded	
FB-14-02	70	71	46	Banded	
FB-14-02	79	80	52	Banded	
FB-14-02	97.4	97.41	44	contact	
FB-14-02	100	101	54	Banded	
FB-14-02	110	111	48	Banded	
FB-14-02	121	122	54	Banded	
FB-14-02	130	131	50	Banded	
FB-14-02	140	141	55	Banded	
FB-14-02	161	162	55	Banded	
FB-14-02	170	171	54	Banded	
FB-14-02	180	181	52	Banded	
FB-14-02	191.04	191.041	55	contact	
FB-14-02	200	201	52	Banded	
FB-14-02	209	210	52	Banded	
FB-14-02	220	221	50	Banded	
FB-14-02	230	231	50	schistosity	
FB-14-02	240	241	48	Banded	
FB-14-02	247.34	247.341	48	contact	
FB-14-02	256.04	256.041	44	contact	
FB-14-02	261.5	261.501	52	contact	
FB-14-02	269	270	54	Banded	
FB-14-02	279	280	52	Banded	

HOLEID	FROM	TO	Angle	Code	Comments
FB-14-02	289	290	56	Banded	



HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
FB-14-02	211.28	214.5	080101	QZMS	-0.005	-0.005	-0.003	69.79	7.12	3.9	0.099	4.64	5.02	2.71	0.24	0.09	0.01	-0.003	99.54	2.73
FB-14-02	214.5	218.5	080102	MSIF	-0.005	-0.005	0.004	50.66	0.3	32.28	1.342	6.17	5.28	0.11	0.05	0.06	-0.01	-0.003	100.3	22.6
FB-14-02	218.5	221.9	080103	MSIF	0.01	0.01	0.05	35.62	2.43	28.34	0.879	9.24	10.46	0.63	2.71	0.46	0.07	0.041	100.7	19.8
FB-14-02	221.9	227.9	080104	M_SCH	0.015	0.013	0.074	35.71	3.22	20.62	0.317	21.19	7.09	0.12	3.45	0.65	0.11	0.061	100.9	14.4
FB-14-02	227.9	233.9	080105	M_SCH	0.013	0.016	0.079	30.96	3.6	18.95	0.314	22.23	7.14	0.07	3.74	0.65	0.12	0.064	100.1	13.3
FB-14-02	233.9	235.25	080106	M_SCH	0.016	-0.005	0.019	21.82	2.04	30.92	0.687	12.57	11.84	0.49	2.71	0.17	-0.01	0.035	100.6	21.6
FB-14-02	235.25	241.25	080107	SCIF	-0.005	-0.005	0.007	39.65	0.35	27.96	0.608	7.89	11.18	0.08	0.19	0.1	-0.01	-0.003	99.96	19.6
FB-14-02	241.25	245.2	080108	SCIF	0.008	-0.005	0.034	34.81	0.9	25.6	0.87	9.8	14.07	0.15	0.81	0.34	0.03	0.012	100.2	17.9
FB-14-02	245.2	251.2	080109	HBG_GN	0.015	0.02	0.039	31.94	6.29	23.28	0.441	16.93	6.82	0.43	5.52	0.51	0.04	0.093	99.75	16.3
FB-14-02	251.2	256.04	080111	M_SCH	0.016	0.027	0.047	29.15	3.65	24.37	0.397	20.81	4.91	0.21	6.58	0.46	0.06	0.105	99.86	17
FB-14-02	256.04	257.4	080112	MCSIF	-0.005	-0.005	0.004	52.46	0.03	39.83	0.415	2.56	2.92	0.08	0.23	0.03	-0.01	-0.003	99.35	27.9
FB-14-02	257.4	261.5	080113	CSIF	-0.005	-0.005	-0.003	51.03	2.05	13.88	0.628	6.34	13.14	0.27	0.4	0.96	-0.01	0.007	99.74	9.71
FB-14-02	261.5	267.5	080114	BQ_GN	-0.005	-0.005	0.005	65.29	14.54	5.63	0.085	2.98	1.57	4.28	0.6	0.2	-0.01	0.016	99.04	3.94

HOLEID	DEPTH	MagSus
FB-14-02	3	0.028
FB-14-02	5	0.02
FB-14-02	7	0.027
FB-14-02	9	0.022
FB-14-02	11	0.015
FB-14-02	13	0.013
FB-14-02	15	0.02
FB-14-02	17	0.025
FB-14-02	19	0.033
FB-14-02	21	0.04
FB-14-02	23	0.149
FB-14-02	25	0.031
FB-14-02	27	0.032
FB-14-02	29	0.037
FB-14-02	31	0.016
FB-14-02	33	0.018
FB-14-02	35	0.119
FB-14-02	37	0.138
FB-14-02	39	0.05
FB-14-02	41	0.125
FB-14-02	43	0.292
FB-14-02	45	0.013
FB-14-02	47	0.135
FB-14-02	49	0.043
FB-14-02	51	0.009
FB-14-02	53	0.007
FB-14-02	55	0.031
FB-14-02	57	0.315
FB-14-02	59	0.034

HOLEID	DEPTH	MagSus
FB-14-02	61	0.28
FB-14-02	63	0.146
FB-14-02	65	0.038
FB-14-02	67	0.025
FB-14-02	69	0.303
FB-14-02	71	0.149
FB-14-02	73	0.008
FB-14-02	75	0.015
FB-14-02	77	0.141
FB-14-02	79	0.171
FB-14-02	81	0.013
FB-14-02	83	0.015
FB-14-02	85	0.017
FB-14-02	87	0.027
FB-14-02	89	0.174
FB-14-02	91	2.258
FB-14-02	93	1.387
FB-14-02	95	1.492
FB-14-02	97	1.709
FB-14-02	99	0.844
FB-14-02	101	0.02
FB-14-02	103	0.032
FB-14-02	105	0.015
FB-14-02	107	0.02
FB-14-02	109	0.044
FB-14-02	111	0.199
FB-14-02	113	0.027
FB-14-02	115	0.019
FB-14-02	117	0.011
FB-14-02	119	0.028
FB-14-02	121	0.017

HOLEID	DEPTH	MagSus
FB-14-02	123	0.018
FB-14-02	125	0.169
FB-14-02	127	0.01
FB-14-02	129	0.012
FB-14-02	131	0.036
FB-14-02	133	0.169
FB-14-02	135	0.013
FB-14-02	137	0.015
FB-14-02	139	0.01
FB-14-02	141	0.012
FB-14-02	143	0.041
FB-14-02	145	0.012
FB-14-02	147	0.16
FB-14-02	149	0.009
FB-14-02	151	0.014
FB-14-02	153	0.034
FB-14-02	155	0.014
FB-14-02	157	0.008
FB-14-02	159	0.24
FB-14-02	161	0.027
FB-14-02	163	0.028
FB-14-02	165	0.026
FB-14-02	167	0.012
FB-14-02	169	0.026
FB-14-02	171	0.015
FB-14-02	173	0.015
FB-14-02	175	0.029
FB-14-02	177	0.01
FB-14-02	179	0.021
FB-14-02	181	0.013
FB-14-02	183	0.026

HOLEID	DEPTH	MagSus
FB-14-02	185	0.037
FB-14-02	187	0.021
FB-14-02	189	0.185
FB-14-02	191	0.01
FB-14-02	193	0.01
FB-14-02	195	0.141
FB-14-02	197	0.01
FB-14-02	199	0.011
FB-14-02	201	0.009
FB-14-02	203	0.008
FB-14-02	205	0.173
FB-14-02	207	0.019
FB-14-02	209	0.156
FB-14-02	211	0.168
FB-14-02	213	0.526
FB-14-02	215	101.6
FB-14-02	217	22.77
FB-14-02	219	9.545
FB-14-02	221	3777
FB-14-02	223	347.1
FB-14-02	225	318.3
FB-14-02	227	297
FB-14-02	229	255.5
FB-14-02	231	201.5
FB-14-02	233	106
FB-14-02	235	305.8
FB-14-02	237	28.86
FB-14-02	239	232.5
FB-14-02	241	13.25
FB-14-02	243	6.839
FB-14-02	245	170

