Technical Report on the Buckingham Graphite Project, Buckingham Township, Quebec, Canada (in accordance with National Instrument 43-101)

Submitted to



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# **Item 1: Summary**

This technical report presents an update on the exploration work undertaken at the Buckingham Graphite Property of Ashburton Ventures Inc., in accordance with the National Instrument 43-101 Standards of Disclosure for mineral projects. The Buckingham Graphite Property is at an exploration stage and located in the Outaouais region of Quebec, Canada, about 30 km NE of Ottawa.

#### Location, Access and Property Agreement.

The Buckingham Graphite Property consists of 18 CDC claims acquired through an option agreement with Cavan Ventures Inc. (13 CDC claims) and through mapstaking in August 2016 (5 CDC claims). Ashburton Ventures Inc. currently owns 80% interest in the 13 CDC claims held by Cavan Ventures and is the 100% owner of the five adjoining CDC claims. The Property is readily accessible by roads from the village of Buckingham and is 100% situated on private land. The exploration work took place on grounds that are owned by logging companies and crisscrossed by several logging roads facilitating the access. Local resources and infrastructures are available nearby, with the Outaouais Electrical Substation located 7km south of the Property and Highway 50, running east-west, about 10 km south of the property.

#### **Historical Exploration**

The Buckingham region is historically known for its numerous small graphite mines operating in the late 1800's and early 1900's. The Walker Mine, located 1 km SE of the property, produced flaky and vein type graphite. In 1982, an EM heliborne airborne survey defined two linear and parallel conductors oriented NE-SW, located in the SE portion of the Property and a strong conductive zone of smaller extent in the south-central part of the property. Limited follow-up work was undertaken by the Ministry of Natural Resources and Stratmin during 1984 to1987 over a small conductive zone while exploration work focusing over the two linear and parallel conductors initiated only in 2013 under Cavan Ventures Inc with geophysical survey and prospecting.

A TDEM heliborne survey generated seven strong anomalies and further definition of the two historic linear conductors: to the east, a strong conductive and magnetic zone extending over 1 km and oriented 30-35° (the NNE conductor) and a few hundreds of meters to the west, a smaller conductive zone extending over 300 m and oriented 65-70° (the ENE conductor). A ground PhiSpy survey then followed with trenching over strongly conductive zones defined near the ground surface by the PhiSpy survey, at the southwest end of the NNE conductor. Two trenches returned mineralized intercepts including 8.2% Cg over 4.75 m (trench T1) and 21.6% Cg over 14.5 m (trench 22C). In April 2015, a bulk graphitic sample (20 kg) from trench 22C was submitted to an initial flotation test. With a head grade of 20.7% Cg, the bulk sample returned 32% of flakes ranging in size from large (+65 mesh) to jumbo (+28 mesh) with a purity varying from 94.8 to 96.1% for these large fractions.

## Geology, Mineralisation and Deposit type

The property lies in a quartzite-rich domain of the southern Central Metasedimentary Belt (CMB) within the Grenville Geological Province. It is mostly overlain by different types of paragneisses, quartzites and impure marbles/calc-silicate rocks. Marble outcrops are seldom observed as it is a soft rock easily weathered and usually found in topographic lows. Nevertheless, marble/calc silicate rocks units were found in significant

amount in the drill core and a few unmapped marble occurrences were noted on the property with enclaves of surrounding rocks. A zone of graphite veins hosted in pegmatites and extending for 80 m in length was found along a creek running parallel to the linear conductive zone. Evidences of deformation (slickensides, mylonites) were observed in the vicinity of these veins. Most of the graphite mineralization is hosted in marble and some very high grade short intercepts (up to 20-25% Cg) may occur either in the middle of this unit or near the contact with adjacent units. Lower grades over significant lengths were also found in a garnet paragneiss. Graphite flakes are variable in sizes within the marble (from small to large flakes), whereas higher proportions of large (1-2 mm) graphite flakes are observed within the garnet-paragneiss.

The graphite mineralization is related to a disseminated flake graphite deposit-type in marble, which would be formed at least partly by metasomatic or hydrothermal processes. The linear shape of the conductive zones and evidence of faulting along a creek running parallel to the longest conductive zone indicate a deformation zone might be related to the metasomatic/hydrothermal event and that cooling of C-H-O fluids may have contributed to the graphite mineralization along with a diagenesis (or graphitization) of carbonaceous material present in the sediments.

#### **Exploration and drilling**

Ashburton Ventures Inc. has carried out exploration at the Buckingham Graphite Property since 2015 that included prospecting, grab sampling, ground geophysical surveys and drilling over two linear conductive zones situated in the southeast portion of the property. The ground geophysical survey consisted of a ground TDEM PhiSpy survey that was carried out over 36.3 line km in November 2016. Three groups of conductive zones, two located at the SW end of the NNE conductor and one over the ENE conductor were considered as prime targets. Nineteen (19) holes were drilled during three phases, totalling 4782 m and 1695 core samples were sent for assay at the Lakefield SGS laboratory for graphitic carbon using the LECO method.

The first drilling phase was carried out in November and December 2015 and focused on the SW end of the NNE conductor with 5 holes distributed over 300 m along a line parallel to the conductor. The second and third phases were performed during the summer and fall of 2016 and tested an additional 500 m along the NNE conductor with nine additional holes. In addition, four holes investigated a 300 m long ENE conductor and one hole was drilled to probe a conductive zone defined by the ground PhiSpy survey. Mineralized intercepts were mainly hosted in marble and ranged from 1.4% Cg over 5 m (BH16-05) to 4.07% Cg over 112 m (BH15-03) for the NNE conductor. The latter was found between 112 to 224 m and included smaller intersections of higher grades (11.20% Cg over 7 m from 166 to 173 m and 8.45% Cg over 5 m from 198 to 203 m). This hole was ended at 224 m, in the mineralization. An intersection of 5.18% Cg over 70 m (BH16-06) was returned for the ENE conductor, although the extension of this mineralized intercept was not found in three subsequent holes drilled to the west.

## Sample Preparation, Analyses and Data Verifications

Grab and drill core samples were sent to SGS Canada Inc. Laboratory of Lakefield, Ontario, an accredited laboratory according to the ISO/CEI 17025:2005 Standards. A QA/QC program was implemented for the 2016 drilling programs and consisted in the insertion of 60 duplicates, 33 blanks within batches of samples submitted for assaying. A low standard, CDN-GR-1 (3.12% Cg) and a high standard, GGC-04 (13.53% Cg) were used as reference material and provided 17 additional control samples. Duplicate samples showed a good consistency, with an average variability of 10% for all the paired samples and a R<sup>2</sup> = 0.9703. No graphite was detected in 30 of the 33 blanks with 3 graphite values close to the detection limit. Assays of low-grade standards (CDN-GR-1)

mostly returned values within the limits of ±2x standard deviation, with a difference generally not exceeding 0.08% Cg in absolute values. (CCG-04) returned higher variability with a difference in absolute values ranging from 0.23 to 1.27% Cg. The overall performance of the control samples is considered to be satisfactory. The assay results provided by the laboratory are therefore considered to be reliable for the purpose of this report.

#### **Adjacent Properties**

The region experienced a revival of graphite exploration since 2011 and significant portions of the Buckingham and Lochaber Townships were mapstaked, wherever permitted. Two graphite properties, the Walker Lump Property of Saint Jean Carbon and the Buckingham Property of CKR Carbon Corp formed the eastern and southern limits of Ashburton/Cavan's Buckingham Graphite property. These two properties were subjected to intermittent exploration from 2013 to 2016. In 2016, Saint Jean Carbon Inc. and CKR Carbon Corp. conducted an airborne survey over their respective properties. CKR Carbon Corp. completed trenching in November 2016, focusing on newly defined conductive anomalies. The Lochaber Graphite Project, situated 14 km east of the Buckingham Graphite Property is the most advanced project. A maiden resource estimate was completed by SRK in 2015 producing an inferred mineral resource of 4MM tonnes at 4% (160 000 t of graphite) based on 8,200 m of drill core.

#### **Conclusions and Recommendations**

The style of graphite mineralization observed at the Buckingham Graphite Property indicates a metasomaticprocess probably associated with a sheared zone in marble. Therefore, the complexity of the geological context may require an increased density of infill and step-out drill holes to meet sufficient requirements for an eventual model resources calculation. Several mineralized intercepts related to the presence of marble beds and in lithological contacts between marble and paragneiss were returned with the most significant located near the southwest end of the NNE conductor. Until now, the 19 drilled holes were principally distributed at roughly 100 m intervals, along the length of the linear conductors and dipped to the northwest. Each section line includes just one hole, which is insufficient to document the lateral extension of the mineralized intercepts. Nevertheless, a preliminary conceptual model for the mineralization is presented for the NNE conductor, consisting of two mineralised marble planes (MBR-1 and MBR-2) having a similar direction (30-35°). MBR-1 would be more important in terms of volumes and steeper than MBR-2, with a dip of 50-55° compared to 30-35° for MBR-2.

A two-phase work program is proposed for a total of C\$ 1.5 million (C\$1,491,210.00). A first, non-contingent phase costing C\$ 577,000 includes additional drilling to further explore the NNE and ENE conductors followed by metallurgical testing. A second phase totalling C\$914,210.00, contingent on the results obtained from Phase 1, is recommended and consists of a detailed drilling program designed to provide a first estimate of the mineral resources.

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# **Item 2: Introduction**

Ashburton Ventures Inc (Ashburton), the Issuer, has commissioned Inlandsis Consultants to prepare a technical report for its Buckingham Graphite Property, in compliance with the National Instrument 43-101. The purpose of the report is to document the current geological information generated from Ashburton's ongoing exploration program and to provide a conceptual model for the graphite mineralization that could be used for future exploration work and mineral resource estimate. This is the first NI43-101 compliant report published for the Buckingham Graphite Property since the inception of the 43-101 instruments in 2004.

The present report provides a general description of the Buckingham Graphite Property along with historical work, geological information and exploration work conducted by Ashburton in 2015 and 2016. It was prepared by Isabelle Robillard (MSc, P. Geo), associate of Inlandsis Consultants The author was responsible for the planning, execution and monitoring of the drilling programs conducted in 2016. The author has also supervised the splitting and sampling of the core material.

Additional sources of information to complete this report was obtained from: 1) scientific papers available in public domain; 2) statutory reports, geological reports and maps from the Ministère des Ressources Naturelles du Québec (MERN) on their "Examine" website; 3) land tenure information on mining claims from the MERN's "GESTIM" website accessed in March 28, 2017 and, 4) internal reports, plans, maps maintained and stored by Ashburton's personal.

# **Item 3: Reliance on Other Experts**

The author has relied upon GESTIM database, a website maintained by the MERN, for land tenure information, as accessed in March, 2017. To the best knowledge of the author, there are no current or pending litigations that may be material to the assets of Ashburton and Cavan Ventures Inc. The author has also relied on two geophysical reports pertaining to the property, both authored by Joël Dubé, geophysicist. One of these reports was published in 2013, as a statutary report in MERN's EXAMINE database and is entitled "Technical Report, High-Resolution Heliborne Magnetic and TDEM Survey, Buckingham Property" and the second report entitled "Technical Report, Ground TDEM PhiSpy Survey, Buckingham Property, Outaouais region" was submitted to Ashburton in December 2016.

