CLINTON MANGANESE PROJECT

1.0 HIGHLIGHTS

- Clinton Manganese Property consists of 3 separate mineral claims (CLINTON MN 2, 3, and 4 or claims 1038680, 1038682, and 1038683) (Table 1), covering 954.53 hectares' land, located 3-6 kilometres to the south of the village of Clinton in British Columbia, Canada.
- Excellent infrastructure support, road accessible, located 40 kilometres to the northwest of Cache Creek, and 400 kilometres to the north of Vancouver, BC. It can be accessed by Highway 97 on the original Cariboo road. British Columbia rail line is also located near the Property.
- Geologically, the area is underlain by basic volcanic flows, tuff, ribbon chert, limestone and argillite of the Permian to Triassic Cache Creek Complex. Marble Canyon Formation (also part of the Permo-Triassic Cache Creek Complex) limestone, limestone breccia and chert with minor argillite, tuff, andesitic and basaltic flows also outcrop in the area.
- There are three manganese occurrences (Clinton Manganese 2, 3 and 4) where surface samples assayed 15 to 33 percent manganese.
- Manganese mineralization is hosted in "quartzite" (chert), a bright red shale unit and minor green shale. The "quartzites" (cherts) are intensely fractured and impregnated with black manganese oxides and hydroxides.
- The property has a good potential for manganese discovery through systematic exploration.
- A two phase exploration program is recommended which includes data compilation, confirmation of historical exploration work through prospecting and sampling in phase 1, and trenching, channel sampling, and metallurgical testing in Phase 2 if feasible. The estimated budget for Phase 1 exploration is $50,150 and will take six weeks' time to complete. Phase 2 work is contingent upon the results of Phase 1 exploration and its estimated budget is $102,450 with three months' duration.

2.0 MANGANESE OCCURRENCES ON THE PROPERTY

A summary of the three manganese occurrences (Minfile) on the Property taken from BC Ministry of Mines website are summarized below.
(http://minfile.gov.bc.ca/default.aspx?page=searchresults&d=150919012927&23=889&27=Any&t=1)

2.1 Clinton 2 Manganese Occurrence

The Clinton Manganese #2 occurrence is located on claim 1038680, approximately 3 kilometres southwest of Clinton on the northwest side of Junction Valley (Dolmage, 1944). It is about 0.8 kilometre east of the B.C. Rail track.

GSC Map 1278A (Memoir 363) shows the area to be underlain by basic volcanic flows, tuff, ribbon chert, limestone and argillite of the Permian to Triassic Cache Creek Complex. Marble Canyon Formation (also part of the Permo-Triassic Cache Creek Complex) limestone, limestone breccia and chert with minor argillite, tuff, andesitic and basaltic flows also outcrop in the area.

Dolmage (1944) states that the deposit is hosted in "quartzite" (chert) and a bright red shale unit and minor green shale. The "quartzites" (cherts) are intensely fractured and impregnated with black manganese oxides and hydroxides and are traceable for a hundred metres or so over widths of 15 or so metres. ***A sample taken by Mr. Olson assayed 33.4% manganese.***

2.2 Clinton 3 Manganese Occurrence

The Clinton Manganese #3 occurrence is located on claim 1038682, approximately 6.4 kilometres southeast of Clinton on the southeast side near the summit of Hart Ridge (Dolmage, 1944). GSC Map 1278A (Memoir 363) shows the area to be underlain by basic volcanic flows, tuff, ribbon chert, limestone and argillite of the Permian to Triassic Cache Creek Complex.

Dolmage (1944) states that the deposit is hosted in "cherty quartzite" (chert) interbedded with thin layers of argillaceous material. The manganese minerals are black to steel grey, hard and crystalline, occurring as streaks and thin lenses to 1 centimetre in thickness parallel to bedding and also as fracture fillings up to 1 centimetre in thickness. Three outcrops expose the showings along a trend of 320 degrees over a strike length of 55 metres. ***A sample taken over a width of 1.07 metres assayed 22.8% manganese.***

2.3 Clinton 4 Manganese Occurrence

The Clinton Manganese #4 occurrence is located on claim 1038683, approximately 5.6 kilometres southwest of Clinton. It is just west of the B.C. Rail track on a small ridge that trends about 350 degrees. The showings trend along the ridge for about 100 metres, about 125 metres above the track.