HOLEID	DEPTH	MagSus
FB-14-02	247	403.1
FB-14-02	249	277.6
FB-14-02	251	655.5
FB-14-02	253	349.7
FB-14-02	255	338
FB-14-02	257	1101
FB-14-02	259	7.158
FB-14-02	261	0.984
FB-14-02	263	1.172
FB-14-02	265	0.496
FB-14-02	267	0.321
FB-14-02	269	0.49
FB-14-02	271	0.765
FB-14-02	273	0.441
FB-14-02	275	0.499
FB-14-02	277	0.405
FB-14-02	279	0.283
FB-14-02	281	0.29
FB-14-02	283	0.415
FB-14-02	285	0.989
FB-14-02	287	0.217
FB-14-02	289	0.27
FB-14-02	291	0.501
FB-14-02	293	0.389



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-02	2.6	5	2.4	2.4	100.00	2.39	99.58	
FB-14-02	5	8	3	3	100.00	3	100.00	
FB-14-02	8	11	3	3	100.00	3	100.00	
FB-14-02	11	14	3	3	100.00	3	100.00	
FB-14-02	14	17	3	3	100.00	2.95	98.33	
FB-14-02	17	20	3	3	100.00	3	100.00	
FB-14-02	20	23	3	3	100.00	2.87	95.67	
FB-14-02	23	26	3	3	100.00	2.71	90.33	
FB-14-02	26	29	3	3	100.00	3	100.00	
FB-14-02	29	32	3	3	100.00	3	100.00	
FB-14-02	32	35	3	3	100.00	3	100.00	
FB-14-02	35	38	3	2.97	99.00	2.95	99.33	
FB-14-02	38	41	3	3	100.00	3	100.00	
FB-14-02	41	44	3	3	100.00	3	100.00	
FB-14-02	44	47	3	3	100.00	3	100.00	
FB-14-02	47	50	3	3	100.00	3	100.00	
FB-14-02	50	53	3	3	100.00	3	100.00	
FB-14-02	53	56	3	3	100.00	3	100.00	
FB-14-02	56	59	3	3	100.00	3	100.00	
FB-14-02	59	62	3	3	100.00	3	100.00	
FB-14-02	62	65	3	3	100.00	3	100.00	
FB-14-02	65	68	3	3	100.00	3	100.00	
FB-14-02	68	71	3	3	100.00	3	100.00	
FB-14-02	71	74	3	3	100.00	3	100.00	
FB-14-02	74	77	3	3	100.00	2.9	96.67	
FB-14-02	77	80	3	3	100.00	3	100.00	
FB-14-02	80	83	3	3	100.00	3	100.00	
FB-14-02	83	86	3	3	100.00	3	100.00	
FB-14-02	86	89	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-02	89	92	3	3	100.00	3	100.00	
FB-14-02	92	95	3	3	100.00	3	100.00	
FB-14-02	95	98	3	3	100.00	3	100.00	
FB-14-02	98	101	3	3	100.00	3	100.00	
FB-14-02	101	104	3	3	100.00	2.89	96.33	
FB-14-02	104	107	3	3	100.00	3	100.00	
FB-14-02	107	110	3	3	100.00	3	100.00	
FB-14-02	110	113	3	3	100.00	3	100.00	
FB-14-02	113	116	3	3	100.00	3	100.00	
FB-14-02	116	119	3	3	100.00	3	100.00	
FB-14-02	119	122	3	3	100.00	3	100.00	
FB-14-02	122	125	3	3	100.00	3	100.00	
FB-14-02	125	128	3	3	100.00	3	100.00	
FB-14-02	128	131	3	3	100.00	3	100.00	
FB-14-02	131	134	3	3	100.00	3	100.00	
FB-14-02	134	137	3	3	100.00	3	100.00	
FB-14-02	137	140	3	3	100.00	3	100.00	
FB-14-02	140	143	3	3	100.00	3	100.00	
FB-14-02	143	146	3	3	100.00	3	100.00	
FB-14-02	146	149	3	3	100.00	3	100.00	
FB-14-02	149	152	3	3	100.00	3	100.00	
FB-14-02	152	155	3	3	100.00	3	100.00	
FB-14-02	155	158	3	3	100.00	3	100.00	
FB-14-02	158	161	3	3	100.00	3	100.00	
FB-14-02	161	164	3	3	100.00	3	100.00	
FB-14-02	164	167	3	3	100.00	3	100.00	
FB-14-02	167	170	3	3	100.00	3	100.00	
FB-14-02	170	173	3	3	100.00	3	100.00	
FB-14-02	173	176	3	3	100.00	3	100.00	
FB-14-02	176	179	3	3	100.00	3	100.00	
FB-14-02	179	182	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-02	182	185	3	3	100.00	3	100.00	
FB-14-02	185	188	3	3	100.00	3	100.00	
FB-14-02	188	191	3	3	100.00	3	100.00	
FB-14-02	191	194	3	3	100.00	3	100.00	
FB-14-02	194	197	3	3	100.00	2.88	96.00	
FB-14-02	197	200	3	3	100.00	3	100.00	
FB-14-02	200	203	3	3	100.00	2.91	97.00	
FB-14-02	203	206	3	3	100.00	2.91	97.00	
FB-14-02	206	209	3	3	100.00	2.68	89.33	
FB-14-02	209	212	3	3	100.00	2.82	94.00	
FB-14-02	212	215	3	3	100.00	2.84	94.67	
FB-14-02	215	218	3	3	100.00	2.88	96.00	
FB-14-02	218	221	3	3	100.00	2.91	97.00	
FB-14-02	221	224	3	3	100.00	2.7	90.00	
FB-14-02	224	227	3	3	100.00	2.96	98.67	
FB-14-02	227	230	3	3	100.00	2.95	98.33	
FB-14-02	230	233	3	3	100.00	3	100.00	
FB-14-02	233	236	3	3	100.00	3	100.00	
FB-14-02	236	239	3	3	100.00	3	100.00	
FB-14-02	239	242	3	3	100.00	2.93	97.67	
FB-14-02	242	245	3	3	100.00	2.92	97.33	
FB-14-02	245	248	3	3	100.00	3	100.00	
FB-14-02	248	251	3	3	100.00	3	100.00	
FB-14-02	251	254	3	3	100.00	3	100.00	
FB-14-02	254	257	3	3	100.00	2.74	91.33	
FB-14-02	257	260	3	3	100.00	3	100.00	
FB-14-02	260	263	3	3	100.00	2.17	72.33	
FB-14-02	263	266	3	3	100.00	3	100.00	
FB-14-02	266	269	3	3	100.00	2.65	88.33	
FB-14-02	269	272	3	3	100.00	2.72	90.67	
FB-14-02	272	275	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-02	275	278	3	3	100.00	2.9	96.67	
FB-14-02	278	281	3	3	100.00	2.86	95.33	
FB-14-02	281	284	3	3	100.00	2.8	93.33	
FB-14-02	284	287	3	3	100.00	2.84	94.67	
FB-14-02	287	290	3	3	100.00	3	100.00	
FB-14-02	290	293	3	3	100.00	3	100.00	



HOLEID	DEPTH	AZIMUTH	DIP
FB-14-02	0	270	-80.15
FB-14-02	0	270	-80
FB-14-02	4	270.29	-80.13
FB-14-02	8	271.38	-80.11
FB-14-02	12	272.03	-79.84
FB-14-02	16	271.71	-79.8
FB-14-02	20	271.55	-79.66
FB-14-02	24	270.93	-79.66
FB-14-02	28	269.97	-79.61
FB-14-02	32	269.08	-79.51
FB-14-02	36	268.2	-79.42
FB-14-02	40	267.62	-79.26
FB-14-02	44	266.61	-79.19
FB-14-02	48	265.55	-79.02
FB-14-02	52	265	-78.86
FB-14-02	56	264.06	-78.79
FB-14-02	60	263.53	-78.74
FB-14-02	64	262.91	-78.68
FB-14-02	68	262.63	-78.58
FB-14-02	72	262.73	-78.48
FB-14-02	76	262.94	-78.39
FB-14-02	80	262.79	-78.35
FB-14-02	84	264.1	-78.32
FB-14-02	88	264.67	-78.22
FB-14-02	92	264.94	-78.21
FB-14-02	96	265.93	-78.18
FB-14-02	100	266.15	-78.16
FB-14-02	104	266.58	-78.12
FB-14-02	108	267.03	-78.06

