1:50,000 NTS Map Sheets 074E10, 074E11, 074E14, 074E15

National Instrument 43-101 Technical Report, Inferred Crush Rock Aggregate Resource Estimate with Updated Lease Boundaries for the Richardson Property, Northeastern Alberta, Canada

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1 Summary

Athabasca Minerals Inc.'s (Athabasca Minerals) Richardson Property (or the Property) is located adjacent to the prolific Athabasca oil sands region of northeastern Alberta, approximately 130 km north-northeast of the urban service area (or city) of Fort McMurray. The Richardson Property comprises 3 contiguous Alberta Metallic and Industrial Minerals Leases totalling 3,904 hectares (9,647 acres). Athabasca Minerals Inc. maintains 100% interest in all 3 Leases and has the exclusive right to develop and mine Alberta-owned metallic and industrial minerals in a specified location.

A maiden inferred resource Technical Report was originally prepared by APEX Geoscience Ltd. (APEX) for Athabasca Minerals Richardson Property with an effective date of June 8, 2015 (Eccles et al., 2015). Since then, Athabasca Minerals has not conducted any exploration activities and/or other work that is material to the issuer; however, Athabasca Minerals has been in consultations with the Government of Alberta with respect to the implementation of a new Provincial Park (the Kitaskino Nuwenëné Wildland Provincial Park) in the vicinity of the original Richardson Property permits.

Accordingly, the purpose of this updated Technical Report is to: 1) state Athabasca Minerals revised Richardson Property land position; 2) state Athabasca Minerals conversion of mineral exploration 'permits' to mineral development 'leases'; and 3) show that the original inferred resource estimate prepared in June 2015 is still current because the resource area outline is situated entirely within the boundaries of the new Property boundary (i.e., the resource area is within the 3 contiguous leases). Hence, the change in land position and conversion of permits to leases represent the only material change to the issuer as documented in this updated and current Technical Report, which supersedes and replaces Eccles et al. (2015).

The Richardson Property is being assessed by Athabasca Minerals for its crush rock aggregate potential, which generally refers to materials that are hard and granular, and are suitable to be used alone or with other materials as binding agents for a number of applications such as: concrete in building construction; road stone; railway track blast; mortar; flux in iron and steelmaking; or to reduce coal sulphur dioxide emissions. Crush rock aggregate is produced from a variety of materials that are usually produced as low-cost, high-volume and bulk mineable commodities.

The Richardson Property is situated along the passive, eastward thinning margin of the Western Canada Sedimentary Basin where sedimentary successions unconformably overly and onlap the southwest dipping Precambrian basement. Within the Property, Precambrian basement, Devonian carbonate and Quaternary surficial materials are either exposed, or occur near the surface. From the industrial mineral perspective, carbonate rocks are commonly considered to be mechanically strong due to their interlocking grain fabrics, carbonaceous mineralogy and subjectivity to recrystallization processes, which in turn increase their strength and decrease porosity. In addition, igneous Precambrian rocks such as granite typically produce strong

aggregates that are skid resistant and therefore, are favourable road aggregate materials.

There are no all-weather roads to the Property; however, a 280 km winter road extending from Fort McMurray to the hamlet of Fort Chipewyan traverses through the central portion of the Richardson Property and provides intermittent access with transport-load capacity.

During 2013, Athabasca Minerals conducted a four-hole diamond drillhole program (drillholes GNA-05, GNA-10, GNA-11 and GNA-16; totalling 235 m) intended to test the Devonian carbonate and Precambrian basement at the Richardson Property. The drill program cored complete stratigraphic sections of the uppermost carbonate lithostratigraphic unit (the Winnipegosis Formation) in two of the four drillholes, and a single drillhole intersected down through the carbonate stratigraphy and into the Precambrian basement. To acquire additional material for evaluation, APEX Geoscience Ltd. was retained by Athabasca Minerals Inc. in 2014 to conduct an eight drillhole program (14RLD001 to 14RLD008; totalling 843 m) at the Richardson Property over an area spanning approximately 20 square kilometres. With the exception of one of the eight 2014 drillholes, the program successfully cored entire stratigraphic sections that terminated in Precambrian basement granite.

The 2013 and 2014 drill campaigns conducted by Athabasca Minerals Inc. shows that the bedrock underlying the Richardson Property includes, from stratigraphic base to top: Precambrian crystalline basement granitic rocks of the Taltson Magmatic Zone; an Early Devonian (or earlier?) discontinuous zone of detrital basal feldspathic sandstone and conglomerate known as the La Loche Formation; marginal marine dolomitic silty shale of the Devonian Contact Rapids Formation; and a thick (relative to the Contact Rapids and La Loche formations), finely crystalline dolostone known as the Winnipegosis Formation. The bedrock is overlain by a layer of Quaternary glaciofluvial and glaciolacustrine deposits that have formed kettle depressions and kame deposits and redistributed surficial sediments into low-lying areas.

Based on the 2013 and 2014 drill results, Athabasca Minerals Inc. further commissioned APEX Geoscience Ltd. to: 1) supervise the logging and sampling of the 2013 and 2014 drill core; 2) supervise the appropriate aggregate test work and geochemical analysis to assess the Winnipegosis Formation and the Precambrian basement granite for their suitability as potential source of crush rock aggregate; 3) prepare a National Instrument 43-101 (NI 43-101) Technical Report and maiden inferred crush rock aggregate resource estimate of the Middle Devonian Winnipegosis Formation; and 4) make recommendations on future exploration to advance the Athabasca Minerals Richardson Property. The Winnipegosis Formation is the focus of this Technical Report due to the near surface proximity of the dolostone unit in the drill area, which represents a small north-central portion of the Property. A secondary objective includes an aggregate assessment of the basement granite, mainly intended toward future exploration strategies at Athabasca Minerals Inc.'s Richardson Property.

The drilling strategy was to terminate each drillhole once ten metres of Precambrian basement granite was penetrated and cored. A single drillhole (14RLD007) tested the granite to a coring depth of 44.5 m to test its uniformity and crush rock aggregate potential at depth (and precious-, base- and specialty- metal potential). The granite comprised light-blue grey coarse-grained weakly foliated granite that is fairly consistent throughout the area of drilling, albeit being variably subjected to potassic alteration. The thickness of the Winnipegosis Formation varies from 8.3 m to 47.9 m (averages 39.5 m) and is comprised largely of competent, light brown dolostone. Overburden thickness ranged from 18.0 m to 64.9 m (averages 35.7 m) and is comprised largely of unconsolidated glaciofluvial sand and boulders.