GSC Map 1278A (Memoir 363) shows the area to be underlain by massive limestone, limestone breccia and chert with minor argillite, tuff, and andesitic and basaltic flows of the Marble Canyon Formation of the Permian to Triassic Cache Creek Complex.

EMPR Minister of Mines Annual Report (1948, page A91) states that lithologies in the vicinity are largely grey and grey-green quartzose schists with interlayers of white, pink and red cherty layers. The strata strike 335 degrees, dipping 45 degrees southwest. A stratigraphic thickness of about 15 metres is exposed on the ridge, with secondary manganese oxides deposited on fracture surfaces. Although it could not be positively identified, rhodonite was suspected as the primary manganese mineral. A 3 metre open-cut at the north end of the exposure containing

"well mineralised" rock, with pyrolusite in vertical stringers to 2 centimetres wide. **A 3.1 metre sample assayed 15.8% manganese.**

3.0 POTENTIAL MANGANESE MARKET

- Manganese metal is used primarily in steel manufacturing with many other secondary industrial uses. It is mined in South Africa, Australia, China, Brazil, Gabon, Ukraine, India, Ghana and Kazakhstan. Manganese is among the most widely used metal in the world, fourth after iron, aluminium, and copper. Price of manganese is depressed due to sluggish demand in the steel industry. Recent development in lithium-ion-manganese batteries (LMD) has opened up an entirely new technology avenue for its demand and supply.
- In 1987, the United States redesignated manganese as a strategic metal essential for the economy and national security. Presently, there are no producing manganese mines in North America. Canada and the USA imports 100% of their manganese requirement. Development of North American manganese mining projects can provide an exciting future investment opportunity.
- A Lithium ion manganese oxide (LMD) battery is a lithium ion cell that uses manganese dioxide (MnO_2), as the primary cathode material. Growth of rechargeable Lithium –ion-manganese (LMD) batteries has made this sector as one of the fastest growing manganese use in technology. In these batteries, lithium is used as electrolyte, graphite as anode and manganese dioxide as cathode.
- Lithium ion batteries have become the batteries of choice for most of the industrial and technical uses. There are six types of lithium ion batteries:
    - Lithium Cobalt Oxide ($LiCoO_2$ or LCO)
    - Lithium Manganese Oxide ($LiMnO_2$ or LMO)
    - Lithium Nickel Manganese Cobalt Oxide ($LiNiMnCoO_2$ or NMC)
    - Lithium Iron Phosphate ($LiFePO_4$ or LFP)
    - Lithium Nickel Cobalt Aluminum Oxide ($LiNiCoAlO_2$ or NCA)
    - Lithium Titanate ($Li_4Ti_5O_{12}$ or LTO)
- Battery industry and auto makers are researching to come up with a combination of batteries to best fit the following industry standards for lithium ion batteries:
    - Safety
    - Life span
    - Cost
    - Performance
    - Specific power
    - Specific energy