HOLEID	DEPTH	AZIMUTH	DIP
FB-14-02	112	267.14	-78.03
FB-14-02	116	268.11	-77.99
FB-14-02	120	267.73	-77.92
FB-14-02	124	267.94	-77.81
FB-14-02	128	268.29	-77.7
FB-14-02	132	268.28	-77.67
FB-14-02	136	268.71	-77.63
FB-14-02	140	268.9	-77.65
FB-14-02	144	269.08	-77.64
FB-14-02	148	269.3	-77.64
FB-14-02	152	269.21	-77.55
FB-14-02	156	268.64	-77.54
FB-14-02	160	268.38	-77.48
FB-14-02	164	268.86	-77.42
FB-14-02	168	268.64	-77.35
FB-14-02	172	268.3	-77.24
FB-14-02	176	268.36	-77.18
FB-14-02	180	268.37	-77.08
FB-14-02	184	268.36	-77.01
FB-14-02	188	268.35	-76.98
FB-14-02	192	268.59	-76.93
FB-14-02	196	268.6	-76.86
FB-14-02	200	268.65	-76.77
FB-14-02	204	268.79	-76.71
FB-14-02	208	268.88	-76.7
FB-14-02	212	268.9	-76.66
FB-14-02	216	269.04	-76.52
FB-14-02	220	269.95	-76.43
FB-14-02	224	270.39	-76.33
FB-14-02	228	270.55	-76.31
FB-14-02	232	270.62	-76.28

HOLEID	DEPTH	AZIMUTH	DIP
FB-14-02	236	271.28	-76.28
FB-14-02	240	271.76	-76.25
FB-14-02	244	271.76	-76.21
FB-14-02	248	271.75	-76.14
FB-14-02	252	271.68	-76.08
FB-14-02	256	271.52	-76.02
FB-14-02	260	271.76	-76.01
FB-14-02	264	271.27	-75.95
FB-14-02	268	270.92	-75.97
FB-14-02	272	270.65	-75.92
FB-14-02	276	270	-75.89



Cliffs Eastern Iron Ore Project Database

HOLEID:	FB-14-03	Project :	Faber
Easting:	605799	Depth:	242.4
Norhting:	5818186	Azimuth:	180
Elevation:	641	Dip:	-75
STARTDATE:	8-Aug-2014	CasDepth:	3
ENDDATE:	13-Aug-2014	OvbDepth:	
PlannedBy:	MJohnson	Logged By:	PBanks
Claim Number:	2049589		
Water source :	Lake, 605797E5818301N		
CollarComments:			
PlannedComments:	2014 proposed collar location		



HOLEID	From	To	Simple Litho	LogLitho	texture	Grain Size	Hardness	Hematite	Magnetite	Grunerite	Actinolite
FB-14-03	3	195.15	SIF	quartz rock - carbonate silicate iron formation	Banded	fine to medium grained	Hard		7	30	5
Comments : Quartz Rock-Carbonate-Silicate IF, 20% carbonate(marble) as 3 to 30 cm bands, 7% magnetite as fine to medium disseminated grains forming cm scale bands usually within the marble bands. Chlorite on fracture surfaces common.											
FB-14-03	195.15	196.46	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard		35	5	
Comments : Magnetite IF, 35% banded magnetite, minor carbonate.											
FB-14-03	196.46	197.53	QZ	quartz rock IF	Disseminated	fine to medium grained	Hard		2	5	
Comments : Quartz Rock IF, minor magnetite as fine to medium grained blebs locally.											
FB-14-03	197.53	199	MIF	magnetite>20%-quartzite (minor marble, Ca/Fe-silicates)	Banded	fine to medium grained	Hard		30	10	
Comments : Magnetite IF, 30 cm section of unit is massive magnetite.											
FB-14-03	199	242.4	SIF	quartz rock - carbonate silicate iron formation	Banded	fine to medium grained	Hard		10	30	
Comments : Quartz Rock-Carbonate-Silicate IF, 20% carbonate(marble) as 3 to 30 cm bands, 7-10% magnetite as fine to medium disseminated grains forming cm scale bands usually within the marble bands. Chlorite on fracture surfaces common.											



HOLEID	FROM	TO	Angle	Code	Comments
FB-14-03	1	2	65	Banded	
FB-14-03	10	11	65	Banded	
FB-14-03	20	21	68	Banded	
FB-14-03	30	31	72	Banded	
FB-14-03	40	41	70	Banded	
FB-14-03	50	51	68	Banded	
FB-14-03	60	61	58	Banded	
FB-14-03	70	71	65	Banded	
FB-14-03	80	81	66	Banded	Fracture running down core at 5dtca.
FB-14-03	90	91	66	Banded	
FB-14-03	100	101	73	Banded	
FB-14-03	110	111	85	Banded	
FB-14-03	120	121	84	Banded	
FB-14-03	130	131	78	Banded	
FB-14-03	140	141	65	Banded	
FB-14-03	155	156	77	Banded	
FB-14-03	160	161	78	Banded	
FB-14-03	170	171	72	Banded	
FB-14-03	180	181	74	Banded	
FB-14-03	190	191	76	Banded	
FB-14-03	200	201	80	Banded	
FB-14-03	210	211	64	Banded	
FB-14-03	220	221	70	Banded	
FB-14-03	230	231	55	Banded	
FB-14-03	240	241	44	Banded	

HOLEID	From	To	SAMPLEID	Litho	Cr3O4 %	CuO %	NiO %	SiO2 %	Al2O3 %	Fe2O3 % (total)	MnO %	MgO %	CaO %	K2O %	Ti2O %	P2O5 %	Cr2O3 %	V2O5 %	Total	Fe %
FB-14-03	189.15	195.15	080115	QZ_CSIF	-0.005	-0.005	-0.003	56.71	-0.01	22.84	0.933	4.62	7.56	0.08	0.02	0.02	-0.01	-0.003	99.84	16
FB-14-03	195.15	196.46	080116	MIF	-0.005	-0.005	-0.003	41.75	0.08	53.57	0.183	1.28	2.1	0.06	0.04	0.06	-0.01	-0.003	99.72	37.5
FB-14-03	196.46	197.53	080117	QZIF	-0.005	-0.005	-0.003	89.36	-0.01	7.84	0.123	1.54	0.3	0.02	-0.01	-0.01	-0.01	-0.003	99.28	5.48
FB-14-03	197.53	199	080118	MIF	-0.005	-0.005	0.009	27.75	0.22	64.58	0.547	4.24	2.42	-0.01	0.04	0.05	-0.01	-0.003	100.2	45.2
FB-14-03	199	205	080119	QZ_CSIF	-0.005	-0.005	0.011	44.01	-0.01	35.7	1.109	5.55	7.29	-0.01	-0.01	0.02	-0.01	-0.003	100.1	25



HOLEID	DEPTH	MagSus
FB-14-03	1	378.1
FB-14-03	3	35.69
FB-14-03	5	3.184
FB-14-03	7	20.79
FB-14-03	9	11.41
FB-14-03	11	1.192
FB-14-03	13	17.97
FB-14-03	15	116.4
FB-14-03	17	2.34
FB-14-03	19	98.39
FB-14-03	21	5.85
FB-14-03	23	1.262
FB-14-03	25	2.96
FB-14-03	27	11.93
FB-14-03	29	479.4
FB-14-03	31	1.482
FB-14-03	33	31.19
FB-14-03	35	2.736
FB-14-03	37	2.656
FB-14-03	39	2.42
FB-14-03	41	0.19
FB-14-03	43	3.712
FB-14-03	45	12.96
FB-14-03	47	106.2
FB-14-03	49	1.256
FB-14-03	51	320.2
FB-14-03	53	30.08
FB-14-03	55	382.9
FB-14-03	57	98.67

HOLEID	DEPTH	MagSus
FB-14-03	59	77.45
FB-14-03	61	69.29
FB-14-03	63	20.2
FB-14-03	65	42.7
FB-14-03	67	4.053
FB-14-03	69	107.1
FB-14-03	71	38.52
FB-14-03	73	135.8
FB-14-03	75	34.59
FB-14-03	77	200.2
FB-14-03	79	23.33
FB-14-03	81	72.38
FB-14-03	83	57.5
FB-14-03	85	272.8
FB-14-03	87	159.8
FB-14-03	89	212.8
FB-14-03	91	166.8
FB-14-03	93	39.23
FB-14-03	95	85.22
FB-14-03	97	23.88
FB-14-03	99	2306
FB-14-03	101	32.13
FB-14-03	103	1041
FB-14-03	105	6.727
FB-14-03	107	11.87
FB-14-03	109	19.07
FB-14-03	111	12.44
FB-14-03	113	70.59
FB-14-03	115	32
FB-14-03	117	175
FB-14-03	119	5.31