The core was logged and sampled in accordance with the appropriate assessment of crush rock aggregate, which involves criteria that considers the materials strength, continuity, fractures and the presence of weakening particulate matter. Geotechnical measurements included: rock quality description, fracture frequency and rock defects, and discontinuity and fracture conditions. Density measurements were carried out once per every metre using the “hydrostatic” method, which involves weighing the item in air and then again while fully submerged in water, to calculate the weight (tonnage) of a volume of rock. Portable X-Ray Fluorescence (XRF) analyzer measurements were taken every metre of core to provide an evaluation of the chemical homogeneity and potential aggregate strength of the core, and secondarily, to evaluate the metallic mineral potential of the core.

The analytical sampling process consisted of two separate sample sets: 1) composite samples for aggregate test work; and 2) interval or channel samples for major- and trace-element geochemical analysis. The objective of the aggregate analytical test work – in the context of this crush rock aggregate resource estimate – was predominantly focused on the aggregate mechanical qualities for its use in aggregate road building and concrete. A sufficient and appropriate number of samples were analyzed to ensure that meaningful sample results were obtained, including: 11 composite samples of Winnipegosis Formation (one sample per drillhole plus one duplicate sample for quality assurance); one composite sample of Contact Rapids (amalgamated from all ten drillholes due to the narrowness of the unit); and two composite samples of basement granite (amalgamated from all drillholes that penetrated basement; n=8).

The results of the aggregate test work were evaluated by making comparisons with aggregate specification and screening criteria as set by Alberta Transportation and the Canadian Standards Association. The results show that the Winnipegosis Formation and Precambrian basement granite met the maximum allowable screening criteria for major aggregate test methods, including: plasticity index; Los Angeles abrasion; magnesium sulphate soundness; and unconfined freeze-thaw. Based on the results of this test work and evidence of the homogeneity and uniformity of the rock units, it is concluded that the Winnipegosis Formation and Precambrian basement granite represent material of merit for several Alberta Transportation aggregate designations, including: Designation 1 (asphalt concrete pavement); and Designation 2 (base course aggregate).

With respect to reporting a resource estimate and abiding by the General Guidelines of NI 43-101, the aggregate test work yields results that suggest the Winnipegosis Formation from Athabasca Minerals Inc.'s Richardson Property has reasonable prospects of economic viability for an industrial mineral deposit. Despite having analyzed only two amalgamated composite granite samples, the Precambrian basement granite also yielded positive aggregate test work results and is recommended, therefore, to undergo additional aggregate testing in the future. In contrast, the single Contact Rapids sample does not meet the screening criteria, and therefore, does not meet the reasonable expectation and/or demonstration of economic viability of an industrial mineral deposit.

The Richardson maiden inferred crush rock aggregate resource estimate is reported in accordance with the Canadian Securities Administrators National Instrument 43-101 and has been estimated using the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014. The senior author performed a site inspection at the Richardson Property on October 25, 2017; the date of the site inspection is considered sufficient for this Technical Report as there has been no material change at the Property since the 2014 drill program.

The CIM Standards on Mineral Resources and Mineral Reserves, Definitions and Guidelines, dated August 20, 2000 (the "CIM Standards", NI 43-101 and Companion Policy 43-101CP) states that: "when reporting Mineral Resource and Mineral Reserve estimates relating to an industrial mineral site, the Qualified Person(s) must make the reader aware of certain special properties of these commodities". It should be noted that the Richardson crush rock aggregate, in the context of this Technical Report, represents an 'early stage project'. The ultimate suitability of an industrial mineral for use in specific applications requires detailed marketing and economic investigations, which are beyond the scope of this Technical Report. With respect to the Richardson Property and northeastern Alberta in general, however, a fundamental statement is that the Fort McMurray region is best known for its vast resource of bituminous oil sand, and that vast quantities of aggregate materials are required to supplement ongoing oil sands infrastructure and construction demand. In addition, it is pertinent to note that Government baseline aggregate mapping in the Fort McMurray area has shown that sand and gravel deposits are distributed unevenly, of variable quality and quantity, and have largely been exploited. Consequently, aggregate exploration has focused on importing aggregate, which is difficult from an industrial mineral economics perspective, or on locating local sources of buried crush rock aggregate. For example, Hammerstone Corporation produces limestone crush rock aggregate from its Muskeg Valley Quarry, which is adjacent to the Richardson Property. Lastly, the oil sands industry poses no potential conflict or risk to industrial minerals production as separate statues regulate the right to metallic and industrial minerals, to coal, to oil/gas, and to bitumen (oil sands) in the province of Alberta.

The resource estimation presented in this Technical Report considered data from four 2013 drillholes and eight 2014 drillholes drilled by Athabasca Minerals (twelve total drillholes). Because two of the 2013 drillholes were terminated at <30 m and did not penetrate through the entire lithostratigraphic section of the Winnipegosis Formation (the primary focus of this resource estimate), only ten drillholes were utilized in the Richardson maiden inferred crush rock aggregate resource modelling and estimation. The 2013 and 2014 drillholes were initially surveyed using a hand-held Garmin GPS unit with the collar elevations subsequently being modified using high resolution Light Detection and Ranging (LiDar) technology with 1 m resolution. All drillholes were vertical holes; no down hole surveying was employed. Spacing between drillholes varies from 500 m to 1.37 km, with an average of about 900 m between drillholes. Consequently, modelling in MICROMINE utilized seven drill lines that ranged in spacing from 570 m to 900 m. In the context of this crushed rock aggregate deposit type, style and formation, the drill spacing is sufficient for resource volume estimation.

Stratigraphic logging, which was performed by APEX for both the 2013 and 2014 drillholes, showed that with the exception of the La Loche Formation–Precambrian basement boundary, which can be gradational, the boundaries between formations have sharp, visually identifiable contacts. These definitive geological boundaries are further characterized as having extensive lateral continuity of the individual formations. The homogeneity of the stratigraphic units was further evaluated using geotechnical (Rock Quality Description and total fracture data) and geochemical data derived from the cores. A positive correlation between the drill logs and the geotechnical/ geochemical data confirmed the lithostratigraphic formation divisions, and the homogenous nature of the Winnipegosis Formation, which highlights its applicability in resource estimation as a potential source of crush rock aggregate.