- Lithium ion manganese batteries are a promising technology as their manganese-oxide components are earth-abundant, inexpensive, non-toxic, and provide better thermal stability. Use of manganese can bring down the manufacturing cost of lithium ion batteries which is a major factor in higher cost of electrical cars. Most Li-manganese batteries "partner" with Lithium Nickel Manganese Cobalt Oxide (NMC) to improve the specific energy and prolong the life span. This combination brings out the best in each system and the so-called LMO (NMC) is chosen for most electric vehicles.
- Research at the University of Illinois has achieved an advanced prototype battery, using Lithiated Manganese that can be recharged in as little as two minutes (equivalent to filling a gas tank.
- General Electric has selected the lithium/manganese dioxide, MnO_2, system as it offers the best balance of safety and performance. The 2nd generation of the Chevy Volt has chosen the manganese dioxide, MnO_2, lithium ion battery which provides high current boost on acceleration and long driving range. The new Nissan leaf has also chosen the manganese dioxide, MnO_2, lithium ion battery.
- The first generation of lithium batteries were made from lithium cobalt oxide which are used by Tesla. Tesla is losing $4,000 for every car it sells due to higher cost of cobalt batteries (~$14/ lb cobalt price). Manganese currently sells for $0.85 / lb and provides a cheaper option as the Tesla battery accounts for 50% of the price of the car. By switching to the manganese dioxide lithium ion battery, they can be profitable because 60% of a MnO_2 lithium ion battery consists of manganese which can provide substantial savings.
- Currently, the world's second-largest market for manganese is dry-cell battery production which is a $50 billion annual industry with rapid growth. Alkaline batteries are a type of primary batteries dependent upon the reaction between zinc and manganese dioxide (Zn/MnO_2). These have higher energy density and longer shelf life.

4.0 RECOMMENDED EXPLORATION WORK

The following phased work program is recommended for the Property, where each phase is contingent upon the results of the previous phase.

Phase 1 – Data Compilation and Field Geological Work

This work includes two stages; the first stage comprises compilation of all the historical geological and data available on the Property. In the second stage, the field geological work will be carried out. This program includes the following tasks:

- Reconnaissance level prospecting, sampling and limited geological mapping of the area of historical geological and exploration work, and manganese showings on the property;
- Detailed sampling of historical mineralized areas; and,
- MMI Soil sampling around reported historical.

The estimated budget for this phase is $50,150, it will take six weeks' time to complete, and the details are provided in the following table.

PHASE 1 BUDGET – DATA COMPILATION AND RECONNAISSANCE WORK

Item	Unit	No. Of Units	Rate	Total
Data Compilation	day	5	$650	$3,250
Maps production	lump sum	1	$1,000	$1,000
Geological mapping (Geo 1)	day	12	$650	$7,800
Geological mapping (Geo 2)	day	5	$650	$3,250
Prospecting (Prospectors 2)	day	13	$700	$9,100
Assaying rock samples	sample	50	$50	$2,500
Soil Samples MMI Analysis	sample	100	$50	$5,000
Accommodation and Meals	manday	40	$200	$8,000
Vehicles : 1	day	15	$150	$2,250
Air travel	travel	1	$1,500	$1,500
Supplies and Rentals	lump sum	1	$1,500	$1,500
Reports		1	$5,000	$5,000
TOTAL (CANADIAN DOLLARS)				**$50,150**

Phase 2 – Trenching, Channel Sampling and Metallurgical Testing

The outcrops and targets identified in Phase 1 investigations will be further explored through trenching and stripping, where channel samples will be collected across the exposed mineralised rocks. Another part of this program will be metallurgical testwork to produce chemical grade manganese suitable for use in lithium-manganese batteries. The estimated budget for this phase is $102,450, it will take three months' time to complete, and the details are provided in the following table.

PHASE 2 BUDGET – TRENCHING AND METALLURGICAL TESTING				
Item	**Unit**	**No. Of Units**	**Rate**	**Total**
Permitting	day	5	$650	$3,250
GIS Work	hrs	20	$60	$1,200

Geologist for channel sampling	day	20	$650	$13,000
Channel sampling labour (2 person crew)	day	20	$800	$16,000
Assaying rock samples	sample	150	$60	$9,000
Backhoe for trenching	hrs	100	$120	$12,000
Accommodation and Meals (3 persons)	day	22	$600	$13,200
Metallurgical testing	lump sum	1	$15,000	$15,000
Vehicles: 1	day	22	$200	$4,400
Supplies and Rentals	lump sum	1	$5,000	$5,000
Reports	day	10	$650	$6,500
Project management	day	6	$650	$3,900
TOTAL (CANADIAN DOLLARS)				**$102,450**

For further information, please contact.