HOLEID	DEPTH	MagSus
FB-14-03	121	9.256
FB-14-03	123	4.508
FB-14-03	125	33.94
FB-14-03	127	1648
FB-14-03	129	217.5
FB-14-03	131	23.89
FB-14-03	133	72.83
FB-14-03	135	2.565
FB-14-03	137	2.004
FB-14-03	139	21.26
FB-14-03	141	3.005
FB-14-03	143	6.712
FB-14-03	145	1.261
FB-14-03	147	2.94
FB-14-03	149	1.115
FB-14-03	151	1.572
FB-14-03	153	9.332
FB-14-03	155	232.3
FB-14-03	157	6.524
FB-14-03	159	21.04
FB-14-03	161	6.88
FB-14-03	163	2.824
FB-14-03	165	3.647
FB-14-03	167	561.5
FB-14-03	169	185.9
FB-14-03	171	350.1
FB-14-03	173	25.72
FB-14-03	175	122.8
FB-14-03	177	318.7
FB-14-03	179	45.78
FB-14-03	181	507.8

HOLEID	DEPTH	MagSus
FB-14-03	183	120.5
FB-14-03	185	224.1
FB-14-03	187	651.3
FB-14-03	189	2.35
FB-14-03	191	2.309
FB-14-03	193	189.2
FB-14-03	195	334.1
FB-14-03	197	96.37
FB-14-03	199	1934
FB-14-03	201	608.1
FB-14-03	203	66.48
FB-14-03	205	549.3
FB-14-03	207	153.7
FB-14-03	209	547
FB-14-03	211	184.6
FB-14-03	213	67.37
FB-14-03	215	824.5
FB-14-03	217	325.2
FB-14-03	219	155
FB-14-03	221	158
FB-14-03	223	96.14
FB-14-03	225	833.1
FB-14-03	227	20.55
FB-14-03	229	247.6
FB-14-03	231	275
FB-14-03	233	256.2
FB-14-03	235	443
FB-14-03	237	15.94
FB-14-03	239	179.3
FB-14-03	241	111.3



HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-03	0	3	3	3	100.00	1.14	38.00	
FB-14-03	3	5	2	2	100.00	1.8	90.00	
FB-14-03	5	8	3	3	100.00	1.96	65.33	
FB-14-03	8	11	3	3	100.00	2.75	91.67	
FB-14-03	11	14	3	3	100.00	2.9	96.67	
FB-14-03	14	17	3	3	100.00	1.82	60.67	
FB-14-03	17	20	3	3	100.00	2.94	98.00	
FB-14-03	20	23	3	3	100.00	2.67	89.00	
FB-14-03	23	26	3	3	100.00	2.76	92.00	
FB-14-03	26	29	3	3	100.00	2.9	96.67	
FB-14-03	29	32	3	3	100.00	2.95	98.33	
FB-14-03	32	35	3	3	100.00	2.94	98.00	
FB-14-03	35	38	3	3	100.00	2.93	97.67	
FB-14-03	38	41	3	3	100.00	2.68	89.33	
FB-14-03	41	44	3	3	100.00	3	100.00	
FB-14-03	44	47	3	3	100.00	2.92	97.33	
FB-14-03	47	50	3	3	100.00	2.91	97.00	
FB-14-03	50	53	3	3	100.00	2.94	98.00	
FB-14-03	53	56	3	3	100.00	3	100.00	
FB-14-03	56	59	3	3	100.00	2.71	90.33	
FB-14-03	59	62	3	3	100.00	3	100.00	
FB-14-03	62	65	3	3	100.00	3	100.00	
FB-14-03	65	68	3	3	100.00	2.91	97.00	
FB-14-03	68	71	3	3	100.00	3	100.00	
FB-14-03	71	74	3	3	100.00	3	100.00	
FB-14-03	74	77	3	3	100.00	3	100.00	
FB-14-03	77	80	3	3	100.00	2.92	97.33	
FB-14-03	80	83	3	3	100.00	1.1	36.67	
FB-14-03	83	86	3	3	100.00	2.57	85.67	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-03	86	89	3	3	100.00	2.81	93.67	
FB-14-03	89	92	3	3	100.00	2.91	97.00	
FB-14-03	92	95	3	3	100.00	2.75	91.67	
FB-14-03	95	98	3	3	100.00	2.72	90.67	
FB-14-03	98	101	3	3	100.00	3	100.00	
FB-14-03	101	104	3	3	100.00	3	100.00	
FB-14-03	104	107	3	3	100.00	2.89	96.33	
FB-14-03	107	110	3	3	100.00	3	100.00	
FB-14-03	110	113	3	3	100.00	2.94	98.00	
FB-14-03	113	116	3	3	100.00	3	100.00	
FB-14-03	116	119	3	3	100.00	3	100.00	
FB-14-03	119	122	3	3	100.00	2.86	95.33	
FB-14-03	122	125	3	3	100.00	2.95	98.33	
FB-14-03	125	128	3	3	100.00	3	100.00	
FB-14-03	128	131	3	3	100.00	2.82	94.00	
FB-14-03	131	134	3	3	100.00	3	100.00	
FB-14-03	134	137	3	3	100.00	3	100.00	
FB-14-03	137	140	3	3	100.00	3	100.00	
FB-14-03	140	143	3	3	100.00	2.76	92.00	
FB-14-03	143	146	3	3	100.00	2.89	96.33	
FB-14-03	146	149	3	3	100.00	2.94	98.00	
FB-14-03	149	152	3	3	100.00	2.79	93.00	
FB-14-03	152	155	3	3	100.00	2.77	92.33	
FB-14-03	155	158	3	3	100.00	2.75	91.67	
FB-14-03	158	161	3	3	100.00	2.77	92.33	
FB-14-03	161	164	3	3	100.00	3	100.00	
FB-14-03	164	167	3	3	100.00	3	100.00	
FB-14-03	167	170	3	3	100.00	3	100.00	
FB-14-03	170	173	3	3	100.00	2.95	98.33	
FB-14-03	173	176	3	3	100.00	2.95	98.33	
FB-14-03	176	179	3	3	100.00	3	100.00	

HOLEID	FROM	TO	Length	Recovery	Rec %	RQD	RQD %	Comments
FB-14-03	179	182	3	3	100.00	2.91	97.00	
FB-14-03	182	185	3	3	100.00	3	100.00	
FB-14-03	185	188	3	3	100.00	2.92	97.33	
FB-14-03	188	191	3	3	100.00	3	100.00	
FB-14-03	191	194	3	3	100.00	3	100.00	
FB-14-03	194	197	3	3	100.00	2.88	96.00	
FB-14-03	197	200	3	3	100.00	3	100.00	
FB-14-03	200	203	3	3	100.00	2.96	98.67	
FB-14-03	203	206	3	3	100.00	3	100.00	
FB-14-03	206	209	3	3	100.00	3	100.00	
FB-14-03	209	212	3	3	100.00	2.64	88.00	
FB-14-03	212	215	3	3	100.00	3	100.00	
FB-14-03	215	218	3	3	100.00	2.9	96.67	
FB-14-03	218	221	3	3	100.00	2.89	96.33	
FB-14-03	221	224	3	3	100.00	3	100.00	
FB-14-03	224	227	3	3	100.00	2.8	93.33	
FB-14-03	227	230	3	3	100.00	3	100.00	
FB-14-03	230	233	3	3	100.00	3	100.00	
FB-14-03	233	236	3	3	100.00	2.94	98.00	
FB-14-03	236	239	3	3	100.00	2.85	95.00	
FB-14-03	239	242	3	3	100.00	2.9	96.67	
FB-14-03	242	242.4	#####	0.4	100.00	0.4	100.00	