The single ‘impurity’ to report involves supplementary bitumen, which is more or less confined to the uppermost portions of the Winnipegosis Formation (and the La Loche Formation directly overlying the Winnipegosis dolostone). The bitumen ranges in intensity from non-existent (in most of the core) to pervasive, the latter of which is evident in 25 cm to 90 cm wide ‘bituminous horizons’ that occur in the eastern drillholes 14RLD006 and 14RLD008. The bitumen appears to be confined to porosity enabling textures in the carbonate such as vugs, sandy horizons and fracture planes. It is not known how the bitumen might influence the processing or marketing of the potential crush rock aggregate, but the overall consistency and volume of non-bitumen-bearing dolostone, and the positive aggregate test work results, provide justification that the bitumen does not influence the viability of the Winnipegosis as an industrial mineral deposit in the evaluation of this early stage project.

A total of 675 bulk density measurements were collected from drill core within the Richardson maiden inferred crush rock aggregate resource area. Additional density measurements (n=14) were also performed as part of aggregate test work, and these results were consistent with hydrostatic average formation density values of 2.68, 2.50 and 2.63 for the Winnipegosis, Contact Rapids and basement granite, respectively, that were used in this Technical Report.

Mineral resource modelling was carried out using a three-dimensional model in commercial geological modelling and mine planning software MICROMINE (v.14.0.4). Block modelling of the resource area was not necessary as no ‘grade’ was being estimated; instead a three-dimensional computer-generated ‘solid’ of the area was generated in MICROMINE to calculate the resource ‘volume’. A separate wireframe was created for each formation (Precambrian basement granite; La Loche Formation; Contact Rapids Formation; Winnipegosis Formation; and overburden), from which, separate ensuing formation volumes could be derived for each lithostratigraphic unit.

The surface area of the resource outline reported in this Technical Report is 6.30 km^2. With the exception of two northwestern drillholes (GNA-10 and 14RDL-008), a resource outline of 500 m was constructed around the outermost drillholes to clip the individual formation wireframes and restrict the lateral extension of the wireframes and the main resource model to the general 2013 and 2014 Athabasca Minerals drill area which represents only a small north-central portion of the Richardson Property. The resource outline of 500 m was deemed appropriate based on the continuous nature of the stratigraphic formations within the resource outline area as defined by 2013 and 2014 Athabasca Minerals drilling, and because the same generally flat-lying stratigraphic formations has been intersected in oil and gas wells that are located several 10’s to 100’s of kilometres away from the Richardson resource area. The radius of the boundary outlines for drillholes GNA-10 and 14RDL-008 was reduced to 50 m (from 500 m) due to the proximity of a lake.

This three-dimensional model formed the spatial basis for calculating the volume and tonnage for the Richardson maiden inferred crush rock aggregate resource estimate. Within the three-dimensional model, the volume of each formation was used to multiply against a nominal density value, which was determined on a formation by formation basis. This resulted in the reported tonnages. The Richardson maiden inferred crush rock aggregate resource estimate has been classified as ‘inferred’ according to the CIM definition standards.

The classification of the Richardson maiden inferred crush rock aggregate resource was based on geological confidence, data quality and stratigraphic continuity. That is, the criteria and rational for the classification of inferred resource is based upon the wide spaced nature of the drilling to date and the fact that the Richardson crush rock aggregate project is classified as an early stage project with little mineral processing test work completed to date. As this is the maiden inferred resource, no mining studies have been employed to constrain the resource within an optimal pit shell.

The Richardson maiden inferred crush rock aggregate resource estimate consists of 683 million tonnes of aggregate material situated within the favourable Winnipegosis Formation (Table 1). Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve. The Winnipegosis aggregate resource is directly overlain by 497 million tonnes of overburden-waste material.

Table 1. Richardson maiden inferred crush rock aggregate resource. Volumes and tonnages for the overburden and all lithostratigraphic units in the resource area are included, but the main resource reported in this Technical Report relates to the Winnipegosis Formation.

Formation	Volume (m^3)	Density (t/m^3) *	Tonnes (million tonnes) **
Overburden	220,625,000	2.25	497.29
Winnipegosis	**254,523,000**	**2.68**	**683.14**
Contact Rapids	63,322,000	2.50	158.11
La Loche	13,339,000	2.54	33.93
Basement granite	62,941,000	2.63	165.41

* Density has been rounded to two decimal places.

** Tonnes have been rounded to the nearest 10,000 tonnes.

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

Note 2: The quantity of tonnes reported in these inferred resource estimations are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource, and it is uncertain if further exploration will result in upgrading them to an indicated or measured resource category.

The estimate of mineral resources presented in this Technical Report may be materially affected by geology, environment, permitting, legal, title, taxation, socio-political, marketing or other relevant issues. Because the Richardson Property is in its preliminary exploration stages, specific detail on project's risks and uncertainties has yet to be fully investigated at this time. As the Richardson Property advances toward an early stage conceptual assessment of potential economic viability of the mineral resources, future discussion on the significant risks, uncertainties and foreseeable impacts are required, including those risks to the project's potential economic viability.

The portion of the Richardson property resource that has been classified as 'Inferred' demonstrates that the nature, quantity and distribution of data is such as to allow confident interpretation of the geological framework and to reasonably assume continuity of geological formations. The collective work to date from the Richardson Property indicate that while the project is in early stages of exploration/resource work that indications of the metallurgical and mineral processing qualities give suggestions that they are of high enough quality that the Winnipegosis at the Richardson Property is considered to be a 'property of merit' and warrants further exploration. This contention is supported by results presented in this Technical Report, which include:

- the Winnipegosis Formation is a uniform and continuous target unit that has undergone pervasive dolomitization and is therefore a hard, competent and resistive lithostratigraphic unit with crush rock aggregate deposit potential;

- sample composites of the Winnipegosis Formation yielded positive aggregate test work results in comparison to Alberta Transportation and Canadian Standards Association aggregate specifications and standards;

- the Winnipegosis Formation is considered the most favourable unit for crush rock aggregate in the resource area given that it is the shallowest lithostratigraphic unit (directly underlying the quaternary cover and occurs at depths ranging from 18.0 m to 64.9 m) with early stage project crush rock aggregate deposit potential;

- a Richardson maiden inferred crush rock aggregate resource estimate that has an aerial extent of 6.30 km^2 and consists of 683 million tonnes of crush rock aggregate material situated within the Winnipegosis Formation (see aforementioned disclaimers); and

- the oil sands region of northeastern Alberta represents an area of enormous growth – while continued oil sands development is subject to an infinite number of variables (e.g., geology, hydrocarbon prices, environment, taxation, socio-political, marketing or other relevant issues), the current circumstances suggest a continued and positive market demand for ‘local’ aggregate products.