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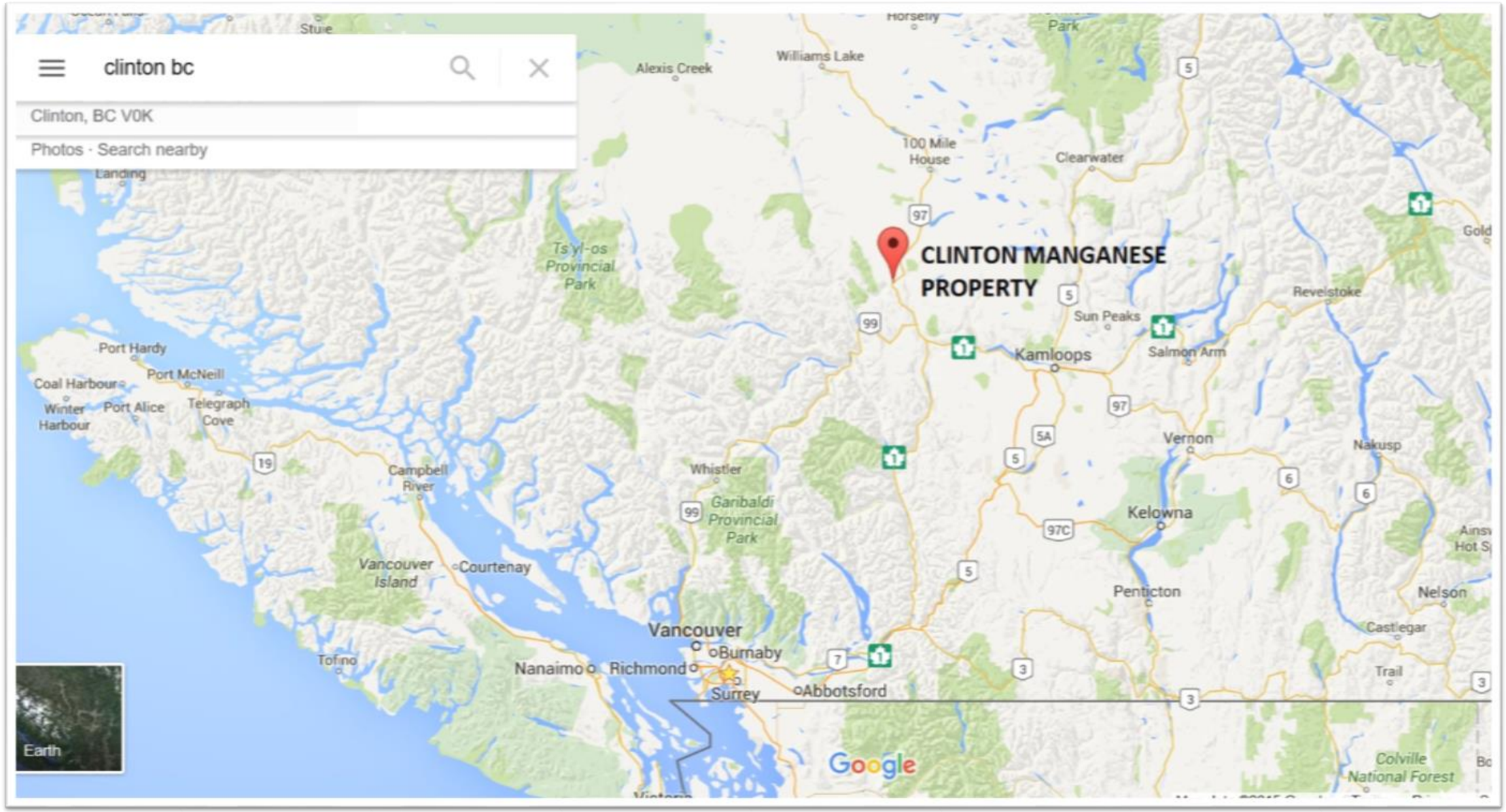