# **Item 4: Property Description and Location**

The Buckingham Graphite Property is located 30 km NE of Ottawa and 150 km west of Montréal, in the Outaouais region of southern Quebec. It belongs to the municipality of L'Ange-Gardien, 8 km northwest of the small town of Buckingham, now amalgamated with the city of Gatineau (Figure 1). The graphite mine of Lac-des-Îles, currently operated by Imerys Graphite & Carbon, is located about 85 km north of the Property. The property lies within SNRC sheet numbers 31G11 and 31G12 and consists of two claim blocks: the West Claim Block and its adjoining East Claim Block (Figure 2).

The West Claim block is composed of 13 map designated cells or "*cellules désignées sur carte*" (CDC) for a total area of 781.44 ha. Expiry dates are August, 19, 2017 for all the mining titles grouped under this block (Table 1). The East Claim block is defined by 5 map designated cells for a total of 300.5 ha with expiry dates of May 23<sup>th</sup> and 24<sup>th</sup>, 2018.

West Claim						
Block	Claim #	NTS Sheet	Area (ha)	Date Registry	Date Expiry	Owner
	2389176	31G12	60.12	13/08/20	17/08/19	Cavan
	2389177	31G12	60.12	13/08/20	17/08/19	Cavan
	2389178	31G12	60.12	13/08/20	17/08/19	Cavan
	2389179	31G12	60.11	13/08/20	17/08/19	Cavan
	2389180	31G12	60.11	13/08/20	17/08/19	Cavan
	2389181	31G12	60.11	13/08/20	17/08/19	Cavan
	2389182	31G12	60.11	13/08/20	17/08/19	Cavan
	2389183	31G12	60.11	13/08/20	17/08/19	Cavan
	2389184	31G12	60.11	13/08/20	17/08/19	Cavan
	2389185	31G12	60.11	13/08/20	17/08/19	Cavan
	2389186	31G12	60.11	13/08/20	17/08/19	Cavan
	2389187	31G12	60.10	13/08/20	17/08/19	Cavan
	2389188	31G12	60.10	13/08/20	17/08/19	Cavan
East Claim						
Block	Claim #	NTS Sheet	Area (ha)	Date Registry	Date Expiry	Owner
DIOCK						
	2445418	31G11	60.12	16/05/24	18/05/23	Ashburton
	2445419	31G11	60.11	16/05/24	18/05/23	Ashburton
	2445637	31G12	60.10	16/05/25	18/05/24	Ashburton
	2445638	31G12	60.10	16/05/25	18/05/24	Ashburton
	2445639	31G12	60.10	16/05/25	18/05/24	Ashburton

Table 1. Claim list



Figure 1. Location map of Buckingham Graphite Property



Figure 2. Claim map and Physiography of the Property Area

Since 2000, the claims are referred to as map-designated cells (or CDC) in the Province of Québec and can be acquired online, using the form « Notice of Map Designation" available on the GESTIM website operated by the Ministry of Natural Resources of the Province of Québec (MERN). The term of a claim is 2 years after the date at which the claim was registered and it can be renewed every two years, providing the conditions set out in the Mining Act are met. These conditions include a minimal amount of expenses in exploration works, as predetermined by the regulations in force. The amount of expenditure per claim will vary depending on the surface area of the claims, whether the claim is located north or south of 52 latitude and the number of terms since their issuance which implies larger amount to be spent as the number of terms increases. The Mining Act allows excess amounts of expenses on a specific claim to be distributed on nearby claims which are located within a radius of 4.5 km from the center of the claim having excess credits. All the claims forming the Buckingham Graphite Property are in good standing and sufficient works were completed to renew them.

## 4.1 Property agreement

In October 2015, The Buckingham Graphite Property was optioned from Cavan Ventures to Ashburton Ventures. The terms of the deal, were to acquire a 60% interest in the Buckingham Property by issuing 1.5 million shares, incur \$200,000 expenditures year one and a further issuance of 1.5 million shares, incur \$250 00\$ expenditures and pay \$25,000 cash year two (PR release of October 15<sup>th</sup>, 2015). In August 2016, Ashburton became the 100% owner of five claims located in the east portion of the Property. These claims contain the longest conductor that was drill tested during the 2015-2016 period.

In September 2016, Ashburton has signed an agreement to increase its stake from 60% to 80% in the Buckingham Graphite Project (PR dated of September 15, 2016). To earn the additional percentage Ashburton has fulfilled the existing option terms to earn its 60% interest, will pay an additional \$5000 cash plus incur an additional \$200 000 in expenditures to Cavan. As of the date of this report, Ashburton has fulfilled all the conditions to earn 80% interest of Cavan's claim block.

## 4.2 Surface Rights and Permitting

The property is located on private land which is divided among several landowners. The grounds owned logging Companies cover more than half of the surface of the project (Figure 3). This portion of land also corresponds to areas of immediate interest as it hosts most of the conductive zones that have been defined until now. Surface agreements were made between two landowners and Ashburton on key locations and are to be renewed on an annual basis. In addition to cash payments for yearly access and drill sites, the agreements include some restrictions for mineral exploration activities during specific hunting time periods. As exploration works were still limited, no permit or certification from governmental agencies were required at this time.



Figure 3. Landowners limits on Buckingham Graphite property

## 4.3 Environmental liabilities and other significant factors and risks

There is no liability related to mineral exploration over the Buckingham Graphite Property. There are no mineral resources or mineral reserves on the Buckingham property according to the 2005 CIM Definition Standards. There are no existing mine workings, tailing ponds, waste deposits and important natural features and improvements relative to the outside property boundaries. However, the property contains mineralized zones manifested by stripped outcrops, small pits and/or trenches. There is sufficient unused land within Cavan/Ashburton and Ashburton claim Blocks for waste and tailing disposal and the construction of a mine and milling installations.

The optimum length of the operating season in the Buckingham region ranges from early May to mid-November, when mining companies usually conduct their field work such as geological mapping, drilling, overburden stripping, trenching, soil survey and sampling. However, airborne and ground-based geophysical surveys and drilling can be carried out yearlong, except for radiometric surveys.

On a regional scale, the Buckingham area is partly restricted to exploration activities by the following land status (Figure 4):

- a large area which borders the western limit of the Property and a portion of the Rivière du Lièvre is devoted to recreational activities or vacationing (*villégiature* in French). This area is available for map staking but can be withdrawn from mining activities by the RCM, once the government will have adopted government policies on land use and development, ensuring guidance for Regional County Municipalities (RCM);
- a small urban perimeter over the town of Buckingham where exploration is prohibited;
- a protected area of white-tailed deer (*Odocoileus virginianus*) where exploration activities are allowed under specific conditions.

To the best knowledge of the author, there are no other known significant factors and risks besides noted in the technical report that may affect access, title, or the right or ability to perform the recommended exploration program.



Figure 4. Regional restrictions for mineral exploration

# Item 5: Accessibility, Climate, Local Resources, Infrastructure and Physiography

Access to the property is made via the Chemin River, a paved road running along the west side of Rivière du Lièvre that extends north of the town of Buckingham. At approximately 7 km north of Buckingham, a left turn on Devine Road connects to a network of logging roads providing various access to the Buckingham Graphite Property. These logging roads, are not maintained during the winter months.

The property is located in the Laurentian Hills, near the flattened area of the St Lawrence Platform. East of the Property, the region is characterized by the valley of Rivière-du Lièvre mainly used for agriculture and with elevation of about 140 m above sea level. Within the limits of the Buckingham Graphite Property, the topography becomes rugged with steep-sided hills reaching 325 m above sea level. The hydrography is dominated by small lakes and creeks draining into south flowing Rivière-du-Lièvre although the drainage may be partly disturbed by beaver dams, as observed on the south portion of the property.

Southern Québec is characterized by a fresh and humid continental climate. According to Environment Canada, the average mean annual temperature in the Gatineau area ranges in summer from 14° to 25° C while in winter the average temperature varies from -13° to -4° C. Typically, the land is free of snow from mid-April to late November. Access from private roads during the winter season would require contracting snow removal for automobile or machinery.

Within the Property, the land is mostly used for logging and hunting and a small recreational development is present in the west portion of the property, around Lac Vert. The property is well served by a network of public and private roads owing to its location in a developed area of southern Quebec. Local resources are available at nearby localities, notably Gatineau. Transportation and housing are available nearby and a local work force should be suitable to support any mining operations. The Outaouais Electrical substation is located 7 km from the property. Highway 50 run in an East West direction, 10 km south of the Property.

# **Item 6: History**

## 6.1 Prior Ownership

Over the years, parts of the Property were owned by several companies including Stratmin and Ressources Canspar inc in the eighties. The Buckingham Graphite Property was entirely owned by Cavan until April 2016 during which it consisted of two contiguous claim blocks, The East Claim block and the West Claim Block, totaling 28 CDC claims. The East Claim block (15 CDC claims) was acquired through an Amending agreement with the "Vendor" Ken Smith. The agreement to acquire a 100% interest in this claim block was subject to the issuance of 750,000 shares of Cavan Ventures (PR June 11, 2014). The West Claim Block (13CDC claim) was acquired by mapstaking in August 2013.

## 6.2 Regional History of graphite mining and geological mapping

The Buckingham and Lochaber Townships host several graphite deposits first described by Vennor (1878). Small scale production of disseminated flaky type graphite occurred from several nearby deposits from the 1860's to 1920. The maximum production was reached in1916, as a consequence of increasing demand of graphite for manufacturers during World War I with prices being 3 to 5 times higher to those of 1914. The Walker Mine, with the main adit located about 1 km southeast of the Property was mined sporadically from 1860 to 1906. The Walker Mine property extended to lot 21 of range IX (Spence 1920), therefore partly straddling the Buckingham Graphite Property.

The geology of the Buckingham/Gatineau region was first mapped in 1913-15 at the scale of 1 : 63 360 by the Geological Survey of Canada (Wilson 1920). Over the years, the Provincial Government of Québec conducted larger scale geological mapping, focusing on specific regions such as the Wakefield-Cascades area (Dupuy, 1989), Glen Almond (Papezik 1961) and the western half portion of NTS sheet 31G11 (Hébert 1988). However, no geological mapping covering the western portion of Buckingham Graphite Property (NTS sheet 31G12) took place since Wilson (1920). Thus, incomplete mapping of the Buckingham region has resulted in significant inconsistencies in the Property geology, as discussed in Section 7.2.

## Item 6.3 Historical Exploration work on Buckingham Graphite Property (1982-1987).

In 1982, a heliborne EM survey (Geonics EM-33 frequency-domain EM and Geometrics G-803 proton magnetometer) was flown over an area totaling 365 km<sup>2</sup> (DP83-05). The survey, contracted by the Provincial Government to "Les Relevés Géophysiques", covered the Buckingham region. Follow-up work including geological mapping and ground geophysical surveys (VLF-EM) was subsequently carried out over selected anomalies (Tremblay 1984). Several anomalies were identified over the Buckingham Graphite Property. Two parallel conductive zones trending NE-SW and extending over 1, 000 and 200 m in length were outlined in the eastern portion of the property. West of these conductors, a smaller but strong conductive zone of was also defined.