In addition to the Richardson maiden inferred crush rock aggregate resource estimate, a stratigraphic compilation of publicly available oil and gas well information, historical metallic and industrial mineral assessment reports, and data from Athabasca Minerals Inc. 2013 and 2014 drill programs shows that there is good stratigraphic continuity of the Winnipegosis Formation and Precambrian basement surface in the general Richardson Property area. By way of preliminary reasoning, the Richardson Property has several potential targets for further exploration. The following statements referring to any potential extension of the Richardson crush aggregate deposit are conceptual in nature; there has been insufficient exploration to define the extended mineral deposit and it is uncertain if further exploration will result in the target being delineated as a mineral deposit and/or resource. Potential targets for further exploration are summarized as follows:

1. Based on good stratigraphic continuity of the Winnipegosis Formation, an extension of the current Winnipegosis crush rock aggregate deposit outwards from the resource area to other parts of the Property could create additional and/or more accessible Winnipegosis tonnage. For example, a potential southerly extension of the Winnipegosis Formation deposit (i.e., an additional aerial extent of 7.49 km^2) could add between 0.671 and 1.006 billion tonnes of aggregate crush rock. There is also justification in targeting the Winnipegosis Formation to the east-northeast, where the thickness of overburden is assumed

to be thinner and could potentially lower the strip ratio to access the Winnipegosis in comparison to the resource area.

2. If the economics of mining the Winnipegosis Formation are feasible, then the Precambrian basement granite represents a potential secondary crush rock aggregate target within the resource area due to its uniform nature and overall hardness as shown by aggregate test work conducted in this Technical Report. Modelling in this Technical Report shows that within the resource area, the Precambrian basement granite could account for an additional 165 million tonnes of potential aggregate. This estimate is conservative as the volume assumes a maximum depth of 10 m (corresponding to when most of the drillholes were terminated). Based on drillhole 14RLD007, which confirmed uniform granite to a depth of 48.35 m, the granite could easily be extended, such that the granite could account for 319 million tonnes if, for example, the modelling depth was extended to 20 m instead of 10 m.

3. In scenario 2 above, any potential granite evaluation in the resource area is contingent on the Winnipegosis being economic. However, the Precambrian basement granite is known crop out on the Richardson Property directly east-southeast of the resource area. In addition, a multi-technique geophysical conducted over the general granite outcrop area helps to define the near-surface boundaries of the granite body. Ground Penetrating Radar (GPR) profiles and ground magnetic data show that the granite outcrop is fairly constrained to the immediate observed exposure; however, the GPR profiles suggest that the area directly north of the outcrop has the least amount of overburden and/or Winnipegosis dolostone material to overlie the Precambrian basement granite. Based on the GPR results, the estimated areas of combined surficial overburden and Winnipegosis Formation dolostone material that is situated on top of the Precambrian granite and is within 5 m, 10 m, 15 m, 20 m and 25 m of surface is approximately: 4,600 m^2; 15,200 m^2; 45,100 m^2; 91,300 m^2; and 147,233 m^2, respectively. The geophysical interpretations remain inherently ambiguous and require other geological information such as drilling to properly confirm and classify the identified litho-magnetic zones. However, based on the uniformity and positive granite aggregate test results from the resource area, and delineation of an exposed and near-surface area of granite on the eastern part of the Property, Precambrian granite at the Richardson Property represents a potential target for further exploration.

4. Lastly, the Contact Rapids Formation, which underlies the Winnipegosis, comprises weakly consolidated muddy and sandy limestone, and is therefore not as desirable in comparison to the Winnipegosis (this is evident in poor aggregate test work results presented in this Technical Report). There is the possibility, however, that the Contract Rapids could provide a source of alternative flux material if the Winnipegosis were to be mined as crush rock aggregate.

To conclude, there are several hypotheses to potentially increase and diversify the current Richardson crush-rock aggregate deposit. Accordingly, a two-Phase approach is recommended for 2019-2020 exploration at the Richardson Property consisting of: Phase One geophysical work, including a Ground Penetrating Radar survey; and a Phase Two extension and infill drill program. Results pending, the Phase Two drill program could be contemporaneous with a Preliminary Economic Assessment (PEA) scoping study. The total cost of both phases of recommended exploration work is estimated at CDN$916,000 (Table 2; not including contingency). With a 10% contingency the total budget is CDN$1,007,600.

The Phase One exploration work includes a 35 line-kilometre Ground Penetrating Radar survey to:

- create a preliminary three-dimensional geological model of the resource area and beyond;
- depict those areas that have shallow overburden overlying Devonian Winnipegosis dolomite and the Precambrian basement granite; and
- define the drillhole locations for the Phase Two drill program.

Subject to the results of the Phase One survey, a Phase Two extension/infill drillhole program and aggregate test work analyses will:

- verify the three-dimensional geological model; and
- provide additional confidence to uniformity, extent, depth and quality of the Winnipegosis dolomite and the basement granite, which is necessary to produce an updated mineral resource estimate.

It is recommended that the Phase Two extension and infill drilling consists of ten to eleven systematically placed diamond drillholes (totalling approximately 1,000 m) designed to:

- extend the Winnipegosis deposit area to the south and to the east-northeast of the resource area; and
- verify and define a potential Precambrian granite aggregate deposit to the area east-southeast of the resource area (adjacent to a known exposure of Precambrian granite).

The drillhole and analytical results will generate: a revised inferred, and possibly indicated, mineral resource Technical Report; and trigger a PEA scoping study that includes an economic analysis of the potential viability of crush rock aggregate resources at the Richardson Property. The PEA scoping study should include: the creation of an initial pit shell; estimations of strip ratios to remove the overburden; examination of certain economic and environmental factors related to the market for crushed rock aggregate in the immediate vicinity of Athabasca Minerals Inc.'s Richardson Property.

Table 2. Summary of recommendations for the Richardson Property.