HOLEID	DEPTH	AZIMUTH	DIP
FB-14-03	0	180	-75
FB-14-03	18	180	-73.03
FB-14-03	22	181.26	-72.99
FB-14-03	26	181.36	-72.95
FB-14-03	30	181.26	-72.96
FB-14-03	34	181.41	-72.85
FB-14-03	38	181.75	-72.85
FB-14-03	42	181.26	-72.82
FB-14-03	46	181.49	-72.77
FB-14-03	50	181.24	-72.66
FB-14-03	54	181.14	-72.52
FB-14-03	58	181.22	-72.44
FB-14-03	62	181.16	-72.42
FB-14-03	66	181.43	-72.45
FB-14-03	70	181.7	-72.47
FB-14-03	74	182.12	-72.53
FB-14-03	78	182.37	-72.47
FB-14-03	82	182.4	-72.38
FB-14-03	86	182.49	-72.23
FB-14-03	90	182.53	-72.05
FB-14-03	94	182.79	-71.85
FB-14-03	98	182.96	-71.78
FB-14-03	102	182.97	-71.76
FB-14-03	106	182.69	-71.79
FB-14-03	110	182.82	-71.69
FB-14-03	114	182.62	-71.58
FB-14-03	118	182.78	-71.47
FB-14-03	122	182.72	-71.43
FB-14-03	126	182.89	-71.36

HOLEID	DEPTH	AZIMUTH	DIP
FB-14-03	130	183.22	-71.4
FB-14-03	134	183.22	-71.36
FB-14-03	138	183.59	-71.35
FB-14-03	142	183.68	-71.26
FB-14-03	146	183.59	-71.28
FB-14-03	150	184.11	-71.26
FB-14-03	154	184.37	-71.28
FB-14-03	158	184.08	-71.32
FB-14-03	162	183.78	-71.3
FB-14-03	166	183.78	-71.24
FB-14-03	170	183.64	-71.15
FB-14-03	174	183.47	-71.01
FB-14-03	178	183.49	-70.95
FB-14-03	182	183.75	-70.92
FB-14-03	186	184.15	-70.88
FB-14-03	190	184.31	-70.95
FB-14-03	194	184.66	-71
FB-14-03	198	184.6	-70.99
FB-14-03	202	184.94	-70.98
FB-14-03	206	185.31	-70.94
FB-14-03	210	185.72	-70.87
FB-14-03	214	186.18	-70.79
FB-14-03	218	186.41	-70.7
FB-14-03	222	187	-70.69
FB-14-03	226	187.43	-70.61
FB-14-03	230	187.55	-70.53
FB-14-03	234	187.63	-70.55
FB-14-03	238	187.69	-70.5
FB-14-03	242	187.56	-70.44

**APPENDIX IV**

**Drill Hole Sections: 2014 Pepler-Lam  e Programme**

## **NUMÉRIQUE**

Page(s) de dimension(s) hors standard numérisée(s) et positionnée(s) à la suite des présentes pages standard

## **DIGITAL FORMAT**

Non-standard size page(s) scanned and placed after these standard pages

**APPENDIX V**

**Core-Sample Assay Certificates: 2014 Pepler-Lam  e Drilling Programme**



**Date Submitted:** 19-Aug-14  
**Invoice No.:** A14-05722  
**Invoice Date:** 05-Sep-14  
**Your Reference:** Labrador South

Cliffs Natural Resources  
30 Greenland Rd  
Toronto ON  
Canada

ATTN: Myles Johnson

## CERTIFICATE OF ANALYSIS

120 Rock samples were submitted for analysis.

The following analytical package was requested:

Code 4C (11+) Whole Rock Analysis-XRF

REPORT      **A14-05722**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

Notes:

CERTIFIED BY:

A handwritten signature in black ink, appearing to read "Elitsa Hrischeva". The signature is written in a cursive style and is positioned above a horizontal line.

Elitsa Hrischeva, Ph.D.  
Quality Control

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Results

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Fe
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01	0.001
Analysis Method	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
080001	< 0.005	< 0.005	0.003	5.24	1.04	2.77	0.150	18.71	28.83	0.10	0.32	0.14	0.04	< 0.01	0.003	42.28	99.63	1.94
080002	< 0.005	< 0.005	0.004	68.44	6.63	11.01	0.226	4.24	5.18	0.51	1.93	0.62	0.16	0.02	0.012	1.70	100.7	7.70
080003	< 0.005	< 0.005	< 0.003	46.07	0.60	37.01	1.589	6.14	5.06	0.06	0.14	0.05	0.10	< 0.01	< 0.003	3.42	100.2	25.9
080004	< 0.005	< 0.005	0.007	44.75	0.05	30.12	1.004	7.76	10.33	0.07	0.06	< 0.01	< 0.01	< 0.01	< 0.003	6.25	100.4	21.1
080005	< 0.005	< 0.005	< 0.003	48.76	0.12	28.08	1.767	7.41	8.87	0.03	0.09	< 0.01	< 0.01	< 0.01	< 0.003	5.74	100.9	19.6
080006	< 0.005	< 0.005	0.006	45.50	< 0.01	34.55	1.596	7.24	7.16	0.05	0.08	< 0.01	0.02	< 0.01	< 0.003	3.91	100.1	24.2
080007	< 0.005	< 0.005	0.010	45.32	< 0.01	33.44	1.576	7.16	7.92	0.04	0.09	< 0.01	< 0.01	< 0.01	< 0.003	4.76	100.3	23.4
080008	< 0.005	< 0.005	0.006	48.73	< 0.01	32.47	1.063	6.82	9.82	0.06	0.07	0.02	< 0.01	< 0.01	0.005	1.84	100.9	22.7
080009	< 0.005	< 0.005	0.004	48.11	0.29	46.47	0.512	2.25	2.94	0.01	0.04	0.11	0.06	< 0.01	< 0.003	-0.67	100.1	32.5
080010	0.006	< 0.005	0.012	47.36	0.27	44.75	0.661	3.15	3.49	0.04	0.18	0.27	0.09	0.01	0.005	0.65	100.9	31.3
080011	< 0.005	< 0.005	0.012	39.82	0.11	49.72	2.044	2.11	4.81	0.04	0.06	0.07	0.04	0.01	< 0.003	1.82	100.7	34.8
080012	0.007	< 0.005	0.005	33.74	0.50	53.83	2.933	2.36	3.58	< 0.01	0.05	0.40	0.08	< 0.01	0.005	2.56	100.1	37.6
080013	0.008	< 0.005	0.022	44.87	15.57	15.03	0.253	8.30	8.43	2.50	1.53	2.44	0.63	0.04	0.037	0.82	100.5	10.5
080014	< 0.005	< 0.005	< 0.003	40.28	0.22	49.73	2.524	1.66	3.03	< 0.01	0.10	0.31	0.07	< 0.01	0.004	2.20	100.1	34.8
080015	0.006	< 0.005	< 0.003	35.20	0.03	51.23	3.978	2.28	4.24	< 0.01	0.03	0.15	0.05	< 0.01	< 0.003	3.43	100.6	35.8
080016	0.006	< 0.005	< 0.003	40.13	< 0.01	45.06	4.645	2.65	4.22	0.03	0.07	0.09	0.03	< 0.01	< 0.003	3.69	100.6	31.5
080017	0.006	< 0.005	0.007	48.09	< 0.01	37.27	2.193	3.59	5.82	0.03	< 0.01	0.53	0.08	< 0.01	0.005	2.73	100.4	26.1
080018	0.005	< 0.005	0.018	49.24	0.24	42.75	0.764	2.02	3.76	0.04	0.14	0.42	0.07	0.01	0.007	1.29	100.8	29.9
080019	< 0.005	< 0.005	0.015	44.04	1.52	20.89	1.061	8.30	15.45	0.06	0.13	1.36	0.61	0.03	0.019	6.61	100.1	14.6
080020	< 0.005	< 0.005	0.009	64.74	1.06	29.37	0.087	1.90	1.85	0.38	0.34	0.07	0.04	< 0.01	< 0.003	0.47	100.3	20.5
080021	0.007	< 0.005	0.024	35.84	3.33	26.14	0.684	8.15	13.53	0.12	1.21	2.96	1.09	0.08	0.038	6.87	100.1	18.3
080022	< 0.005	< 0.005	0.003	54.27	6.58	15.48	0.289	4.88	7.53	0.13	4.36	0.58	0.75	0.02	0.006	4.39	99.27	10.8
080023	< 0.005	< 0.005	0.017	37.50	6.20	18.00	0.617	7.75	15.59	0.35	3.93	0.80	2.30	0.01	0.010	6.62	99.69	12.6
080024	< 0.005	< 0.005	0.013	59.36	0.09	34.87	1.202	0.11	0.04	< 0.01	0.06	0.01	0.13	< 0.01	< 0.003	4.53	100.4	24.4
080025	0.006	< 0.005	0.173	49.80	0.22	40.02	3.005	0.15	0.12	< 0.01	0.15	0.08	0.32	0.03	< 0.003	6.69	100.8	28.0
080026	0.018	0.022	0.097	37.81	3.20	23.07	0.481	15.79	7.54	0.14	0.14	4.45	1.03	0.11	0.080	6.43	100.4	16.1
080027	0.017	0.022	0.108	37.09	3.44	23.96	0.501	16.21	8.73	0.06	0.05	4.64	0.94	0.11	0.086	4.59	100.5	16.8
080028	0.021	0.031	0.113	32.57	4.72	28.21	1.311	14.35	7.09	0.11	0.19	5.43	1.02	0.12	0.100	5.03	100.4	19.7
080029	0.030	0.040	0.143	18.92	7.38	45.89	1.425	1.80	0.76	< 0.01	0.10	9.96	1.09	0.22	0.181	12.16	100.1	32.1
080030	0.006	< 0.005	0.027	62.23	0.52	31.87	0.765	0.15	0.08	< 0.01	0.09	0.82	0.19	0.03	0.014	3.61	100.4	22.3
080031	< 0.005	< 0.005	0.015	46.08	0.37	48.47	0.430	0.06	0.03	< 0.01	0.11	0.46	0.10	< 0.01	0.007	3.63	99.78	33.9
080032	0.008	< 0.005	0.020	45.21	15.85	14.61	0.260	8.03	8.31	2.61	1.38	2.48	0.67	0.04	0.038	1.11	100.6	10.2
080033	< 0.005	< 0.005	0.008	56.57	< 0.01	39.75	0.998	0.04	0.06	0.02	0.15	0.12	0.05	< 0.01	< 0.003	2.07	99.83	27.8
080034	< 0.005	< 0.005	0.004	51.12	< 0.01	46.06	0.898	< 0.01	0.02	< 0.01	0.11	0.06	0.03	< 0.01	< 0.003	2.04	100.4	32.2
080035	< 0.005	< 0.005	0.004	50.97	< 0.01	46.52	1.447	< 0.01	< 0.01	< 0.01	< 0.01	0.07	0.02	< 0.01	< 0.003	1.50	100.6	32.5
080036	< 0.005	< 0.005	0.006	49.43	0.19	47.54	1.429	0.02	0.02	< 0.01	0.17	0.36	0.04	< 0.01	< 0.003	1.20	100.4	33.2
080037	< 0.005	< 0.005	0.015	46.76	0.06	49.94	2.542	0.02	0.02	< 0.01	0.08	0.11	0.02	< 0.01	< 0.003	0.73	100.3	34.9
080038	0.006	< 0.005	0.007	44.19	< 0.01	48.15	7.072	0.02	0.03	< 0.01	0.14	0.03	0.02	< 0.01	< 0.003	1.17	100.8	33.7
080039	0.007	< 0.005	0.007	38.98	< 0.01	50.91	9.705	< 0.01	0.03	< 0.01	0.07	0.03	0.03	< 0.01	< 0.003	1.14	100.9	35.6
080040	< 0.005	< 0.005	0.008	54.24	1.03	39.00	0.111	2.62	2.08	0.31	0.24	0.07	0.05	< 0.01	< 0.003	0.47	100.2	27.3
080041	0.007	< 0.005	0.025	39.56	< 0.01	56.90	2.050	< 0.01	0.01	< 0.01	0.06	0.02	0.05	0.02	< 0.003	2.17	100.9	39.8
080042	0.008	< 0.005	0.013	49.41	0.09	46.15	1.866	0.01	0.02	< 0.01	0.10	0.04	0.11	< 0.01	< 0.003	2.61	100.4	32.3
080043	< 0.005	0.005	0.007	66.03	12.36	8.42	0.174	2.43	1.72	0.93	4.91	0.88	0.23	0.01	0.008	1.74	99.86	5.89
080044	< 0.005	< 0.005	0.012	54.65	0.51	43.39	0.039	0.45	0.70	0.08	0.14	0.40	0.11	0.01	0.009	-0.19	100.3	30.3
080045	< 0.005	< 0.005	< 0.003	59.21	< 0.01	40.66	0.023	0.15	0.43	< 0.01	0.06	0.02	0.11	0.01	< 0.003	0.13	100.8	28.4
080046	< 0.005	< 0.005	< 0.003	46.36	< 0.01	53.18	0.010	0.05	0.37	< 0.01	0.02	0.01	0.02	< 0.01	< 0.003	0.26	100.3	37.2
080047	0.005	< 0.005	< 0.003	49.63	0.10	49.74	0.027	0.29	0.43	< 0.01	0.11	0.02	0.02	< 0.01	< 0.003	0.20	100.6	34.8