In 1984, this strong conductive zone (identified as anomaly 17), was selected for further investigation. Detailed geological mapping and a VLF ground survey were completed on a grid t covering the selected area. The geological map provided in the report reveals a marble unit that appears to crosscut a gabbroic intrusion and graphite mineralization (5% Cg at the contact between the marble and the gabbro (Tremblay 1984). The VLF survey was done on six north-south lines spaced by 100 m and each measuring approximately 500 m (Figure 5).

In 1986-1987, Stratmin staked this area and mandated Geomines to conduct a Max-Min survey. 16 line-km trending NW-SE were surveyed and 4 conductors were recognized with an additional one appearing at the northern end of the grid (Fortin 1987). Geomines recommended drilling this favorable target and extending the geophysical survey to the north (Fortin 1987, Tremblay and Cummings 1987)



Figure 5. Historical geophysical surveys and geological mapping in 1982-1987 (after Tremblay 1984)

# Item 6.4 Recent Exploration Work on the Buckingham Graphite Property (2013-2015)

## Item 6.4.1 Prospecting Campaign

Cavan Ventures commissioned Magnor Exploration to conduct exploration work on their East Claim Block. A short period of prospection in May 2013 was followed by a heliborne survey that covered the southern portion of Cavan's property. In the spring of 2014, a limited ground geophysics program covered two conductors previously identified in the heliborne survey, followed by trenching and channel sampling.

From May 14 to 21, 2013, a short prospecting campaign with the help of a beep mat targeted the two historical conductors in the south portion of the Claim Block. A total 40 samples including 11 channel samples were also assayed (Ouellet 2014). Best results were concentrated in the southwest portion of the1 km long historical airborne conductor with 6 grab and channel samples returning Cg content from 2.93 to 21.7%. Following these positive results, a short drilling program was recommended.

## Item 6.4.2 Geophysical surveys

In August 2013, Cavan Ventures Inc. commissioned a high-resolution heliborne magnetic (MAG) and timedomain electromagnetic (TDEM) survey to DD Geoscience to be completed in the southern portion of Buckingham Graphite Property. A total of 135 line-km was flown, with traverse lines at 50 m spacing, oriented N305°. The survey identified a total of 250 EM anomalies, including 7 strong and continuous anomalies that were considered to be highly prospective for graphite and/or sulphide mineralization (Figure 6). Several of these anomalies confirmed the historic conductors of the 1982 airborne survey while better defining their extent, magnitude and orientation. Some of these EM anomalies corresponded to magnetic anomalies, and were therefore interpreted to partly reflect the presence of sulphides, including pyrrhotite (Dubé 2013). The two easternmost anomalies confirmed the existence of the 1km long historic conductor that probably originate from similar conductive sources as they display comparable characteristics and strike. The anomalies are fairly continuous except for a local disruption and are roughly oriented 30-35° with a total extent over 1 000 m (Dubé 2013). These two zones are grouped and identified as the NNE conductor in this report.

Another conductive zone located some 300 to the west of the NNE conductor was also considered a highly favorable target. This conductor also overlaps a previously defined historic conductor although its strike is now interpreted to be at 65-70° instead of being parallel to the 1 km long conductor. This conductor is therefore referred as the ENE conductor. As opposed to the NNE conductor, this ENE conductor is not associated with magnetism and is therefore considered to be highly prospective for graphite (Dubé 2013).



Figure 6. Heliborne EM and DTEM survey of 2013 (after Dubé 2013)

In May 2015, Dubé & Desaulniers Geoscience performed a limited ground geophysical survey over the NE and ENE conductors. Due to budget constraints, the survey was limited to a 2.3 line km single traverse along the NE and ENE conductors. Two maps showing the interpreted results were provided, with no accompanying report (Ouellet 2015). Results of the PhiSpy survey indicated highly conductive zones scattered along the two conductors with the two largest zones being found at the SW end of the NE conductor, just north of a lake that is elongated along a similar direction. Also note the highly conductive zones for the ENE conductor that are offset to the east by a few tens of meters (Figure 7).

## Item 6.4.3 Trenching

Based on the preliminary data obtained from the PhiSpy survey and assay results from grab samples, Magnor Exploration carried out trenching and subsequent channel sampling (T1 to T5 and 22C) on May 23 and 24, 2014 at the southwest end of the NNE conductor (Figure 7). Two of these trenches, T1 and 22C, were sampled using a rock saw and a total of 59 channel samples were sent for assays (Ouellet 2015). The channel samples varied in length from 0.4 to 1.4 m, averaging 1 m and had widths of 11.5 cm. Due to limited budget and time, no geological mapping or QA/QC program were completed for this trenching program.

Trench T1 was oriented 100° and measured approximately 48 m in length and 2.5 m in width. 25 channel samples distributed along three distinct segments were collected. Each segment returned mineralized intersections with a best result of 8.2% Cg over 4.75 m, including 12.1% Cg over 1 m and 12.5% Cg over 3.5 m. (Figure 7).

Trench 22C was excavated on the top of a steep-sided hill, some 75 m NE of T1. It consisted of two perpendicular corridors: one shorter NE-SW corridor measuring 20.5 m in length, being cut at the southeast end of a longer corridor measuring 24 m and oriented NW-SE. 39 channel samples were collected and 35 of the 39 channel samples returned Cg contents above 8%. The NW-SW corridor yielded 21.6% Cg over 14.5 m and 16.8% Cg over 3.9 m (Figure 7). The mineralized zone remains open on the NW and SE sides (Ouellet 2015).



**Figure 7.** PhiSpy limited survey of 2014 with location of the sampled trenches (after Ouellet 2015). Histograms help to visualize graphite values.

Blue = < 5% Cg; Green = 5-10% Cg; Yellow = 10-15% Cg; Orange = 15-20% Cg; Red = >20% Cg.

## Item 6.4.4 Purity Test, April 2015.

In 2015, Cavan Ventures performed a bulk sampling for initial flotation testing of graphite. These tests were carried out by SGS Canada Inc. of Lakefield, as requested for the terms of agreement in an eventual joint venture with another junior exploration company (Caribou King Resources Ltd., Press Release of June 11, 2015). In April 2 and 3, 2015, about 20 kg of material was taken in trench 22C with a jackhammer at roughly 0.5 m in depth in order to minimize the amount of weathered material. The bulk sample was submitted to a simple flotation test, without process optimization or chemical treatment, such as addition of acid leach or alkaline roast.

The head grade obtained was 20.7% Cg and returned an overall combined flotation concentrate purity of 94.8% (Table 2). The results indicate 32% of the flakes are large (+65 mesh) to jumbo (+28 mesh) in size and the purity obtained in these large fractions ranges from 94.8 to 96.1%, which is equivalent or higher to that of the overall average obtained.

Product	W	eight	Assays, %	% Distribution
	g	%	C (t)	C (t)
+28 mesh	9.4	2.3	96.1	2.3
+35 mesh	12.5	3.0	95.9	3.1
+48 mesh	31.1	7.6	95.3	7.6
+65 mesh	78.8	19.1	94.8	19.1
+100 mesh	21.7	5.3	92.5	5.2
+150 mesh	30.7	7.5	92.8	7.3
+200 mesh	14.6	3.5	97.1	3.6
+270 mesh	19.2	4.7	97.1	4.8
+400 mesh	21.9	5.3	96.6	5.4
-400 mesh	172.2	41.8	94.2	41.6
Head (calc.)	412.2	100.0	94.7	100.0
Head (direct)			94.8	

**Table 2.** Flake size distribution of bulk sample from Trench 22C.

# **Item 7: Geological Setting**

The property is situated in the Central Metasedimentary Belt (CMB) of the Mesoproterozoic aged (1.6 Ga – 1.0 Ga) Grenville geological Province. The Grenville is recognised as a deeply exhumed Mesoproterozoic Himalayan-type collision orogenic belt that extends over thousands of kilometers and interpreted as a collage of gneissic terranes that were subjected to high-grade metamorphism ranging from upper amphibolites grade to granulite facies (Martignole and Friedman 1998, Corriveau and van Breemen 2000).

The southwest portion of the CMB is divided into two distinct domains, a marble –rich domain and a quartziterich domain, respectively exposed west and east of the Gatineau River (Figure 8). The property is located in the quartzite-rich domain, which consists of quartzite and quartz-rich rocks with horizons of metapelite, graphitic quartzo-feldspathic and biotite gneisses, marble and calc-silicate rocks. Monzonite and gabbro bodies cut across the gneisses. These two main rock types were already recognized by Wilson (1920) who distinguished the Grenville sedimentary Series and the Buckingham Igneous Series. The regional structural grain of the quartzite-rich domain trends northeast-southwest and is mostly subvertical (Corriveau and van Breemen 2000).

## Item 7.1 Geology of Buckingham region

Wilson (1920) mapped the Buckingham Township as being mostly covered by intrusive rocks (pyroxenesyenite, pegmatite diorite, gabbro, pyroxenite, peridotite) regrouped in the Buckingham Series with a lesser content of metamorphosed sedimentary rocks (gneiss, quartzites and crystalline marbles) included in the Grenville series.

Subsequent geological mapping focusing on the eastern side of the township covered by the 31G11 NTS sheet, rather described the Buckingham region as being mostly overlain by sedimentary rocks of the Grenville Supergroup with abundant paragneiss and quartzites and lesser amount of marbles and calc-silicate rocks (Hébert 1988). Although several intrusives of various composition (syenite, diorite, granite, pegmatite- granite sills, gabbro pyroxenite and peridotite) were observed, these rocks were of small extents and crosscut the sedimentary rocks. The whole region is characterized by a high-grade metamorphism (granulite facies) typical of the Grenville Geological Province, that resulted in partial melting of rocks, producing migmatites that can be observed locally. Finally, a swarm of diabase dykes mostly oriented E-W crosscut all the formations.

Paragneiss are usually well banded and are alternating with crystalline limestones (marbles), quartzite and amphibolites. They are observed in a variety of compositions i.e. quartzo-feldspathic gneiss, biotite gneiss, biotite-garnet gneiss, biotite-garnet-sillimanite gneiss and biotite-hornblende gneiss. Quartzite may also be observed in larger beds, up to 100 m in width, which usually form the crests of ridges. Quartzite is generally impure and can be distinguished in three varieties, i.e. feldspath-bearing quartzite of white to pinkish color, a biotite-bearing quartzite and a massive quartzite generally blueish-gray in color. Marble is described as generally forming thin beds of less than 1 m within gneiss and quartzites. Larger bands up to 150 m can be found locally.



Figure 8. Grenville Geological Province in the SW portion of Québec (after Corriveau and van Breemen 2000)

Marble is seldom pure and usually contain < 15 % of accessory minerals, thus forming a variety of rock types such as diopside marble, phlogopite marble, graphite marble and serpentine marble. The marbles may also contain abundant fragments of surrounding rocks including paragneiss and quartzite. Marble outcrops are seldom observed as it is a soft rock that usually occurs in swampy, topographic lows. However, limited prospecting and mapping within and nearby the Buckingham Graphite Property revealed several marble occurrences that are not shown on the official geological map. For instance, several marble outcrops are exposed for about 200 m on each side of the logging road leading to the Buckingham Graphite Property, about 1 to 1.5 km from its southern boundary (Figure 9)



**Figure 9**. Marble outcrop, 1 km south of the limit of the Property. Enclaves of nearby geological units (paragneiss, quartzite, graphite-bearing pegmatite and black biotite) are observed within the marble unit.