Phase One: Ground Geophysical Survey and Preliminary 3D Model

Activity	Description	Cost (CDN$)
Ground Penetrating Radar (GPR) geophysical survey	A 35-line km GPR survey to develop a preliminary 3D model, determine o/b thickness and site drillhole locations.	$40,000
	Sub-total	**$40,000**

Phase Two: Drill Program, Indicated/Inferred Technical Report and Preliminary Economic Assessment

Activity	Description	Cost (CDN$)
Drilling	A 10-11 drillhole heli-supported program (approximately 1,000 m of coring)	$511,000
Analysis	Aggregate test work	$30,000
Reporting	NI 43-101 Mineral Resource Estimation and Technical Report	$35,000
Reporting	Preliminary Economic Assessment Scoping Study	$300,000
	Sub-total	**$876,000**
	Total	**$916,000**
	10% Contingency	**$91,600**
	Total with Contingency	**$1,007,600**

2 Introduction

Athabasca Minerals Inc. (Athabasca Minerals) maintains 100% interest in the Richardson Property (the Property), which is located in the Athabasca oil sands region of northeastern Alberta, approximately 130 km north of the city of Fort McMurray (Figure 1). The Property comprises 3 contiguous Alberta Metallic and Industrial Minerals Leases totalling 3,904 hectares (9,647 acres; Figure 2; Table 3). Athabasca Minerals has exclusive right to develop and mine Alberta-owned metallic and industrial minerals at the Property.

Athabasca Minerals is Canadian mineral exploration company that has identified, explored and developed various industrial minerals to support oil sands development in the prolific Athabasca oil sands area of northeastern Alberta. For example, Athabasca Minerals currently manages the largest open pit gravel pit in Canada, the Susan Lake Aggregate Operation, which is located approximately 25 km south-southwest of the Richardson Property.

The Richardson Property, which is the focus of this Technical Report, lies along the passive, eastward thinning margin of the WCSB where sedimentary successions unconformably overlie and onlap the southwest dipping Precambrian basement. The bedrock geology at the Property generally consists of Precambrian basement and Middle Devonian carbonate rocks that are either exposed or buried by a veneer of Quaternary surficial deposits.

The Richardson Property is being assessed by Athabasca Minerals for its crush rock aggregate potential. From the industrial mineral perspective, carbonate rocks are commonly considered to be mechanically strong due to their interlocking grain fabrics, carbonaceous mineralogy and subjectivity to recrystallization processes. In addition, Precambrian igneous rocks such as granite typically produce strong aggregates that are skid resistant and therefore, are favourable road aggregate materials.

During 2014, APEX Geoscience Ltd. (APEX) was retained by Athabasca Minerals to:

1. complete an eight drillhole program at the Property on behalf of Athabasca Minerals intended to increase the amount of material available for the crush rock aggregate assessment (the 2014 drill program builds upon a 2013 drill program by Athabasca Minerals that drilled four drillholes totalling 235.1 m);

2. review, log, sample and analyze drill cores from the 2013 and 2014 drill programs that were completed at the Property by Athabasca Minerals;

3. prepare a National Instrument 43-101 (NI 43-101) Technical Report and maiden inferred crush rock aggregate resource estimate of the Middle Devonian Winnipegosis Formation at Athabasca Minerals Richardson Property; and

4. conduct a multi-technique ground geophysical survey around a granite outcrop and make recommendations on potential future exploration target areas.

Figure 1. Location of Athabasca Minerals Inc.'s Richardson Property in northeastern Alberta.

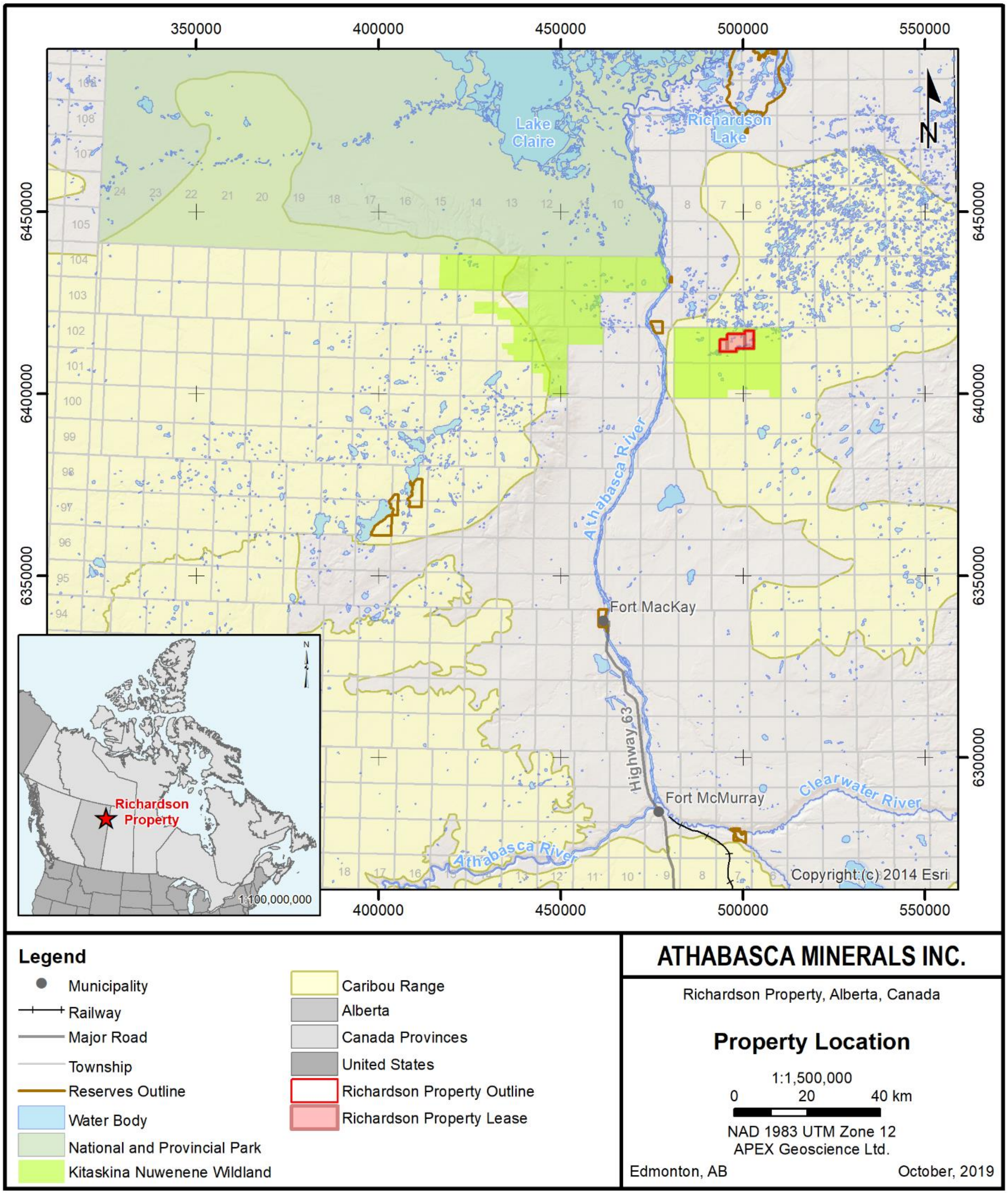


Figure 2. Athabasca Minerals Inc.'s Alberta metallic and industrial mineral leases at the Richardson Property.