Figure 1: Property location

Table 1: Claims details

Title Number	Claim Name	Owner	Title Type	Title Sub Type	Map Number	Issue Date	Good To Date	Status	Area (ha)
1038680	CLINTON MN2	260370 100%	Mineral	Claim	092P	2015/sep/19	2016/sep/19	GOOD	284.33
1038682	CLINTON MN3	260370 100%	Mineral	Claim	092P	2015/sep/19	2016/sep/19	GOOD	406.21
1038683	CLINTON MN4	260370 100%	Mineral	Claim	092P	2015/sep/19	2016/sep/19	GOOD	263.99
Total Area in Hectares									954.53

Figure 1: Property location

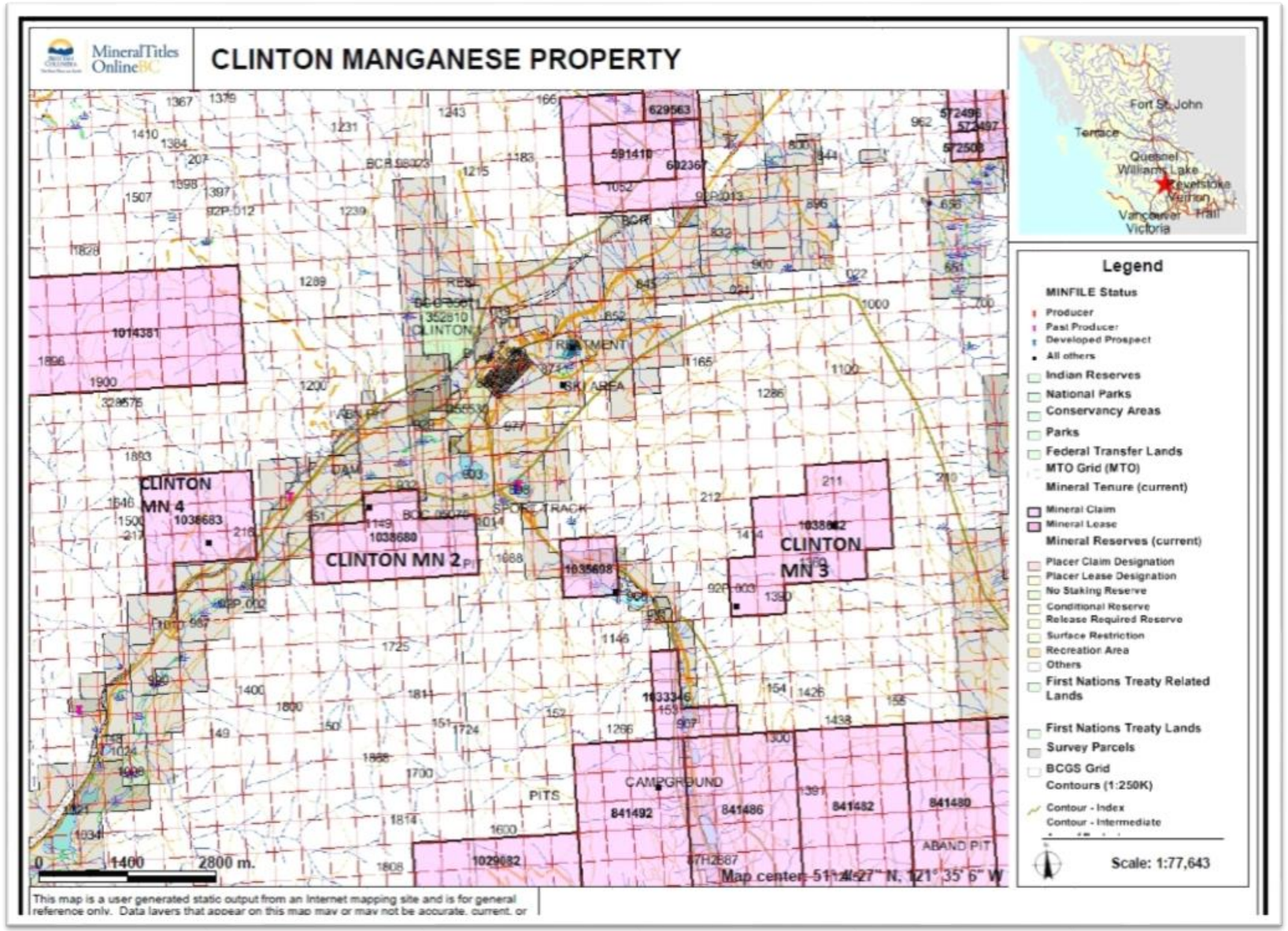

Figure 2: The three claim blocks on the Property

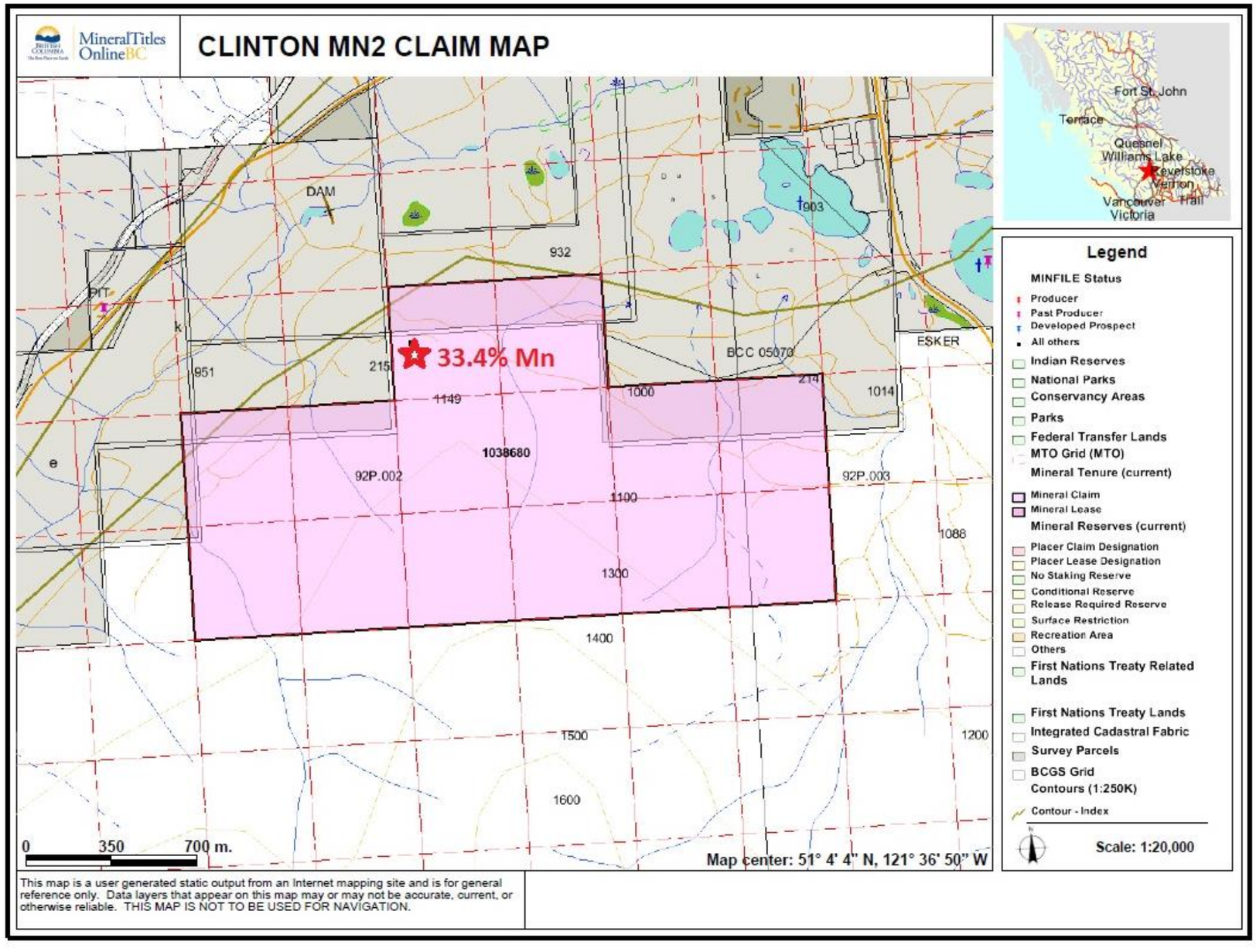