Calc-silicate rocks outcrop locally and are usually in contact with marble units. They resulted from regional metamorphism or contact metamorphism and metasomatism of carbonated rocks and are recognized by the presence of specific minerals such as scapolite, tremolite, apatite, diopside, wollastonite and/or sphene. This rock type is generally well banded and appears as thin beds <1 m in width. Dupuy (1989) describes the calc-silicate rocks of the Wakefield area as medium to very coarse-grained rocks, which display great variations in terms of size and proportions of its minerals. The identification of such rock type may be arbitrary as it is distinguished from impure marble or carbonated rocks by its larger proportion of specific minerals. Amphibolite may also occur in bands within the paragneiss and can be intercalated with quartzite locally reaching 100 m in width. Finally, partial melting of paragneiss resulted in migmatites, described as a medium to coarse-grained, quartzo-feldspathic rocks that can be observed locally (Hébert 1988).

## Item 7.2 Geology of Buckingham Graphite Property

Buckingham Graphite Property encompasses NTS maps 31G11 and 31G12, which were mapped at different times by several geologists. The east portion of the Buckingham Graphite Property was mapped by Hébert (1987), as part of the geological mapping of the western half of 31G11 NTS sheet. As for 31G12 NTS map, the geology is compiled in Hébert (1986) but recent geological mapping was mostly limited to the Wakefield area, some 30 km west of the property (Dupuy 1989), therefore leaving most of the Buckingham Graphite Property (the portion over 31G12 NTS map) unmapped since 1920, except for a very limited portion in its NE corner. This specific area was part of a 56 km<sup>2</sup> area that was mapped at a larger scale of 1 : 12 000 (Papezik 1961). Therefore, as a result of these successive geological mapping programs, there are significant discrepancies and lack of uniformity between the geological units over the Buckingham Graphite Property (Figure 10).

Recent geological observations from outcrops and drill core, bring some precisions on the geology of the southeastern portion of the Buckingham Graphite Property: a few marble occurrences were noted near or at the ground surface, notably nearby Trench T1 (Figures 11a and b) and along the drilling road (Figure 12). These marble occurrences, in addition to those noted on the historic map (Tremblay 1984) and along the logging road south of the Property, indicate the marble units are more prevalent than what is shown on the official geological map.

Paragneisses remain the most commonly observed units, although quartzites outcrops are prevalent over the ridge located between the two linear conductors (Figure 12). In outcrops, paragneisses often have a rusty appearance that probably results from the weathering of sulphides. Several types were recognized in the drill core including quartzo-feldspathic paragneiss, a phlogopite paragneiss and a phlogopite-garnet paragneiss that usually contains graphite mineralization. Pure quartzite, mostly blue in color can be observed at the surface of the Property. In drill cores, white or light gray-colored quartzites were also logged, some of which containing more than 10% accessory minerals such as chlorite, phlogopite, feldspar, hornblende and garnet.

Marble is medium-grained, white to medium gray in color on fresh surface. It easily crumbles due to surface weathering, turning into a brown beige color. It is composed of calcite with a wide range of impurities (apatite, diopside, tremolite) and grades to a calc-silicate rocks when high amounts of impurities and/or silicification is observed. Marble is associated with graphite mineralization and may contain up to 25% of graphite. The presence of enclaves and the thin linear bed of marble that is shown to crosscut a gabbroic intrusive (Tremblay 1984) suggest the marble units were emplaced during a late event. Papezik (1961) also evokes this possibility in his description of marble or "crystalline limestone": "Crystalline limestone is also common as thin, discontinuous lenses and narrow bands filling local fractures".



Figure 10. Geology of Buckingham Graphite Property (after Wilson 1920, Hébert 1986 and Hébert 1988



Figure 11 a) to f): Photographs of lithologies and other geological features noted on the Property. 12a) Marble block that originally rested on top of the west end of Trench T1. Enclaves are observed as well as the typical yellow-brown crumbly texture; 12b) Marble beds with 2-3% graphite (visual estimate) above the maximum graphite content obtained in Trench T1; 12c) Porphyroblastic calc-silicate rock with clusters of dark green tabular diopside and brownish losangic sphene within a finer grained matrix of calcite; 12d) Highly deformed and metamorphosed rock (mylonite) showing porphyroblasts of feldspar and quartz augen in a finely foliated matrix of quartz/feldspar/phlogopite. Epidote is concentrated in some fine bands and indicates hydrothermal alteration (BH16-10); 12e) Evidence of faulting with slickenside on a block lying at the bottom of the creek 12f) Graphite veins, 1 to 3 cm wide, in a pegmatitic rock near the creek.



Figure 12. Geological observations in the southeast portion of the Property

In the drill core, impure or silicified marbles and carbonated rock with specific minerals such as diopside, sphene apatite or tremolite were identified as calc-silicate rocks. Several types were noted:

- 1) calc-silicate rocks showing a porphyroblastic texture with very large size (up to 2-4 cm) tabular dark green diopside forming clusters with brownish losangic sphene, (Figure 11c);
- 2) a greenish gray carbonated rock, much less reactive to HCl than marble. This rock is devoid of graphite mineralization but may contain 5-10% sulphides (mostly pyrrhotite and pyrite). It is observed at the contact with graphitic marble (see BH16-02 and BH16-14 DDHs) and may contain up to 25-30% of light yellowish vitreous minerals (diopside?)
- 3) a white carbonated rock dotted with 1-2 mm size dark green mineral (diopside) which could represent 20-25% of the rock. Traces of, yellow, orange or reddish rounded minerals (chondrodite, humite, vesuvianite?) are also commonly observed.

Minor amounts of intrusive rocks, such as pyroxenite intersected at the end of hole BH16-02 alternating with bands of biotite-gneiss. Diabase dykes were found in several holes and were generally < 1 m in width, except in holes BH16-06 and BH16-05 where the diabase reached 40 m and 70 m in apparent thickness, respectively. Local occurrences of migmatite or diatexite were noted on the property, more specifically close to the creek some 200 m west of the main conductor, Ductile zones were logged in several sections of the drill core (Figure 11d) and slickensides were noted on boulders in the middle of the creek (Figures 11e and 12) and on an outcrop along the drill road. Tens of meter away from these deformation zones, graphite veins were found on the eastern side of the creek, extending for about 80 m in length. The veins are located in strongly jointed and fractured outcrops of quartzo-feldspathic composition. They vary in width from a few mm up to 4 cm and are distributed in a linear or convoluted manner (Figure 11f).

## **Item 7.2 Mineralization**

## 7.2.1 Graphite Mineralization at Buckingham Graphite Property

Different styles of graphite mineralization related to the types of hosting rocks and the distribution of graphite content were recognized. Most of the significant graphite mineralization (Cg >0.5d wt. %) was found in marble, garnet- bearing paragneiss and quartzite. In the following discussion, mineralized intersections with graphite contents > 5 wt.% are considered to be high grade whereas mineralized intersections with graphite contents ranging from 1.5 to 5 wt. % are considered to be low grade.

Mineralized intercepts usually occur in marble and in surrounding paragneiss. Higher graphite contents are commonly found within a marble that is strongly reactive to HCl. A sharp increase or decrease in graphite content is observed at the contact of rock units, which shows a lithological control of the graphite mineralization. The graphite content is highly variable within the mineralized marble and some very high-grade short intercepts may occur either in the middle of this unit or near the contact with others (Figure 13a). For example, in hole BH15-01, an intercept of 17.7 wt. % Cg over 8 m occurs in the central portion of a mineralized marble unit. The marble is typically medium-grained and granoblastic although some minor porphyroblastic occurrence, such as cm-size apatite crystals also occur (BH15-02). The content of minerals other than calcite and graphite is generally <5-10% and includes 2-4% sulphides (pyrrhotite/pyrite. Graphite flake size is also highly variable, ranging from amorphous to 2-3 mm.

In some cases, graphitic mineralized intersections are exclusively contained in a specific paragneiss that is easily distinguished by its medium to coarse grained texture and alternating bands of white quartz-feldspar and purplish-brown phlogopite and garnet. The longest mineralized intercept of this type was found in BH16-01 yielding2.22 % Cg over 32 m. Garnet is pink and can reach 30-35% in content (Figure 13b). A greater proportion of large graphite flakes (1-3 mm) occur in this unit, as opposed to flakes observed in marble. However, graphite grades are generally lower (1.5-4%) than those observed in the marble units.

Finally, short mineralized intercepts with graphite contents higher than 5% are found at the contact between marble and paragneiss. These intercepts are observed for a few meters and are characterized by sharp variation in graphite content (see holes BH15-03, BH15-05, BH16-04 and BH16-10). For example, in hole BH16-10, the graphite content increase from 0.5 to 2.3% from 80 to 88 m near the contact with maximum values of 8.15, 5.49 and 7.3%Cg corresponding to the paragneiss/marble contact. This is reflected in the drill core, by a fine-grained rock typically dark green- coloured rock having a gray shiny luster typical of graphite mineralization. (Figure 13c). This transition of marble/paragneiss units containing graphite mineralization may reach a considerable length, such as in holes BH15-03 (112 m) and BH15-05 (88 m) and BH15-10 (39 m). In some long intercepts, local occurrences of vein type graphite hosted in pegmatites were logged (BH15-01, from 203 to 209 m).

Pyrite and pyrrhotite are the main sulphide phases commonly observed. They are disseminated, in stringers or in chunks within all identified units. Some calc-silicate layers may contain higher disseminated pyrrhotite/pyrite (5-10%) content. These layers are generally devoid of graphite mineralization. Minor amounts of chalcopyrite were also observed, notably in a small section of hole BH16-06 (from 75.5 to 76.5 m). Within this interval, chalcopyrite and a greenish/gray mineral (malachite?) were observed in quartzite, along with large graphite flakes (from traces to 2%), pink garnet and a black needle shape mineral (tourmaline?).



Figure 13a) Highly mineralized marble (BH16-06)



Figure 13b) Mineralized garnet-gneiss (BH16-01)



Figure 13c) Mineralized contact marble / paragneiss (BH16-04).

## 7.2.1 Regional Mineralization

The Outaouais region is known for its past mining exploitation, with several historical feldspar, quartz, micas apatite and graphite mines of operating during the late 1800's. Most of these mines involved small operations and there is no current extraction except for the Othmer Feldspar Mine located 8 km from the Property, in the Derry Township that operates intermittently.

The graphite extracted from small mines located in the Buckingham and Lochaber Townships was of the flaky type but some production of vein type graphite is also documented, notably west of the adit of the Walker Mine, and at Pugh & Weart Mine, respectively located about 1 km SE and 4 km SW of the property (Spence 1920, Simandl 1989). At the Pugh & Weart Mine, graphite was mined from a surface lump vein f about 65 cm wide that reaching 21 m in depth. At the Walker Mine, graphite flakes grade up to 25 wt. % Cg, whereas other nearby mines (Peerless and Bell Graphite Mine) had historical grades ranging from 6 to 8 wt. % (Spence 1920). Calcsilicate rocks such as diopsidite are also associated with graphite mineralisation at the Walker Mine (Simandl 1989).