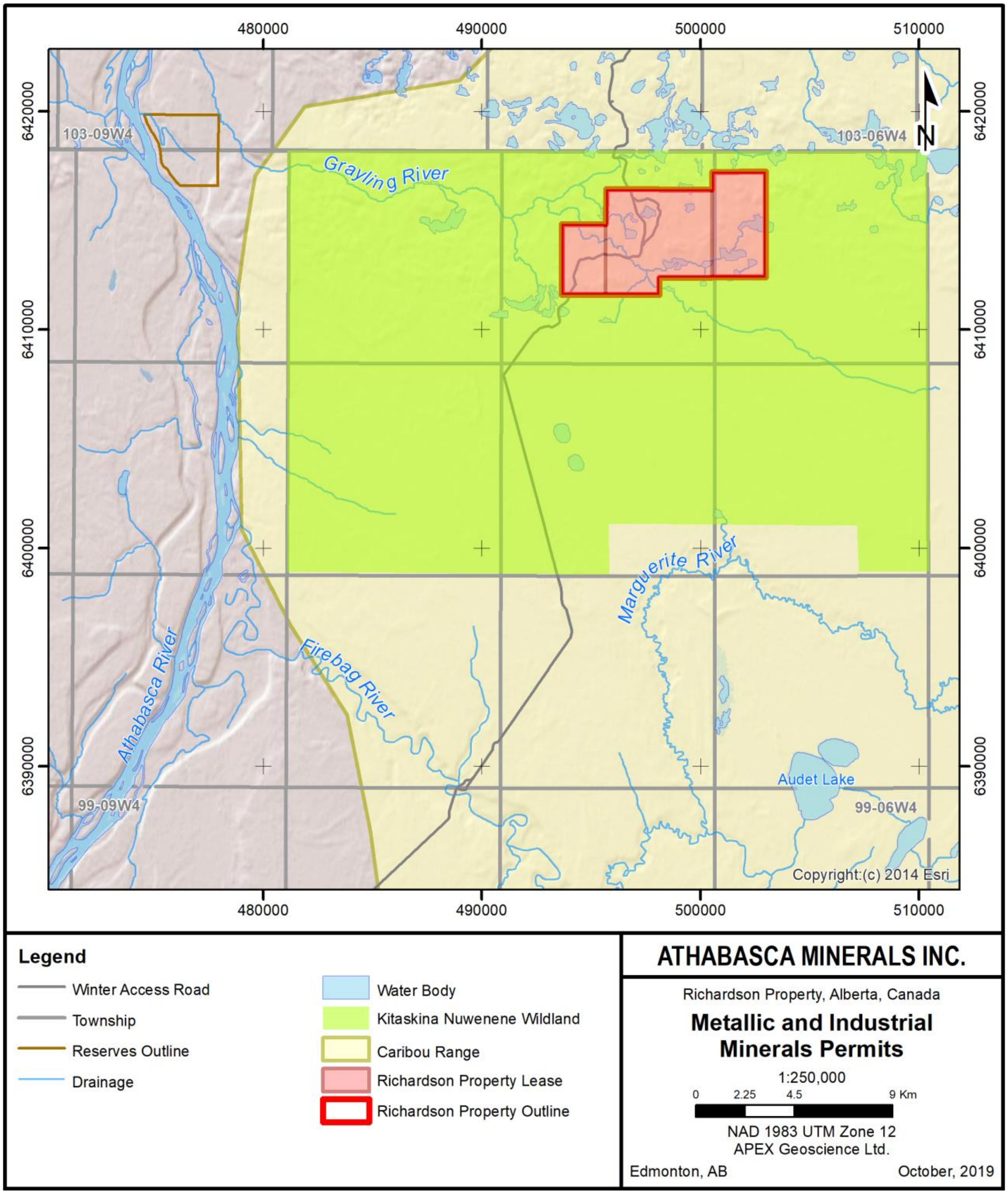


Table 3. Description of Athabasca Minerals Inc.'s Alberta metallic and industrial mineral leases at the Richardson Property.

Agreement Number	Status	Designated Representative	Term Date	Land Description	Area (hectares)	Area (acres)
094 9419010272	Active	Athabasca Minerals Inc. (100%)	2019-01-18	**4-06-102:** 17NW; 18N; 19; 20W; 29W; 30; 31S; 32SW	1,152.00	2,846.65
094 9419010270	Active	Athabasca Minerals Inc. (100%)	2019-01-18	**4-07-102:** 13N; 14N,SW; 15; 22-27	2,112.00	5,218.87
094 9419010271	Active	Athabasca Minerals Inc. (100%)	2019-01-18	**4-07-102:** 16; 17L1,L8,L9,L16;	640.00	1,581.47
				Total	**3,904.00**	**9,646.99**

Out crop exposures of the Mesoarchean to Paleoproterozoic Marguerite River Complex are found on the eastern edge of the Property. The Marguerite River Complex comprises of undifferentiated granite, Arch Lake-type granitoid, hornblende-quartz monzonite and granitoid gneiss rocks (Dufresne et al., 1994; Prior et al., 2013). The crystalline basement at the Property is overlain by, from stratigraphic base to top, the: La Loche, Contract Rapids and Winnipegosis formations. The Devonian and Precambrian rock units are almost entirely overlain by Quaternary surficial deposits, which form a thin veneer of ice-contact glaciofluvial and glaciofluvial outwash deposits (Bayrock, 1971; Fenton et al., 20012). The Early Devonian La Loche Formation is composed of detrital basal feldspathic sandstone and conglomerate and is considered equivalent to the Granite Wash (Sherwin, 1962; Norris, 1963; Schneider et al., 2013), and the Contact Rapids Formation is comprised of marginal marine dolomitic siltstone-shale, argillaceous dolostone and shale-siltstone (Sherwin, 1962; Meijer Drees, 1994).