Figure 3: Clinton Manganese 2 Claim Block

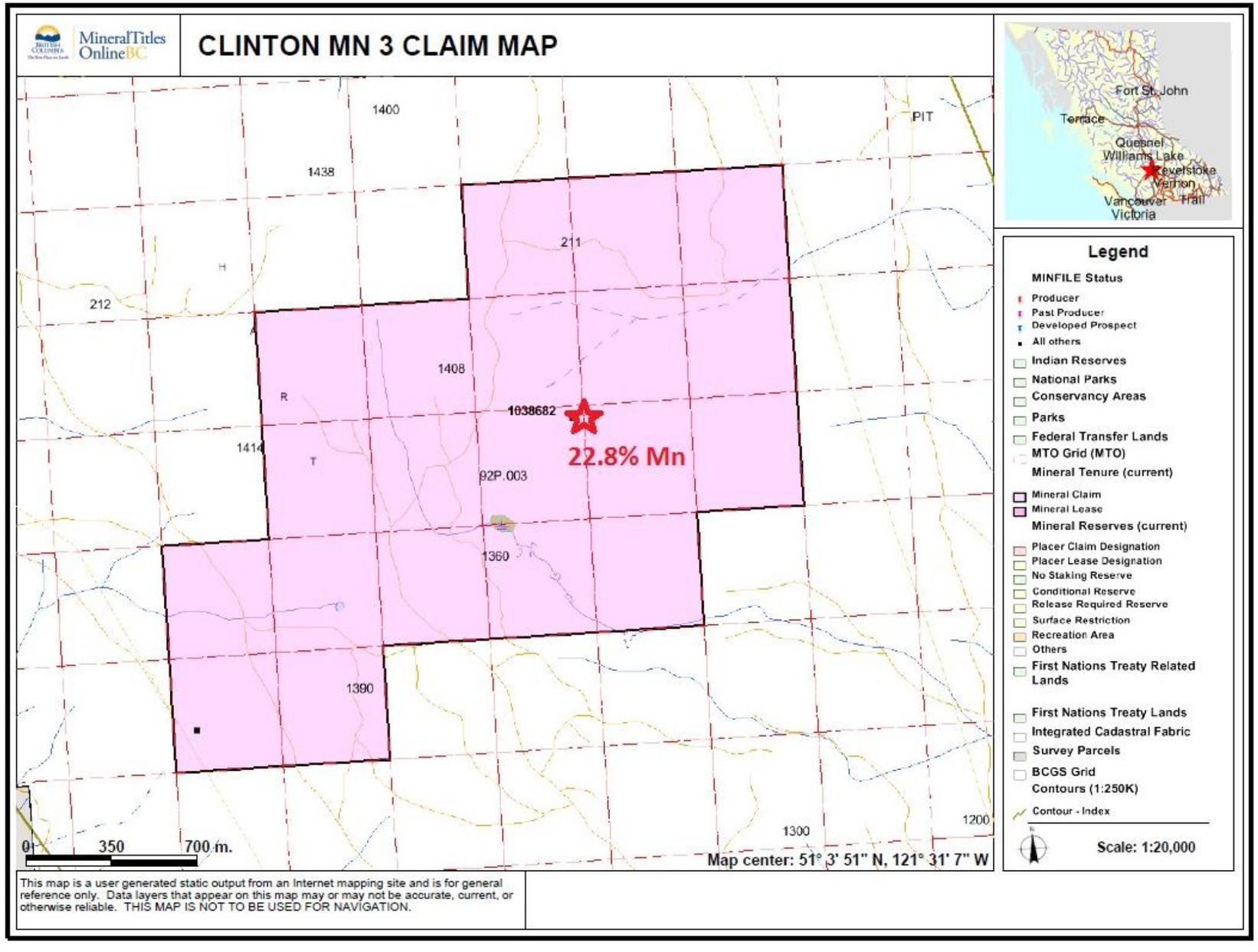

Figure 4: Clinton Manganese 3 Claim Block

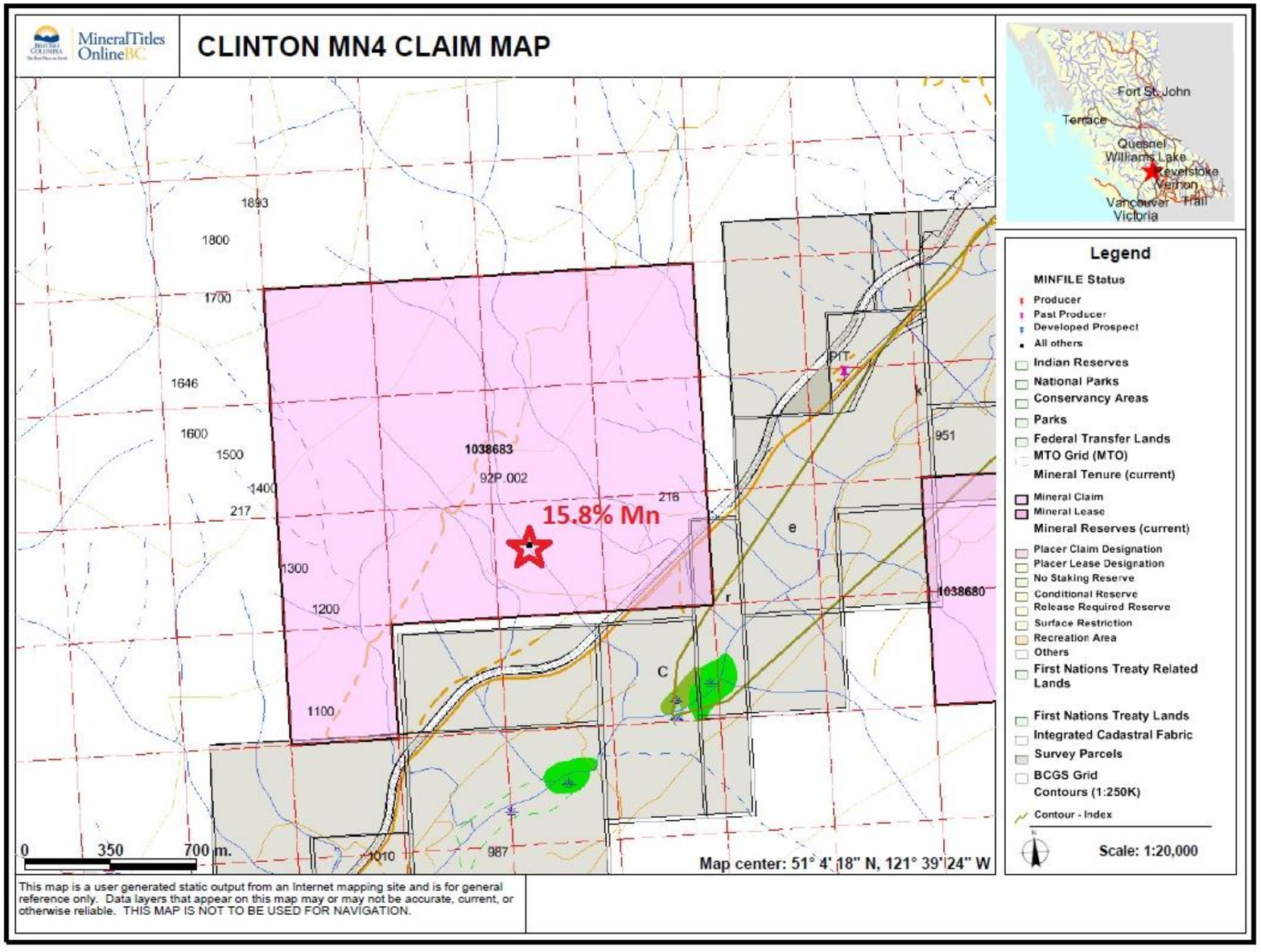

Figure 5: Clinton Manganese 4 Claim Block