In addition to graphitic paragneiss, granitic pegmatites dykes were regarded as economically important rocks since potassium feldspar, sodium feldspar and quartz were mined from these bodies. Rare earths bearing mineral such as euxenite (Yttrium bearing oxide) and allanite (La, Ce) were also observed in some granitic pegmatites as accessory minerals at the Derry and Back Mines, situated 5 km NE of the Property (Rose, 1959). Silica was usually mined as a by-product of feldspar mines. The Cameron (quartz-feldspar) Mine, located 100 m west of the property produced 34 000 t of feldspar from 1926-1946 (MERN website).

North and west of the Buckingham Graphite Property, a number of apatite and micas (phlogopite) occurrences were mined as early as 1867. In 1877, Vennor mentions a "belt of apatite", 1-2 km north of Buckingham graphite property. The area produced considerable amounts of apatite for its phosphate content; the largest producer being the Emerald mine, located some 2 km north of the Property (Papezik1961). Apatite and/or phlogopite constitute veins or irregular lenses in salmon-pink calcite accompanied by minerals typical of calc-silicate rocks. Deposits of these minerals are formed by metasomatism of carbonated rocks (MERN website).

# **Item 8: Deposit Types**

There are two types of natural graphite: crystalline (flake or lump graphite) or microcrystalline. Microcrystalline is known commercially as amorphous graphite and is the product of contact metamorphism of coal. Vein graphite and crystalline flake graphite deposits form in highly metamorphosed terrains. Economically significant concentrations of flake graphite are commonly hosted by porphyroblastic and granoblastic marbles, paragneiss, and quartzites. Alumina-rich paragneisses and marbles in upper amphibolite or granulite-grade metamorphic terranes are the most favorable host rocks (Simandl and Kenan, 1997). Depending on market conditions, large deposits having high proportions of easily liberated coarse flakes graphite, may become economic with grades as low as 4% or even less. This is the case of the Bissett Creek deposit of Northern Graphite, which reported an economically viable deposit showing a grade of 1.74 wt. % Cg, using a 1.02 wt. % Cg cutoff (Leduc *et. al* 2013).

The formation of low grade crystalline flake deposits is well established and is explained by a two-stage process: carbonization during diagenesis and graphitization occurring during subsequent burial and metamorphism. Carbonization is a process involving the carbonaceous matter dispersed in the sediments converted into carbon-rich components, while oil and natural gas are being released. The graphitization stage takes place during regional or contact metamorphism during which a carbon-enriched component evolves into a well-ordered graphite crystal. The deposits are typically stratabound and consist of individual graphitic beds or lenses up to 30 m thick and 2 km length.

In contrast, the genesis of enrichment zones within crystalline flake deposits and the origin of graphite veins are still widely debated and remain elusive. One explanation proposed by Simandl (2015) involves either: 1) mixing of fluids produced by decarbonation reactions in marbles and dehydration reactions in paragneiss or fluids derived from pegmatitic rocks and other minor plutonic bodies or, 2) cooling of C-H-O-rich fluids. Vein-type deposits often display cavities and breccia zones. The formation of graphite involves the precipitation of solid carbon from fluids containing one or more carbonic species such as CO2 and CH4 (Rodas *et al.* 2000).

Graphite deposits can be classified into five major deposit types:

- 1) disseminated flake graphite in silica-rich metasediments;
- 2) disseminated flake graphite in marble;
- 3) metamorphosed coal and carbonaceous sediments;
- 4) veins and
- 5) contact metasomatic or hydrothermal deposits in metamorphosed calcareous sediments of marble.

Categories 1), 2) are related to flake-type graphite, while categories 3 and 4 pertain to amorphous and vein-type graphite. Flake-type or amorphous graphite occurs in category 5 (Garland 1987). Categories 2 and 5 are often related and flake graphite can be associated with lenses and pods in an impure skarn-type marble and display characteristics intermediate between flake-type and vein-type of graphite.

The graphite mineralization of the Buckingham graphite property is classified as a mixture of disseminated flake graphite in marble (category 2) and contact metasomatic and/or hydrothermal mineralization (category 5). According to Garland (1987), the graphite content in marble-type deposit is typically

<1 wt. %. However, contact metasomatic deposits, are associated with much higher grades but smaller tonnage. Variable amounts of graphite, reaching up to 25 wt. % Cg in marble are associated with porphyroblastic marble instead of granoblastic marble, the latter containing low concentrations (1-3% Cg) (Simandl,2015). One example is the Asbury graphite mine, located about 50 km to the north, and where mineralization is hosted in porphyroblastic marble containing clinopyroxene and minor amounts (less than 3 wt. % of quartz, pyrite, garnet, titanite, magnetite, chlorite and traces of chalcopyrite, clinozoisite and prehnite. Simandl (2015) also noted blue quartzite separates porphyroblastic graphite-rich marble from pale grey or white quartzite and suggested the presence of blue quartzite is an indicator of proximity to high grade graphite mineralization.

Graphite mineralization on the Buckingham property was mostly developed within marble units in variable contents and flake sizes. Numerous intersections of graphite mineralization over 5 wt. % that include a few meters with higher graphite content (20-25 wt. %) were recorded. Lower grade graphite mineralization is also present within a garnet gneiss and, high contents of graphite may also be found over short intervals at the contact of marble/gneiss. The presence of graphite veins and calc-silicate rocks corroborates a metasomatic or replacement process that remobilized and concentrated the graphite. It is also possible the formation of graphite could originate primarily from carbonaceous material already present in the sediments (diagenetic process) but the enrichment of graphite at the contact between gneiss and marble must involve other mechanisms such as metasomatism, remobilization or hydrothermal processes (precipitation of carbon from circulating fluids).

The Buckingham conductive zones associated with the graphite mineralization are linear. The 1.3 k long NNEoriented conductor runs parallel to a linear creek flowing into a lake of similar orientation. Evidence of faulting observed in nearby outcrops show a similar NNE strike (N033°) and a sub-vertical dip and could therefore indicate the presence of a deformation zone, which we also observed in some drillholes (see BH16-10). The deformation zone is a possible structure that could exert control on the graphite mineralization favoring the circulation of fluids. Similarly, the graphite mineralization for the Lochaber Graphite Deposit of Great Lakes Graphite, some 14 km east of the Property is also associated with a NE-oriented deformation zone (Bernier *et al.* 2015). NE of the property, Papezik (1961) described the marble as thin lenses in gneiss and tabular masses filling fractures in more competent rocks. Therefore, the deposition of marble could have occurred along the length of a deformation zone reflected in the linear and NE- trending conductor.

In SE Ontario, several graphitic occurrences are located within the Frontenac Axis, a subdivision of the CMB of Grenville province. Graphite-bearing rocks occur within 5km of a major NE-trending structure transecting the Frontenac Axis (Rideau Lake fault) and forming a shear zone at least 500 m-wide. All graphitic occurrences at the Buckingham graphite property are hosted in crystalline marble interlayered with paragneiss and intruded by pegmatite bodies. Most units underwent complex folding and faulting producing highly variable thicknesses and attitudes of the graphitic zones. At a regional scale (Figure 1), the Lac des Iles and Asbury deposits, respectively located at 85 and 50 km north of the property, are near the north-south-oriented Rivière du Lièvre, flowing 4 km east of the Property. Although no North -South lineament or other structural features are associated with this River, the spatial association could be important.

#### Effective Exploration methods for graphite mineralization

Ground-based electromagnetic (VLF during the initial exploration stage, horizontal or vertical loop in the later stages) and resistivity surveys are most appropriate to locate large graphite veins. Ground TDEM (Time Domain EM system) are well suited for detection of shallow conductors. The method enable real time display of TDEM profiles, enabling on the spot anomaly detection. Shallow anomalies can be dug out and sampled simultaneously. A ground-based TDEM system can reach deeper conductors (from 15 to 20 m in depth) and records full TDEM decay curves which can be analyzed to retrieve information about the conductance and geometry of conductors. Ground-based TDEM fills the gap between powerful deep penetration TDEM systems and very small size EM devices (Beep mat) that penetrate no deeper than 3 m in depth.

Metasedimentary rocks of upper amphibolites or granulite facies represent the best exploration targets since the overall quality of graphite flake increases with the intensity of regional metamorphism. Therefore, in a contact metasomatic or hydrothermal graphite deposit, the following characteristics should be considered favorable:

- The presence of a major fault, high regional metamorphic grade, complex structure, igneous intrusions may have influenced the formation and/or concentration of graphite. For the Buckingham graphite deposit, a NNE and subvertical deformation zones seems to be associated with the mineralization;
- 2) The high ductility of marble, particularly graphitic marbles may result in extremely irregular volumes and attitudes for a potential graphite deposit and may necessitate a detailed exploration program.

# **Item 9: Exploration**

During the fall of 2015, when a first drilling phase was being completed on the property, limited prospecting led to the discovery of vein type graphite with grab samples being collected. A ground-based geophysical survey was completed during the fall of 2016, in order to assist the second drilling program.

# 9.1 Prospecting work (2015)

In December 2015, a total of 19 grab samples were collected along the full length of the graphite vein zone near a creek. and at the southwest end of the NE-oriented conductor being drilled (Figure 14). The samples were sent for assays at SGS Lakefield Laboratory and 13 samples provided graphite values ranging from 12.2% Cg to 68% Cg from the vein type occurrence and from 13.3 Cg to 28.6% Cg from the drilled area. A series of 5 grab samples were collected roughly along the trace of Boreholes BH15-03 and -04 returning high Cg contents, ranging from 20.1 wt. % Cg to 28.6 wt. % Cg (Table 3). Due to the small number of this sampling program, no QA/QA (blanks or duplicates) was carried out.

Sample #	area	Mineralization type	Easting	Northing*	Cg wt. %
36566	Creek	disseminated flakes	460612	5055065	14.3
36568	Creek	disseminated flakes	460605	5055041	12.2
36569	Creek	lump vein	460603	5055017	36
36570	Creek	lump vein	460602	5055014	68
36571	Creek	lump vein	460597	5054988	8.82
01501	Drilled zone	disseminated flakes	460586	5054897	13.3
01502	Drilled zone	disseminated flakes	460483	5054641	17.1
01505	Drilled zone along ddh15- 03	disseminated flakes	460474	5054516	20.1
01506	Drilled zone along ddh15- 03	disseminated flakes	460461	5054528	21.7
01507	Drilled zone along ddh15- 03	disseminated flakes	460463	5054533	28.6
01508	01508 Drilled zone disseminated flakes		460541	5054540	18.5
01509	Drilled zone along ddh15- 03	disseminated flakes	460446	5054554	22.6
01510	Drilled zone along ddh15- 03	disseminated flakes	460454	5054556	26.4

#### Table 3. Grab samples from the graphite vein and drilling areas

\*UTM Coordinates (Nad83, Zone 18)



Figure 14. Locations of grab samples (2015) with respective percentage of graphite content

## 9.1 Ground-based Geophysical Survey 2016

Ashburton commissioned DDG (Dynamic Discoveries Geoscience) to conduct a PhiSpy ground TDEM survey to cover the area of two linear conductors previously defined with an airborne TDEM survey completed in 2013 (Dubé 2013) in the NE portion of the Buckingham Property. The survey was carried out from November 24<sup>th</sup> to 28<sup>th</sup>, 2016.

The equipment used is the PhisSpy system developed by Dynamic Discovery Geoscience in partnership with Xogenus, in Ottawa. The system is powered by light weight batteries, and consists of a horizontal transmitting loop of 44" x 7", with a horizontal (co-axial/coplanar) small size receiver loop in the centre recording the Z component of the EM field. The system is relatively lightweight and store the location with a coupled BPS system that enables its use in a sparsely- forested area. The survey grid was oriented N125 ° with lines spaced every 50 m perpendicular to the dominant strike of the airborne anomalies, with a total of 36.3 km surveyed. 41 PhiSpy conductors were identified.