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Fe
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01	0.001
Analysis Method	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F
080048	< 0.005	< 0.005	< 0.003	51.38	1.15	45.25	0.046	0.89	0.95	0.12	0.28	0.38	0.12	< 0.01	0.005	0.30	100.9	31.6
080049	< 0.005	< 0.005	0.009	46.60	0.02	53.72	0.015	0.13	0.13	< 0.01	0.09	0.06	0.04	0.01	< 0.003	0.06	100.9	37.6
080050	< 0.005	< 0.005	0.004	48.29	0.07	51.75	0.017	0.13	0.13	< 0.01	0.09	0.03	0.03	0.01	< 0.003	0.11	100.7	36.2
080051	< 0.005	< 0.005	0.009	60.46	6.27	22.01	0.113	2.69	3.31	0.95	1.21	1.79	0.48	0.01	0.024	1.08	100.4	15.4
080052	< 0.005	< 0.005	< 0.003	49.65	< 0.01	50.16	0.033	0.08	0.27	< 0.01	0.06	0.04	0.03	< 0.01	< 0.003	0.17	100.5	35.1
080053	< 0.005	< 0.005	< 0.003	48.47	< 0.01	51.99	0.030	0.06	0.18	< 0.01	0.02	0.01	0.03	0.01	< 0.003	0.03	100.8	36.4
080054	< 0.005	< 0.005	0.003	51.65	0.70	43.99	0.059	1.19	1.47	0.02	0.20	0.25	0.16	0.01	0.008	0.58	100.3	30.8
080055	< 0.005	< 0.005	0.005	42.94	0.27	54.50	0.079	0.61	0.91	< 0.01	0.14	0.48	0.19	0.01	0.006	0.38	100.5	38.1
080056	< 0.005	< 0.005	0.004	45.54	< 0.01	53.26	0.048	0.42	0.62	< 0.01	0.09	0.24	0.07	0.01	< 0.003	0.43	100.7	37.2
080057	< 0.005	< 0.005	0.003	45.31	< 0.01	50.94	0.200	0.94	1.70	0.02	0.06	0.01	0.02	< 0.01	< 0.003	1.17	100.4	35.6
080058	< 0.005	< 0.005	0.008	55.26	< 0.01	41.26	0.592	1.08	1.28	0.02	0.07	< 0.01	0.02	< 0.01	< 0.003	0.45	100.0	28.9
080059	< 0.005	< 0.005	< 0.003	41.02	< 0.01	51.33	0.838	2.63	4.03	< 0.01	0.04	< 0.01	0.02	< 0.01	< 0.003	0.50	100.4	35.9
080060	< 0.005	< 0.005	0.004	53.90	1.08	39.63	0.095	2.66	2.16	0.33	0.28	0.08	0.06	0.01	< 0.003	0.38	100.7	27.7
080061	< 0.005	< 0.005	0.014	46.21	< 0.01	44.47	0.927	4.26	4.68	0.02	0.03	0.01	0.03	< 0.01	< 0.003	-0.27	100.4	31.1
080062	0.006	< 0.005	0.014	47.78	12.74	18.76	0.329	4.93	6.73	1.75	1.58	3.50	0.94	0.02	0.049	0.97	100.1	13.1
080063	< 0.005	< 0.005	0.004	30.62	< 0.01	59.32	4.030	2.52	2.79	0.05	0.07	0.03	0.03	< 0.01	< 0.003	0.70	100.2	41.5
080064	< 0.005	< 0.005	0.028	51.24	1.65	37.31	0.350	4.00	3.32	0.23	0.38	0.52	0.14	0.01	0.007	1.59	100.8	26.1
080065	< 0.005	< 0.005	< 0.003	48.34	0.99	40.34	0.230	4.34	2.83	0.03	0.16	0.13	0.05	< 0.01	< 0.006	3.03	100.5	28.2
080066	< 0.005	< 0.005	< 0.003	93.11	0.35	2.80	0.057	1.28	1.16	0.02	0.13	0.02	0.01	< 0.01	< 0.003	0.83	99.77	1.96
080067	< 0.005	< 0.005	< 0.003	90.37	1.87	4.08	0.141	2.20	0.34	0.02	0.20	0.09	0.14	0.01	< 0.003	0.81	100.3	2.85
080068	< 0.005	< 0.005	0.030	55.86	0.89	36.03	0.199	3.33	2.15	0.02	0.07	0.17	0.07	0.01	0.005	1.97	100.8	25.2
080069	0.006	< 0.005	0.015	45.18	15.60	14.84	0.267	6.95	8.49	2.64	1.45	2.69	0.71	0.02	0.038	1.07	99.96	10.4
080070	0.006	< 0.005	0.014	44.59	12.71	19.26	0.520	9.53	4.34	1.02	0.79	3.74	1.00	0.02	0.059	3.11	100.7	13.5
080071	< 0.005	< 0.005	0.003	87.05	2.90	4.25	0.044	1.21	1.79	0.04	1.09	0.12	0.32	0.01	< 0.003	1.70	100.5	2.97
080072	0.005	< 0.005	0.023	43.33	1.05	40.33	1.895	5.57	4.17	0.03	0.29	0.12	0.16	0.01	0.008	3.70	100.7	28.2
080073	< 0.005	< 0.005	0.009	61.50	7.15	4.96	0.103	5.37	7.81	0.13	2.61	0.27	0.12	0.02	0.003	10.00	100.1	3.47
080074	< 0.005	< 0.005	0.027	44.63	0.60	42.96	2.022	5.47	3.10	0.04	0.20	0.10	0.13	< 0.01	0.006	1.10	100.4	30.0
080075	< 0.005	< 0.005	0.004	49.77	0.03	39.92	0.500	2.77	4.74	< 0.01	0.07	< 0.01	< 0.01	< 0.01	< 0.003	2.27	100.1	27.9
080076	< 0.005	< 0.005	< 0.003	47.94	< 0.01	43.17	0.876	3.60	4.13	0.02	0.06	0.03	0.02	< 0.01	< 0.003	0.87	100.7	30.2
080077	< 0.005	< 0.005	< 0.003	42.69	0.01	41.82	0.956	5.96	5.79	0.03	0.07	0.02	0.03	< 0.01	< 0.003	3.16	100.5	29.2
080078	< 0.005	< 0.005	0.011	58.08	0.09	32.52	0.313	3.16	5.07	0.06	0.08	0.01	0.01	< 0.01	< 0.003	1.13	100.5	22.7
080079	< 0.005	< 0.005	< 0.003	48.81	0.18	26.82	1.154	7.29	8.20	0.03	0.08	0.34	0.09	< 0.01	0.007	7.42	100.4	18.8
080080	< 0.005	< 0.005	0.004	50.90	1.14	41.56	0.099	2.85	2.21	0.30	0.30	0.08	0.06	< 0.01	< 0.003	0.49	99.98	29.1
080081	< 0.005	< 0.005	0.005	40.02	0.17	33.34	1.611	7.67	7.97	0.03	0.10	0.27	0.09	< 0.01	< 0.003	9.14	100.4	23.3
080082	< 0.005	< 0.005	< 0.003	46.40	0.25	21.94	1.511	10.02	11.46	0.07	0.11	0.07	0.04	< 0.01	< 0.003	8.90	100.8	15.3
080083	0.008	0.007	0.023	35.22	2.09	20.14	0.713	10.29	13.43	0.12	0.32	2.06	0.42	0.04	0.032	15.47	100.4	14.1
080084	< 0.005	< 0.005	0.019	49.23	0.32	38.97	0.690	4.78	3.46	0.02	0.12	0.24	0.07	< 0.01	0.005	2.11	100.0	27.2
080085	0.006	< 0.005	0.014	39.71	5.17	34.88	0.774	7.39	7.86	0.39	0.23	0.77	0.16	< 0.01	0.017	2.67	100.0	24.4
080086	0.014	0.022	0.095	31.51	3.35	22.24	0.673	23.87	2.65	0.43	0.24	3.91	0.51	0.09	0.066	11.04	100.7	15.6
080087	0.006	< 0.005	0.004	35.17	0.05	53.73	1.476	5.87	3.98	0.38	0.16	0.13	0.04	< 0.01	< 0.003	-0.47	100.5	37.6
080088	0.005	< 0.005	0.003	35.18	0.06	53.07	1.533	4.58	5.72	0.23	0.04	0.09	0.03	< 0.01	< 0.003	0.21	100.8	37.1
080089	0.006	< 0.005	< 0.003	35.61	0.23	51.09	1.483	4.91	5.61	0.29	0.15	0.25	0.06	< 0.01	< 0.003	0.26	99.95	35.7
080090	0.015	0.020	0.078	32.34	3.86	19.42	0.475	25.27	3.91	0.15	0.06	4.16	0.55	0.10	0.073	9.69	100.2	13.6
080091	0.016	0.022	0.087	33.45	4.03	20.95	0.281	25.94	3.28	0.07	0.05	4.67	0.52	0.10	0.084	7.24	100.8	14.6
080092	0.016	0.036	0.084	31.59	3.97	20.46	0.263	26.73	3.60	0.08	0.05	4.54	0.52	0.10	0.084	8.39	100.5	14.3
080093	0.014	0.031	0.079	32.59	3.67	18.97	0.264	25.52	5.29	0.07	0.02	4.24	0.46	0.09	0.075	8.86	100.2	13.3
080094	0.009	0.012	0.030	30.02	0.95	43.89	0.922	9.67	12.02	0.16	0.06	1.37	0.29	0.05	0.025	1.29	100.8	30.7
080095	0.016	0.021	0.093	32.37	3.31	20.62	0.318	20.33	7.01	0.34	0.23	5.47	0.81	0.09	0.079	8.81	99.92	14.4
080096	0.014	0.019	0.086	32.52	3.32	21.50	0.342	19.31	7.57	0.32	0.41	5.42	0.87	0.09	0.076	8.30	100.2	15.0