Most of the bedrock overlying the crystalline basement at the Property comprises the Middle Devonian Winnipegosis Formation of the Upper Elk Point Group, which is the focus of this Technical Report (a secondary interest is the Precambrian granite). The Winnipegosis Formation is the stratigraphic equivalent to the Keg River Formation in northwestern Alberta. The Winnipegosis Formation reflects an open-marine platform and reef system and is composed of thickly bedded brownish to yellowish-grey dolostone containing various brachiopod, bivalve and gastropod fossils (Macoun, 1877; Bassett, 1952; Norris, 1963; Schneider et al., 2013).

The primary objectives of this Technical Report are to: 1) describe the process used to assess whether the Devonian Winnipegosis Formation at the Richardson Property have reasonable prospects of economic viability for an industrial mineral deposit; and 2) prepare a Richardson maiden inferred crush rock aggregate resource estimate that is reported in accordance with the Canadian Securities Administrators National Instrument 43-101. A secondary objective is to report on those potential targets that require further exploration and evaluation for crush rock aggregate potential at the Richardson Property.

The authors include R. Eccles and S. Nicholls, all of whom are independent of Athabasca Minerals and employed as geological consultants with APEX. Mr. Eccles, M.Sc. P.Geol., supervised the preparation of, and is responsible for the ultimate publication of this Technical Report. Mr. Eccles is a Qualified Person as defined by the Canadian Securities Administration National Instrument (NI) 43-101. The Canadian Institute of Mining and Metallurgy defines a Qualified Person as "*an individual who is a geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these; has experience relevant to the subject matter of the mineral project and the technical report; and is a member or licensee in good standing of a professional association*."

Mr. Eccles is a Professional Geologist with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) and has worked as a geologist for more than 25 years since his graduation from University. Mr. Eccles has been involved in all aspects of mineral exploration and mineral resource estimations for metallic and industrial mineral projects and deposits in Canada. Mr. Eccles was a geologist with the Alberta Geological Survey for 21 years (1990-2011). In this capacity, he travelled and conducted geological studies in northeastern Alberta's clastic sedimentary rock units, including specific studies related to Devonian rock units at the sub-Cretaceous unconformity. Mr. Eccles performed a site inspection at the Richardson Property on October 25, 2017; the date of the site inspection is considered sufficient for this Technical Report as there has been no material change at the Property since the 2014 drill program.

The resource estimation statistical analysis and three-dimensional modeling was completed by Mr. Nicholls, MAIG, a Qualified Person, under the direct supervision of Mr. Eccles, P. Geol., who are both Qualified Persons with respect to mineral estimation as defined by the Canadian Securities Administration NI 43-101. Mr. Nicholls is a resource geologist with over 14 years of exploration and mining experience.

The maiden crush rock aggregate resource estimate of the Middle Devonian Winnipegosis Formation on Athabasca Minerals Richardson Property is classified as an "Inferred" Mineral Resource, and was classified in accordance with guidelines established by the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014. By definition,

> *"An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource is based on limited information and sampling gathered through appropriate sampling techniques from locations such as outcrops, trenches, pits, workings and drill holes. Inferred Mineral Resources must not be included in the economic analysis, production schedules, or estimated mine life in publicly disclosed Pre-Feasibility or Feasibility Studies, or in the Life of Mine plans and cash flow models of developed*

> *mines. Inferred Mineral Resources can only be used in economic studies as provided under NI 43-101."*

This Report is a compilation of proprietary and publicly available information, as well as information obtained during the 2013 and 2014 drill programs. References in this Technical Report are made to publicly available reports that were written prior to implementation of NI 43-101, including government geological publications and Alberta Metallic and Industrial Mineral Permit Assessment Reports that are filed with Alberta Energy. These reports are cited in the 'Reference' section.

Government reports include those that depict the geology of northern Alberta (e.g., Carrigy, 1959; Bayrock, 1971; Fox, 1980; Meijer Drees, 1980, 1990, 1994; Ross et al., 1991; Burwash et al., 1994; Dufresne et al., 1994; Halbertsma, 1994; Mossop and Shetson, 1994; Ross et al., 1994; Oldale and Munday, 1994; Switzer et al., 1994; Wright et al., 1994; Abercrombie and Feng, 1997; Scafe et al., 1988; Pana and Olson, 2009; Scafe and Edwards, 2000a,b; Jefferson et al., 2007; Eccles, 2011; Fenton et al., 2013; Prior et al., 2013; and Schneider et al., 2013). Alberta Metallic and Industrial Mineral Permit Assessment Reports, which are reviewed by the Alberta Government, were used to reference historical mineral exploration work in the general Richardson Property area (e.g., Sproule, 1968; Frantz, 1969; McWilliams and Sawyer, 1977; Laanela, 1977, 1978; Bradley, 1978; Fortuna, 1979; McWilliams et al., 1979; Walker, 1980; Orr, 1986, 1989, 1991; Orr and Robertshaw, 1989; Aravanis, 1999; De Paoli et al., 2000; Dahrouge, 2004).

The authors of this Technical Report have reviewed all government, work assessment and laboratory reports. Government reports were prepared by a person, or persons, holding post-secondary geology or related degrees. Industry prepared work reports were reviewed, approved and archived by the Alberta Government (Alberta Energy and the Alberta Geological Survey). Based on review of these documents and/or information, the authors have deemed that these reports and information, to the best of their knowledge, are valid contributions to this Technical Report, and take ownership of the ideas and values as they pertain to the Technical Report.

Geochemical and geotechnical data presented in this Technical Report were analyzed at: AMEC in Calgary, Alberta and Hamilton, Ontario; Tetra Tech EBA in Edmonton, Alberta; and Acme Analytical Laboratories in Vancouver, British Columbia. AMEC and Tetra Tech EBA are both certified by the Canadian Council of Independent Laboratories (CCIL) in accordance with Canadian Standards Association (CSA) Standards for testing concrete and concrete aggregates and are qualified as a Category II Laboratories. Acme Analytical Laboratories is an ISO/IEC 17025:2005 accredited analytical laboratory. The authors have reviewed the geotechnical and geochemical data and found no significant issues or inconsistencies that would cause one to question the validity of the data.

Unless otherwise stated, all units used in the Report are metric, the geographic coordinates provided are projected in the Universal Transverse Mercator ("UTM") system relative to Zone 12 (north) of the North American Datum ("NAD") 1983 and all references to currency are in Canadian dollars ("$").

This Technical Report was completed pursuant to the National Instrument ("NI") 43-101 regulations and guidelines, and in compliance to Form 43-101F1 for the Canadian Securities Administration. The estimated Mineral Resources are considered compliant with the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM"), with CIM Standards on Mineral Resources and Reserves, and with Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions.