Based on the strength, continuity over several lines and apparent width of the PhiSpy anomaly, a priority number was assigned to each PhiSpy axis. 24 of the 41 conductors were considered first (13) and second (11) priority to). Each anomaly forms part of a cluster of anomalies regrouped and identified from "A" to "K" (Figure 15).

Groups "C" and "I", respectively located at the SW and NE end of the 1.5 km long conductor were considered of the highest priority. Group C includes anomalies with the widest apparent thickness, significant amplitude and longitudinal extension. Group "I" consists of strong, wide and continuous anomalies (Dubé 2016).

Group "A", located above the 300 m long ENE conductor defines a single conductive horizon having significant width and strength, although some discontinuities were observed. Nevertheless, it was also considered as a prime exploration target (Dubé 2016).



Figure 15. Ground PhiSpy survey and conductive zones, taken from Dubé (2016)

# **Item 10: Drilling**

A first drilling program, carried out between November 27, 2015 and December 22, 2015, consisted of five holes for a total meterage of 1,033 m. Following the positive results of the first phase, 14 additional holes (2,749.1 m) were drilled in two phases, from July 20 until September 15, 2016 and from November 27 to December 23, 2016. During all 3 phases, the hired contractor was Northern Drilling of Timmins, Ontario and the drill holes were of NQ size. The first drilling program was supervised by geologist Casey Lewis whereas the planning, execution and monitoring of Ashburton's second and third drilling phases of 2016 were conducted under the supervision of the author (MSc, geo) and Michel Boily (PhD, geo, Director of Ashburton). The author also supervised the drilling program including the splitting and sampling of the core material.

## **10.1 Drilling Procedures**

The geologist located each drill hole using a hand-held GPS for the coordinates and a compass for the orientation of the holes. No deviation was measured by the driller and no survey was made to measure precisely the elevation of each drill hole. Drill holes were individually and sequentially marked with black felt pen on wood stakes. Once the hole was completed, the geologist took a GPS reading of the casing location.

The rig was operated on 12-hour daily shifts a with a team of two drillers. A technician was assisting the geologist on a part time basis during all three phases and one driller was in charge of transporting the core box to the logging facilities which consisted of a Tempo shelter for phases 1 and 2. During phase 3, the last 4 holes were logged in a cottage at Devine Lake and were stored nearby.

Upon reception of the core boxes, the footage marked by the drillers was checked and completed for each meter. Once the logging was completed, a photo of each core box was taken and an aluminium tag was placed on the core box to properly identify the hole and box numbers and the corresponding depth interval. The geologist selected the core interval to be sampled and inserted in the core box two water-resistant tags per sample y. One tag was placed with the sample in a plastic bag and one tag was stapled to the core box, at the appropriate interval. Except for a few cases, the usual length for one core samples was 1 m. During the second and third phases, one additional meter was sampled at the beginning and the end of each mineralized intercept in order to constrain the limits of the graphitic interval for future resource estimate.

## 10.2 2015 Diamond drilling Program

The purpose of this first phase was to test the SW end of the NNE conductor, where strong conductive areas were previously defined by the limited PhiSpy survey of 2014. Five holes were distributed along a section line running along the conductor and were spaced at every 100 m, except for holes BH15-03 and BH15-04 which were collared at the same location (Figure 16). The holes were oriented perpendicular to the conductor with a NW dip ranging from 45-50°, except for BH15-04 (70°). The coordinates, lengths and number of assays for each hole are listed in Table 4. Mineralized intercepts were selected for assays on a visual basis, although further examination of the drill core has revealed some minor mineralized sections that were not entirely assayed. A total of 531 samples were sent for assays for this first phase. Most significant mineralized intersections are summarized in Table 5.



Figure 16. Location of drillholes (2015-2016)

#### **Table 4**. Characteristics of Drill holes of the first Phase (2015)

					Sample	Total			
Drillhole	Easting*	Northing*	Azimut	Dip	#	depth (m)			
BH15-01	460535	5054608	310°	50°	116	209			
BH15-02	460573	5054701	320°	45°	32	200			
BH15-03	460499	5054487	310°	50°	172	224			
BH15-04	460499	5054487	310°	70°	103	200			
BH15-05	460617	5054750	302°	45°	108	200			
total 2015	total 2015 531 1033								
*UTM Coordin	nates (Nad83,	Zone 18)							

This first drilling program returned several intersections ranging in width from 11.3 to 112 m with respective content of 1.81 wt. % Cg to 4.07 wt. % Cg. Borehole BH15-03 located at the SW extremity of the conductor returned the longest intersection of 112 m at 4.07 wt. % Cg and BH15-05 located some 300 m further to the NNE, returned 88 m at 3.29 wt. % Cg. These mineralized intervals included several short intersections of higher Cg average content (such as 11.2 wt. % Cg over 7 m in BH15-03 and 8.36 wt. % Cg over 28.8 m in BH15-01). Most of the mineralized intercepts, specifically the high-grade intercepts, are hosted in marble, except for the deepest intersection of BH15-02 (2.86 wt. % Cg over 12.3 m), that was entirely contained in paragneiss. Hole BH15-03 ended in mineralization at 224 m.

Hole ID	From (m)	To (m)	Length (m)*	Cg (wt.%)	Hosting Rock	
BH15-01	3.7	15.0	11.3	1.81	Marble	
	70.0	106.0	36.0	2.51	Marble, gneiss	
including	73.0	85.7	12.7	4.16	Marble	
	175.0	203.8	28.8	8.36	Marble	
including	185.0	193.0	8.0	17.70	Marble	
BH15-02	162.0	174.0	12.0	2.07	Phlogopite garnet gneiss, quartzite	
	187.7	200.0	12.3	2.86	Gneiss	
BH15-03	30.0	54.0	24.0	3.05	Marble	
including	46.0	52.0	6.0	6.63	Marble	
	112.0	224.0	112.0**	4.07	Marble, gneiss	
including	166.0	173.0	7.0	11.20	Marble	
including	198.0	203.0	5.0	8.45	Marble	
BH15-04	51.0	67.0	16.0	11.90	Marble, gneiss	
BH15-05	68.0	81.0	13.0	2.43	Phlogopite and garnet gneiss	
	109.0	197.0	88.0*	3.29	Marble, gneiss	
including	144	160	16	7.34	Marble	

**Table 5**: Best intersections from drilling phase 1 (2015)

\*the mineralized lengths do not represent true thickness as the attitude of the marble units are not defined at this time.

\*\*the intercept was not totally assayed: there are no values from 162-169.4 m and 174.5-179 m

#### 10.3 2016 Diamond drilling Program

The objective of the second and third drilling phases was to test the NNE-oriented conductor further to the NE and to investigate the 300 m long, ENE-oriented conductor. Seven holes, spaced by approximately 100 m, were distributed for 500 m along the NNE-oriented conductor. The presence of swamps, steep sided hills or streams constrained the location of some holes. An additional drillhole (BH16-10) was emplaced as an infill between holes BH15-02 and BH15-05. Four other holes; BH16-06, -07, -09 and -12, explored the ENE-oriented conductor and hole BH16-13 tested a small conductive anomaly defined by the 2016 PhiSpy survey. The UTM coordinates, depth and number of assays for each hole are listed in Table 6. Mineralized intercepts were selected for assaying on a visual basis, and a total of 1164 samples were sent to the SGS Lakefield laboratory.

Drillholo	Facting*	Northing*	Azimut	Din	# Samplos	Total
Drinnole	Easting	Norunng	Azimut	DIP	Samples	ueptii (iii)
Phase 2:	2016				400	
BH16-01	460688	5054841	318°	45°	123	200
BH16-02	460727	5054891	318°	45°	123	199
BH16-03	460726	5054890	356°	45°	120	200
BH16-04	460913	5055258	315°	45°	192	200
BH16-05	460852	5055336	0°	45°	76	200
BH16-06	460361	5055020	326°	45°	121	199
BH16-07	460284	5054968	324°	45°	40	199
BH16-08	460762	5055173	164°	45°	128	200
BH16-09	460327	5054993	326°	45°	0	141.7
BH16-10	460554	5054650	315°	45°	149	199
subtotal					1072	1937.7
Phase 3:	2016					
BH16-11	460821	5054934	318°	45°	16	223.4
BH16-12	460284	5054968	138°	45°	12	181.9
BH16-13	460434	5055097	105°	45°	40	217.9
BH16-14	460850	5055196	15°	45°	24	188.2
subtotal					92	811.4
total 2016					1164	2749.1

**Table 6.** Characteristics of Drill holes of the second and third phases (2016)

\*UTM Coordinates (Nad83, Zone 18)

Best intersections from the 2016drilling program returned average graphite content ranging from 1.4 to 5.18 wt/% Cg, over respective intervals of 5 to 72 m. Boreholes drilled along the NNE conductor returned mineralized intersections summarized in Table 7. Mineralized intercepts mostly occurring in garnet-bearing paragneiss (e.g.drill holes BH16-01 and BH16-02) were collared 100 and 200 m further to the NE of hole BH15-05 (Figure 16). These intercepts display average Cg contents ranging from 2.22 to 3.24 wt. % and can attain 32 m in length. At the contact with marble or deformed zones, the graphite content can grow significantly higher, with a maximum of 8.46% Cg assayed from112 to 113 m in hole BH16-01 at the contact between a thin mineralized marble unit and garnet-bearing paragneiss.

More mineralized intervals entirely included in marble were obtained from the 2016 drilling programs. For instance, drill hole BH16-03 yielded 6.28 wt. % Cg over 24 m, from 176 to 200 m. This intercept included a high mineralized section of 17.90% Cg over 7 m and presented the highest graphite concentration assayed on the Buckingham Graphite property (25.7 wt. % Cg from 180 to 181 m).

Drill hole BH1-06 emplaced near the ENE- oriented conductor returned the best intercept of 2016 with 5.18 wt. % Cg over 72 m, all in marble and included a higher interval of 12.52 wt. % Cg over 14m from 11 to 25 m. However subsequent efforts to define the extent of the mineralization by drilling of three boreholes (BH-07, 09 and 12) were unsuccessful so far although hole BH16-12, located 230 m from hole BH16-06 did return a significant interval of 6.5 m at 3.55 wt. % Cg near the surface. BH16-01 and BH16-02 ended in mineralization

There is not yet sufficient information provided by the 19 collared drill holes along the NNE conductor to establish the true widths of the mineral intercepts, since the orientation of mineralized marble beds are not known at this time.