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Fe
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01	0.001
Analysis Method	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F
080097	0.008	0.008	0.029	33.94	1.27	37.81	1.157	8.00	10.66	0.09	0.07	1.50	0.37	0.03	0.029	5.61	100.6	26.4
080098	0.011	0.013	0.047	33.81	2.53	30.17	0.586	13.90	7.39	0.18	0.75	3.63	0.62	0.06	0.056	6.98	100.7	21.1
080099	< 0.005	< 0.005	0.006	51.74	1.97	18.63	0.792	5.32	11.58	0.13	0.42	0.49	0.94	0.01	0.007	8.07	100.1	13.0
080100	< 0.005	< 0.005	0.003	52.15	1.12	41.06	0.098	2.74	2.16	0.34	0.25	0.08	0.06	< 0.01	< 0.003	0.58	100.6	28.7
080101	< 0.005	< 0.005	< 0.003	69.79	7.12	3.90	0.099	4.64	5.02	0.09	2.71	0.24	0.09	0.01	< 0.003	5.83	99.54	2.73
080102	< 0.005	< 0.005	0.004	50.66	0.30	32.28	1.342	6.17	5.28	0.03	0.11	0.05	0.06	< 0.01	< 0.003	4.03	100.3	22.6
080103	0.010	0.010	0.050	35.62	2.43	28.34	0.879	9.24	10.46	0.11	0.63	2.71	0.46	0.07	0.041	9.66	100.7	19.8
080104	0.015	0.013	0.074	35.71	3.22	20.62	0.317	21.19	7.09	0.16	0.12	3.45	0.65	0.11	0.061	8.14	100.9	14.4
080105	0.013	0.016	0.079	30.96	3.60	18.95	0.314	22.23	7.14	0.11	0.07	3.74	0.65	0.12	0.064	12.04	100.1	13.3
080106	0.016	< 0.005	0.019	21.82	2.04	30.92	0.687	12.57	11.84	0.11	0.49	2.71	0.17	< 0.01	0.035	17.17	100.6	21.6
080107	< 0.005	< 0.005	0.007	39.65	0.35	27.96	0.608	7.89	11.18	0.03	0.08	0.19	0.10	< 0.01	< 0.003	11.93	99.96	19.6
080108	0.008	< 0.005	0.034	34.81	0.90	25.60	0.870	9.80	14.07	0.19	0.15	0.81	0.34	0.03	0.012	12.56	100.2	17.9
080109	0.015	0.020	0.039	31.94	6.29	23.28	0.441	16.93	6.82	0.49	0.43	5.52	0.51	0.04	0.093	6.90	99.75	16.3
080110	0.008	< 0.005	0.016	44.67	16.08	14.35	0.245	6.73	8.54	2.86	1.38	2.71	0.73	0.02	0.037	1.17	99.56	10.0
080111	0.016	0.027	0.047	29.15	3.65	24.37	0.397	20.81	4.91	0.20	0.21	6.58	0.46	0.06	0.105	8.87	99.86	17.0
080112	< 0.005	< 0.005	0.004	52.46	0.03	39.83	0.415	2.56	2.92	< 0.01	0.08	0.23	0.03	< 0.01	< 0.003	0.77	99.35	27.9
080113	< 0.005	< 0.005	< 0.003	51.03	2.05	13.88	0.628	6.34	13.14	0.07	0.27	0.40	0.96	< 0.01	0.007	10.96	99.74	9.71
080114	< 0.005	< 0.005	0.005	65.29	14.54	5.63	0.085	2.98	1.57	1.65	4.28	0.60	0.20	< 0.01	0.016	2.17	99.04	3.94
080115	< 0.005	< 0.005	< 0.003	56.71	< 0.01	22.84	0.933	4.62	7.56	0.02	0.08	0.02	0.02	< 0.01	< 0.003	7.03	99.84	16.0
080116	< 0.005	< 0.005	< 0.003	41.75	0.08	53.57	0.183	1.28	2.10	< 0.01	0.06	0.04	0.06	< 0.01	< 0.003	0.62	99.72	37.5
080117	< 0.005	< 0.005	< 0.003	89.36	< 0.01	7.84	0.123	1.54	0.30	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.003	0.08	99.28	5.48
080118	< 0.005	< 0.005	0.009	27.75	0.22	64.58	0.547	4.24	2.42	< 0.01	< 0.01	0.04	0.05	< 0.01	< 0.003	0.37	100.2	45.2
080119	< 0.005	< 0.005	0.011	44.01	< 0.01	35.70	1.109	5.55	7.29	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.003	6.37	100.1	25.0
080120	< 0.005	< 0.005	0.006	50.11	0.98	42.31	0.097	2.74	2.15	0.26	0.18	0.07	0.06	< 0.01	< 0.003	0.44	99.42	29.6