Hole ID	From (m)	To (m)	Length (m)	Cg (wt %)	Hosting Rock	
BH16-01	108	129	21	2.48	Marble, garnet gneiss	
	146	177	32	2.22	Gneiss, marble	
	191	200	9	2.62	Marble	
BH16-02	69	74	5	4.45	Marble	
	124	149	25	3.24	Gneiss, marble	
BH16-03	87	101	14	4.33	Marble	
	176	200	24	6.28	Marble, gneiss	
including	177	184	7	17.90		
BH16-04	41	49	8	2.75	Marble, gneiss	
	94	122	28	3.88	Gneiss, ductile zone and marble	
including	106	116	10	5.75	Ductile zone and marble	
BH16-05	29	34	5	1.63	Marble	
	165	170	5	1.4	Marble	
BH16-06	2	72	70	5.18	Quartzite, marble, gneiss	
including	11	25	14	12.52	Marble	
BH16-08	91	101	10	4.42	Marble	
	113	130	18	3.20	Marble	
	148	184	36	3.34	Marble	
BH16-10	48	87	39	2.66	Marble, gneiss	
including	80	87	7	4.62	Gneiss	
	104	114	10	3.98	Gneiss, marble	
BH16-12	4.5	11	6.5	3.55	Gneiss, calc-silicate rocks	
BH16-14	111	122	11	3.54	Calc silicate rocks, gneiss	

**Table 7.** Best intersections from drilling phase 2 and 3, 2016

\*the mineralized lengths do not represent true thickness as the attitude of marble units are not defined at this time.

# Item 11: Sample Preparation, Analyses and Security

Grab and drill core samples were sent to SGS Canada Inc., an ISO/CEI 17025:2005 accredited laboratory following the Standards Council of Canada evaluating a number of specific procedures, including the assay methods used in this project. Although no external analytical control measures were designed for the drilling programs of 2015, a QA/QC program was implemented for the 2016 drilling programs to ensure the validity of the chemical assays. The author has not visited the laboratory to see the operation firsthand, nor is he familiar with the general historical performance of the facilities. There is no relation between the SGS Canada Inc. laboratory and the Issuer.

#### **Sample Preparation and Analyses**

The drill core was split in half, using an hydraulic splitter. Care was taken to clean the splitter with a brush between each sample. One half core was transferred in an individual plastic bag with a identification tab and sent for assay, while the other half remained in the core box and kept for reference and/or eventual metallurgical testing.

Split core samples were directly transported by truck in sealed bags from the drill site to the SGS Laboratory of Lakefield, Ontario for graphitic carbon Cg analysis of using the GE/COGC\_CS A05V package. The analytical method involves combustion followed by infrared detection on LECO instrumentation. The detection limit is 0.05 wt. % Gg. Samples were weighed, dried, crushed to 75% passing 2 mm, split to 250g and pulverized to 85% passing 75 microns. The sample is then roasted in an oven at 550° C for 1 hour to remove all organic carbon. Carbonate carbon is then leached/evolved using HCl. The sample is then dried to remove the chlorides. The residue is mixed with metal accelerators and placed in the LECO IR combustion system. The residual carbon is taken as graphitic carbon. For high grade carbon values, samples are wetted with methanol prior to addition of acid. The author is confident that the size and weight of all samples were adequate and that the sampling procedures covered a representative part of the graphite mineralization and different rock types exposed within the Buckingham property.

## **Quality Assurance and Quality Control Programs**

The QA/QC protocol included the insertion of appropriate reference materials for monitoring, inclusion of blanks and duplicates samples to validate the accuracy and precision of the assay results. Approximately one duplicate and one blank were added for each batch of 20 samples, for a total of 60 duplicates and 33 blanks. Samples were duplicated by splitting the half-core into two equal parts. The two obtained quarter cores were placed in two separate bags, identified with two subsequent assay tag number. Garden stones which consisted of unmineralized slate mulch from a mine located in Nova Scotia were used as blanks.

Two commercial Cg standards were used: CDN-GR-1 (3.12 ±0.11 wt. % Cg) prepared by CDN Resource Laboratories Ltd, BC and GGC-04 (13.53 wt. % Cg) provided by Geostats PTY LTD, Australia. The CDN-GR-1 standard originates from the Kokanee Graphite Property of Noram Ventures Inc. near Crawford Bay on Kootenay Lake, BC. The GGC-04 standard was collected from a graphite occurrence in Eyre Peninsula, South Australia. In average, one standard was inserted for each batch of 50 samples, for a total of 13 low-grade (3.12 wt. % Cg) and 4 high-grade (13.53 wt. % Cg) standards. The variability of the assay results obtained for 59 pairs of duplicate was evaluated by dividing the difference between two duplicate values, by the average value obtained for the two paired samples. Duplicate samples showed a good consistency, with an average variability of 10%, mostly <25%, except for 4 samples producing variability between 26 and 115%. Most high-variability paired samples had Cg contents <1.5 wt. %. Overall, the variability remains fairly low, with a R<sup>2</sup> = 0.9703 (Figure 17). Cg contents were detected in three of the 33 blanks with two values slightly above the detection limit (0.06%) and one of 0.8 wt. % Cg.



Figure 17. Graphite (wt. %) Original vs graphite (wt. %) Duplicate values.

The Cg results obtained for the 13 low-grade standards averaged 3.12 % Cg, which represent the expected value for this standard. No QA/QC failures were observed since all but one of the obtained Cg values fall within the warning performance gate (±2X standard deviation) and none of the obtained Cg values fall outside the failure performance gate ((±3X standard deviation) (Figure 18). The High Standard (CCG-04) returned higher variability with a difference in the measured and expected Cg values ranging from 0.23 to 1.27% Cg. The highest difference (1.27% Cg) representing a 9% variability (Table 8).

		Measured	Expected		Difference in
Standard	Sample #	%Cg	Value	Difference	%
GGC-04	58503	14.1	13.53	0.57	4.21
GGC-04	58697	13.9	13.53	0.37	2.73
GGC-04	58903	14.8	13.53	1.27	9.39
GGC-04	A00279623	13.3	13.53	0.23	1.70



Figure 18. Graphite assay values of the CDN-GR-1standard. Blue dashed line is the obtained average; Purple and Red dashed lines represent 2 and 3 standard deviation values.

Although some differences are evident between duplicates CG and the expected Cg value for the high-grade standard GGC-04, the QA/QC program is considered e satisfactory. The Cg assay results delivered by the SGS laboratory are therefore reliable for the purpose of this report.

 Table 8. Assays Results for Standard Samples

# Item 12: Data Verification

We could not verify data generated prior to 2015. However, there appears to be no inconsistency and this information is non-critical to the results and conclusions presented in this report. For the 2015drilling program, minor sections of mineralized drill core were not submitted for assays. Furthermore, the 2015 core boxes were not photographed and identified with an aluminium tag and most of them were not stored in core racks at the beginning of the 2016 program. During the first phase of 2016 program, they were properly identified and stored but no photographs were taken. The author herself followed the best practice guidelines implemented by the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") concerning the standards and methodologies for collecting, analyzing, and verifying data.

# Item 13: Mineral Processing and Metallurgical testing

In December 2016, a bulk sample was prepared from mineralised cores from two drillholes for further mineral testing at the SGS Laboratory of Lakefield. Quarter splits were prepared from drillholes BH16-03, from 176 to 200 m and from drillhole BH16-06 from 2 to 40 m. Results are pending.

# **Item 14: Mineral Resource Estimates**

There is no NI 43-101 compliant mineral resource estimate that has been carried out by the issuer.

# Item 15 to 22 (Not applicable to this report)

# **Item 23: Adjacent Properties**

The region experienced a revival of graphite exploration since 2011, responding to the steady rise in graphite price over that period. The Buckingham and Lochaber Townships were covered with active claims, some of which are being located at the boundaries of the Buckingham Graphite Property (Figure 19). The most advanced project is the Lochaber Graphite Project, located 14 km east of the Property. A maiden inferred resource estimate of 4 Mt at 4 wt. % Cg (160 000 t of graphite) was completed by SRK in 2015 based on 8,200 of core (Bernier *et al.* 2015)

Two graphite properties, the Walker Lump Property of Saint Jean Carbon and the Buckingham Property of CKR Carbon Corp, border the eastern and southern limits of Ashburton/Cavan's Buckingham Graphite property. The properties were subjected to intermittent exploration during 2013 to 2016 period.

#### Saint-Jean Carbon

The Walker Lump property of Saint Jean Carbon is located east of Cavan and includes the Walker past producing mine that produced some 816 tons of flaky-type graphite between 1876 and 1906 and about 100 t of vein type graphite. Disseminated graphite flakes were mined from an adit located on the side of a hill (about 1 km from Buckingham property) and the vein type graphite was extracted from roughly 30 pits located over 1200 m NE and SW the main adit (Robillard, 2014).

From 2013 to 2014, Saint-Jean Carbon carried out some prospection work and beep mat mapping focusing on the historic pits southwest of the adit (Robillard,2014). A bulk sample of graphite lump material was sent for metallurgical testing (Glow Discharge Mass Spectrometer Testing, Raman Spectroscopy, X-Ray Diffraction and Scanning Electron Microscope) that are discussed on Saint-Jean Carbon's website.

In 2016, an airborne time domain electromagnetic (TDEM) survey was flown over the Walker Lump Property (Saint Jean Carbon's Press Release dated July 14, 2016). Although a report has yet to be filed from this survey, the TDEM map shows three prospective areas available in Saint Jean Carbon' s website. Grab samples of disseminated graphite were collected nearby the adit and returned Cg values ranging from 0.63 wt. % to 15.5 wt. % Cg.

#### CKR Carbon Corp.

The Buckingham Property of CKR Carbon Corp. (Formerly known as Caribou King Resources Ltd.), is located at the southern border of the property and forms a contiguous block of eight (8) CDC claims. Limited prospection work using of a beep mat accompanied by a small geophysical survey were undertaken since 2013 (Lamarche 2013 and Lewis 2015). Exploration work focused on two specific areas: the southeast part where graphite veins and historic pits were mapped (Lamarche, 2014) and the north central part, where two linear conductors were previously defined (Relevés géophysiques, 1982) and several beep mat anomalies were defined (Lewis, 2015).

Grab samples were collected and returned high grade graphite values. 7 grab samples ranging from 17.0 wt. % to 81.1 wt. % Cg were collected in the southeast area (Caribou King's Press Release dated of November

14<sup>th</sup>,2013) and 18 grab samples gathered from the north central area were assayed providing graphite contents ranging from 1.6 wt. % to 28.7 wt. % Cg (Lewis, 2015). Initial crushing and flotation test without process optimization were also performed on two bulk samples from material collected from the vein type areas and a purity of 99.4% was achieved (Press Release of Caribou King Resources Ltd dated of February 17, 2015).

In 2016, an airborne time domain electromagnetic (TDEM) survey was flown over the Buckingham Property and revealed several anomalies, including a 1.54 km-long conductor oriented NE-SW that considerably expanded the length of the historic conductor. Trenching works were carried out in late November 2016, targeting the newly defined conductive anomalies (Press Release of CKR Carbon Corp. dated of November 29, 2106).

The IMERYS graphite mine is located 85 km north of our property and is currently under production. The mine was commissioned 25 years ago and has been extracting graphite products of various sizes and purities. According to the MERN DV2011-01 document, the deposit contained 25 Mt including 5.2Mt to be mined in an open pit, at a grade of 7.43 wt. % Cg



Figure 19. Adjacent properties and former graphite mines

# Item 24: Other Relevant Data and Information

The author is not aware of any additional information or explanation necessary to make this report understandable and not misleading.