QC

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Fe
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01	0.001
Analysis Method	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F
BE-N Meas	0.009	0.010	0.036	38.51	10.10	13.03	0.201	13.01	14.04	3.29	1.40	2.73	1.08	0.06	0.048			9.11
BE-N Cert	0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9	3.18	1.39	2.61	1.05	0.0500	0.042			8.98
OREAS 13P Meas	0.013	0.324	0.305															7.70
OREAS 13P Cert	0.0120	0.313	0.293															7.58
DTS-2b Meas				39.35	0.44			49.05	0.14					2.28				
DTS-2b Cert				39.4	0.450			49.4	0.120					2.27				
MICA-Mg Meas				38.03	15.17	9.41	0.254	19.79	0.09	0.11	9.78	1.66	0.01	0.01				
MICA-Mg Cert				38.30	15.20	9.46	0.26	20.40	0.08	0.12	10.00	1.63	0.01	0.01				
NCS DC73304 (GBW 07106) Meas				88.73	3.60	3.24		0.09	0.35	0.08	0.63		0.22					
NCS DC73304 (GBW 07106) Cert				90.36	3.52	3.22		0.082	0.30	0.061	0.65		0.222					
AMIS 0129 Meas				9.54	2.70	63.46	0.355	1.96	0.85			23.39			0.494			44.4
AMIS 0129 Cert				9.57	2.75	62.31	0.36	2.07	0.80			22.94			0.48			43.573
080029 Orig	0.029	0.040	0.140	19.02	7.44	45.90	1.421	1.82	0.77	< 0.01	0.10	9.91	1.09	0.22	0.181	12.29	100.4	32.1
080029 Dup	0.032	0.040	0.145	18.83	7.31	45.88	1.430	1.78	0.76	0.03	0.11	10.01	1.08	0.22	0.181	12.04	99.88	32.1
080030 Orig	0.006	< 0.005	0.027	62.23	0.52	31.87	0.765	0.15	0.08	< 0.01	0.09	0.82	0.19	0.03	0.014	3.61	100.4	22.3
080030 Split	0.006	< 0.005	0.026	61.68	0.53	31.83	0.767	0.12	0.08	< 0.01	0.06	0.83	0.18	0.03	0.014	3.58	99.71	22.3
080050 Orig	< 0.005	< 0.005	0.004	48.29	0.07	51.75	0.017	0.13	0.13	< 0.01	0.09	0.03	0.03	0.01	< 0.003	0.11	100.7	36.2
080050 Split	< 0.005	< 0.005	0.005	45.06	0.08	54.23	0.014	0.15	0.13	< 0.01	0.08	0.04	0.03	0.01	< 0.003	0.05	99.85	37.9
080059 Orig	< 0.005	< 0.005	< 0.003	41.14	< 0.01	51.41	0.841	2.64	4.02	< 0.01	0.05	0.01	0.02	< 0.01	< 0.003	0.52	100.7	36.0
080059 Dup	< 0.005	< 0.005	< 0.003	40.90	< 0.01	51.25	0.835	2.62	4.05	< 0.01	0.03	< 0.01	0.02	< 0.01	< 0.003	0.48	100.2	35.8
080060 Orig	< 0.005	< 0.005	0.004	53.90	1.08	39.63	0.095	2.66	2.16	0.33	0.28	0.08	0.06	0.01	< 0.003	0.38	100.7	27.7
080060 Split	< 0.005	< 0.005	0.005	53.33	1.10	39.34	0.091	2.68	2.18	0.33	0.24	0.08	0.06	< 0.01	< 0.003	0.51	99.95	27.5
080089 Orig	0.006	< 0.005	< 0.003	35.67	0.24	51.15	1.482	4.90	5.60	0.29	0.14	0.25	0.06	< 0.01	< 0.003	0.25	100.1	35.8
080089 Dup	0.006	< 0.005	0.004	35.54	0.22	51.02	1.484	4.92	5.62	0.29	0.16	0.25	0.06	< 0.01	< 0.003	0.26	99.84	35.7
080090 Orig	0.015	0.020	0.078	32.34	3.86	19.42	0.475	25.27	3.91	0.15	0.06	4.16	0.55	0.10	0.073	9.69	100.2	13.6
080090 Split	0.014	0.023	0.076	32.64	3.79	19.55	0.481	25.49	3.93	0.11	0.09	4.21	0.55	0.10	0.075	9.52	100.7	13.7
080100 Orig	< 0.005	< 0.005	0.003	52.15	1.12	41.06	0.098	2.74	2.16	0.34	0.25	0.08	0.06	< 0.01	< 0.003	0.58	100.6	28.7
080100 Split	< 0.005	< 0.005	0.005	53.82	0.78	40.04	0.096	2.71	2.17	0.28	0.22	0.08	0.06	< 0.01	< 0.003	0.41	100.7	28.0
080119 Orig	< 0.005	< 0.005	0.012	44.05	< 0.01	35.74	1.107	5.57	7.29	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.003	6.36	100.2	25.0
080119 Dup	< 0.005	< 0.005	0.010	43.97	< 0.01	35.66	1.111	5.52	7.29	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.003	6.38	99.99	24.9
080120 Orig	< 0.005	< 0.005	0.006	50.11	0.98	42.31	0.097	2.74	2.15	0.26	0.18	0.07	0.06	< 0.01	< 0.003	0.44	99.42	29.6
080120 Split	< 0.005	< 0.005	0.005	50.12	1.02	42.46	0.095	2.79	2.15	0.29	0.21	0.07	0.06	< 0.01	< 0.003	0.41	99.68	29.7
Method Blank	< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003			< 0.001