# **Item 25: Interpretation and Conclusions**

A total of 19 boreholes (3,782.1 m) were drilled to explore two linear conductive zones lying in the southeast portion of the Buckingham Graphite Property. Fourteen boreholes tested 800 m of the 1.3 km long NNE-oriented conductor at the SW extremity and 4 boreholes investigated the 300 m long ENE conductor, located some 300 m to the NW. A total of 1695 samples were sent for Cg assaying. Most of the exploratory holes had similar orientations and dips and were principally spaced at 100 m intervals along a line running parallel to the conductor.

Several mineralized intervals likely controlled by the presence of marble beds and lithological contacts between marble and paragneiss were returned; most significant Cg values obtained near the southwest end of the NNE conductor. Attitudes, strikes and true widths of these mineralized intercepts are yet to be defined and there are not enough drill holes to validate a viable block model. Nevertheless, a conceptual model based on the existing drill hole database can be established as an exploration target for exploring the 1.3 km NNE conductor.

## NNE conductor

Best results were obtained in hole BH15-03 (50° dip) giving a mineralized interval of 112 m hosted in a succession of marble and paragneiss units. BH15-04, collared at the same location but with a more vertical dip (70°), returned only minor mineralized intercepts, therefore constraining the geometry of the deposit. A preliminary exploration target was defined for this conductor using 14 boreholes and 1458 sample data. In the model, each drill hole was plotted in 3D with its corresponding geology and Cg content according to the following intervals: <0.5 wt. %; 0.5-1.5 wt. %; 1.5-5 wt. %; 5-15 wt. % and >15 wt. % (Figure 20). Three mineralized planes were defined: 1) a marble plane (MBR-1) oriented 30-35° and dipping 50-55° to the northwest providing a rock volume of 2 784 500 m<sup>3</sup>; 2) a thinner marble plane with a similar strike (MBR-2) located to the SE of MBR-1 and dipping 30-35° yielding a rock volume of 555 790 m<sup>3</sup> and a smaller ill-defined garnet gneiss mineralized plane (59 380 m<sup>3</sup>). The mineralized planes are a preliminary sketch for a possible geometry of the mineralization. Confidence in the dip of the mineralized planes is increased by the results of borehole (BH16-08) drilled in the opposite direction relative to the others.

#### **ENE conductor:**

Drill hole BH16-06 located at the NE end of this 300 m long conductor returned the best intercept of the 2016 drilling program, with 5.18 wt. % Cg over 72 m, including an intercept of higher grade at shallow depths (12.52 wt. % Cg over 14m). Subsequent holes were drilled to the SW but did find the continuity of the mineralization. Except for hole BH16-12, the additional drill holes were all dipping NW and were emplaced along a line parallel to the conductor (60-65°), Both airborne and ground-based geophysics identified this conductive zone as a prime exploration target since it was not associated with strong magnetism and showed decent width and strength, although local discontinuities were reported. Therefore, the author is of the opinion that this zone still represents a valuable target that deserves further investigation.

#### **Metallurgical Testing**

The price of graphite depending on its quality, it is imperative to complete metallurgical testing tests to assess its purity, flake size and beneficiation. The characteristics of graphite in a particular deposit must be investigated in parallel to its spatial distribution. The purity (carbon content) and flake size are key factors for determining the weighted average price per tonne of concentrate. The value of graphite increases with the size of flakes and its purity. Limited metallurgical testing was done on one bulk sample from Trench T22 with a combined flotation concentrate purity of 94.8% obtained. The head grade was 20.7 wt. % Cg and 32% of the flakes belonged to the large and jumbo sizes, with a purity of 94.8 and 96.1%, respectively. These results were obtained without an optimization process. These preliminary metallurgical testing are positive for the Buckingham graphite property as concentrate grades over 94% and large flakes (above 80 mesh) sell at higher prices

The style of mineralization observed at the Buckingham Graphite Property indicates the deposit is a metasomatic-like graphite deposit in marble and seems to be associated with a sheared zone. The definition of high grade mineralized zones requires detailed knowledge of the structure, because the mineralization is emplaced in a deformed terrain with recrystallization folding and faulting. The complex geological setting necessitates an increase density of infill and step-out drill holes to meet sufficient confidence for obtaining an eventual resource estimate.

There are certain risks and uncertainties that could be expected to affect the reliability or confidence in the project's potential economic viability. Besides the external risks pertaining to mining projects (fluctuation of graphite prices, availability of investment capital, changes in government regulations), metallurgical recoveries and physical properties of the graphite mineralization are key factors to the profitability of the project. Social acceptability may become a concern as the project will develop into more advanced stages. A pro-active and transparent approach with the community and nearby residents is a good practice to address this issue. The presence of small lakes and wetlands may constrain exploration activities, which should be carried out and in accordance with regulations in force within these sensitive areas.



**Figure 20.** Conceptual model for the mineralization along the NNE conductor. Above: General Surface plane with the position of five cross sections of 250 m in width. Below: Cross section showing the two mineralized marble planes MBR-1 (in green) and MBR 2 (in brown). Assays intervals are represented by the inner cylinders: in blue: Cg < 0.5; in green = Cg between 0.51-1.5%; in yellow = Cg between 1.5-5%; in orange = Cg between 5-15% and in red = Cg >15%. Outer cylinders represent lithological units.

# Item 26: Recommendations and Budget

Based on the results obtained from the 2015-2016drilling programs of, the author believes the Buckingham Graphite Property fully deserves further investigation. A two-phase work program is proposed including additional drilling to further explore the two linear conductors and metallurgical testing of high grade and low grade graphite mineralization (Table 9). A second phase, contingent to the results obtained from Phase 1, is recommended with a more detailed drilling program to carry out a first calculation of mineral resources

## Phase 1

## Extend the exploration on the NNE conductor

According to the 2016ground-based PhiSpy survey of, a fairly strong and conductive rock assemblage was defined in the NE end of the conductor and this should be considered as a prime target. Exploration holes should be collared on the last 300-400 m forming the NE end of the NNE conductor using 100 m intervals Two drill holes should be implanted for each section line to constrain the structural geology. Additional holes along section lines in the SW drilled area could determine the orientation and dip of the mineralized planes, as tentatively modelled in section 25 (Figure 20). These holes should be implaced further to the NW and plunge in the opposite direction to that of 2015-2016 drill holes.

#### Additional investigation over the ENE conductor

Despite the absence of mineralization in three drill holes drilled along the 300 m long ENE conductor, additional efforts should be spent to define the extent of the 72 m long mineralized intercept given by hole BH16-06. Four additional holes located in the vicinity of BH16-06 to constrain the orientation and dip of the mineralization. Two holes could be oriented along a section line, 25 m to 50 m of BH16-06 and the two other holes should be along the same section line as BH16-06.

Item	Quantity	Cost per unit (CAD\$)	Total Cost (CAD\$)
Phase 1 Exploration holes: NNE and ENE conductors 15 o	ldh		
Drilling	3,000 m	75	225,000
Equipment: core splitter, core racks, sample bags			3,000
Mob-Demob + Accommodation	60 days	400	24,000
Assaying	3,000	40	120,000
Geologist (600\$/day) and technician (300\$/day)	60 days	900	54,000
Metallurgical testing	3	40,000	120,000
Petrographical studies			5,000
Report			20,000
Contingencies(10%)			6,000
Sub Total (phase1)			577,000
Phase 2	1	I	
Mineral Resource Estimate			
Line cutting 6 line km	6 km	600	3,600
Detailed drilling program: 30 holes	6,000 m	75	450,000
Assaying	3,500	40	140,000
additional assays (2015 drill core)	100	35	3,500
Equipment: core splitter, core racks, sample bags			3,000
Mob-Demob + Accommodation	120 days	400	48,000
Geologist (600\$/day) and technician (300\$/day)	120 days	900	108,000
Report (resource calculation)			75 000
Contingencies (10%)			8310
Sub Total (phase 2)			914,210
Total Phase 1 and 2			1,491,210

**Table 9.** Recommended exploration budget: Phase 1 and 2

#### **Metallurgical testing**

Purity content higher than 94 wt. % Cg and flake sizes > 80 mesh carry market price of 1200-1400\$/ton (Leduc *et al.*, 2013). Considering the three different styles of mineralization and the distinctive proportion of flake sizes that were evaluated on the Buckingham property, these characteristics should be tested on three separate bulk samples: 1) high- grade marble intercepts > 15 wt. % Cg), 2) low-grade marble intercept (5-10 wt. % Cg) in marble and 3), low -grade garnet-paragneiss.

Sulphide contents should also be determined since common impurities such as pyrite and pyrrhotite will have an impact on the liberation of pure graphite. Information on gangue materials by scanning electron microscopy (SEM) imaging would help refine the grinding process necessary to optimize the proportion of large flake products and to determine which chemical purification technique should be used to improve the graphite purity.

#### Phase 2

Based on the results obtained in Phase 1 of exploration, a calculation of mineral resources should be implemented for the most promising sectors. The proposed exploration budget for Phase 2 is based on a scenario that includes a resource estimate on the first 600 m of the NNE conductor, based on the length and position of the mineralized intercepts obtained so far. To define mineral resources, drill holes should be emplaced at 50 m intervals over a grid oriented perpendicular to the NNE conductor. 3 to 4 holes are proposed per section line and should be oriented 120 or 300° and plunge either to the SE or the NW, to constrain the geometry of the mineralization.

Concurrently, the drill core from the 2015 drilling program should be photographed and re-examined to validate their description. Furthermore, mineralized samples not assayed should be selected and sent for graphite analysis to complete the geochemical database.

The cost for the non-contingent Phase 1 Exploration Program is estimated at C\$ 577,000.00 and the cost for contingent Phase 2 Mineral Resource Estimates, based on a scenario covering the southwest end of the NNE conductor is evaluated at C\$914,210.00, for a total of C\$ 1.5 million (C\$1,491,210.00).

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# Signature Page and Qualification for the first Author

I, Isabelle Robillard, P.Geo., M.SC., do hereby certify that:

I reside at the 7667 Chateaubriand Street, Montreal, Quebec, Canada H2R 2M2 and I am currently an Associate of Inlandsis Consultants s.e.n.c., located at the same address.

This certificate accompanies the report entitled "Technical Report on the on the Buckingham Graphite Project, Buckingham Township, Quebec, Canada dated of March 19<sup>th</sup>, 2017 (the "Technical Report") prepared for Ashburton Ventures Inc., in accordance with National Instrument 43-101 - Standards of Disclosure For Mineral Projects ("NI 43-101").

I received a B.Sc. in Geology from the University of Montreal in 1987 and a M. Sc. degree in Geochemistry in 1990 from McGill University. I have been working as a geologist in mineral exploration since 1997 being involved in various metal and industrial minerals. I am an active Professional Geologist presently registered with the *Ordre des Geologues du Quebec*, permit # 287.

I supervised the drilling programs of summer and fall 2016 and accessed the Property from November 27<sup>th</sup>, to December 23<sup>rd</sup>, 2016. In addition, I was involved in the exploration works of three nearby graphite properties since 2013.

I am a "qualified person" for the purposes of this National Instrument 43-101 and I am independent of the issuer Ashburton Ventures Inc, as set out in section 1.5 of NI 43-101

I have no prior involvement with the Buckingham Graphite Project which is the subject of this Technical Report.

I have read NI 43-101 and confirm that this Technical Report has been prepared in accordance therewith.

As of the date of this Technical Report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

April 12<sup>th</sup>, 2017

<< Signed Isabelle Robillard >> Isabelle Robillard M.Sc., P.Geo, OGQ #287