The effective date of this report is October 24, 2019.

3 Reliance on Other Experts

The authors are not qualified to provide an opinion or comment on issues related to environmental, legal, socio-economic, land title or political issues, and are therefore, not qualified to comment on issues related to permitting, legal agreements, royalties and environmental matters.

Accordingly, the authors of this Technical Report disclaim portions of this Technical Report, particularly in Section 4. More specifically, the authors have not attempted to verify the legal status of the Property; however, the Alberta Energy metallic and industrial mineral disposition of mineral rights management system shows that the Athabasca Mineral Leases are active and in good standing at the effective date of this Technical Report: October 24, 2019.

In addition, the Richardson Property Government of Alberta lease information was provided verbally by Mr. Robert Beekhuizen (CEO Athabasca Minerals) on March 20, 2019 and in Lease documents provided by Mr. Jan Cerny (VP Corporate Development, Athabasca Minerals) in October 2019.

The senior author and QP relied exclusively on the Property information in Sections 4.1 and 4.4 as provided by Athabasca Minerals.

4 Property Description and Location

4.1 Property Description

Athabasca Minerals Inc.'s Richardson Property is located comprises 3 contiguous Alberta Metallic and Industrial Minerals Leases totalling 3,904 hectares (9,647 acres), of which Athabasca Minerals holds 100% interest. The Property is located in northeast Alberta in the Athabasca oil sands region, approximately 80 km northeast of hamlet of Fort Mackay, and 130 km north-northeast of the city of Fort McMurray (Figure 1). The Richardson Property lies entirely within the 1:250,000 scale National Topographic System ("NTS") Map Sheet 074 E, more specifically the 1:50,000 within Map Sheets 074E10, 074E11, 074E14 and 074E15. The Property is approximately centered at 57° 48' 53" North Latitude and 111° 08' 30" West Longitude (491580E, 7277835N UTM). The Permits are contained within the Alberta Township Survey ("ATS") system Township ("T") 6, Range ("R") 102, west ("W") of the 4th meridian (T06-R102W4), T07-

R102W4, T08-R102W4, T09-R102W4, T06-R101W4, T07-R101W4, T06-R100W4 and T07-R100W4. The Richardson Property includes Alberta Metallic and Industrial Minerals Permits: 9310060418, 9310060419, 9312060367, 9312060387, 9312060388, 9312070594, 9312100494and 9312110408 (Figure 2; Table 3).

4.2 Property Rights and Maintenance

In Alberta, Alberta Metallic and Industrial Minerals Permits may be held by any organization, corporate entity, or individual which is properly registered to conduct a business in Alberta. The Alberta Metallic and Industrial Minerals Permits grant Athabasca Minerals the exclusive right to conduct metallic and industrial mineral exploration for up to 7-consecutive 2-year terms, totalling up to 14 years, subject to biannual assessment work and reporting. Permit holders are required to perform work compliant to $5.00/ha during the first term, then $10.00/ha for both the second and third terms. Over the fourth, fifth, sixth and seventh terms, $15.00/ha of work is required. Once a mineral deposit has been identified and the 14 years of MIM permits in good standing have passed, leases may be granted for a fifteen-year renewal term subject to annual payments of $3.50/ha, with no work requirements.

Athabasca Minerals original (ca. 2014) land position included 8 permits totalling 60,966 hectares (150,650 acres; Eccles et al., 2015). On January 18, 2019 the land position was converted to 3 leases totalling 3,904 hectares (9,647 acres), of which Athabasca Minerals holds 100% interest.

An Alberta Metallic and Industrial Minerals Lease grants the exclusive right to develop and mine Alberta-owned metallic and industrial minerals in a specified location. The term of a lease is 15 years, and it may be renewed. Annual rent must be paid. Royalties must be paid if any mineral production takes place on the lease.

The Alberta Mines and Minerals Act and Regulations (Metallic and Industrial Mines Tenure Regulation 145/2005, Metallic and Industrial Exploration Regulation 213/98) states the complete terms and conditions for work and permitting for mineral exploration in Alberta. These acts and regulations, among others pertinent to mineral exploration and mining in Alberta can be found on the Government of Alberta Queen’s Printer website (Alberta, 2014).

4.3 Coexisting Oil, Gas and Oil Sands Rights

Separate statues regulate the right to metallic and industrial minerals, to coal, to oil/gas, and to bitumen (oil sands) in the province of Alberta. These separate regulations enable a number of different rights to be held by different grantees and to coexist over the same geographic location. Oil/gas leases, coal leases, oil sands leases and permits coexist on the, in the vicinity of, and under, Richardson Property.

4.4 Land Use and Environmental Matters

In March 2019, the Government of Alberta created the Kitaskino Nuwenëné Wildland Provincial Park following discussions with Indigenous Peoples, industry and other stakeholders between December 2018 and February 2019. The new Wildland Provincial Park covers an area of 161,880 hectares and surrounds the Richardson Property. Note:

Based on feedback received during the consultation period, the final boundary of the park was adjusted to accommodate industrial activities currently taking place in the area.

Athabasca Minerals Inc. has the right to develop and mine Alberta-owned metallic and industrial minerals at the Property subject to procuring the appropriate Exploration Approval land use permits from the Alberta Environment and Parks (AEP) Land Administration Division. The Alberta Metallic and Industrial Minerals Leases identify the minor activity restrictions which apply to the granted land.

The Land Division of the AEP regulates the land use in Alberta, including the issuance of surface disturbance permits, in addition to structured local consultations. For the 2013 and 2014 drilling programs, a number of consultation meetings were conducted between Athabasca Minerals and aboriginal communities in the Fort MacKay to Fort McMurray area in order to acquire the Exploration Approval necessary for the drilling program.

At present, the authors and Athabasca Minerals have no knowledge of major obstacles to resource development, of any material restrictions, or of pending aboriginal claims on the Property or surrounding area. Sensitivities as outlined in Government correspondence to Athabasca Minerals include:

- Exploration and any proposed development activity must comply with all applicable provincial legislation and regulations;

- The Government of Alberta's "First Nations Consultation Policy on Land Management and Resource Development" may apply to surface activities proposed as a result of acquiring Crown mineral rights.

- Environmental concerns will be associated with rivers, creeks, lakes, and any sensitive terrain in the mineral permit area. Surface access will normally be available for exploration. However, topographic and ground conditions, as well as natural resource values, may restrict access in terms of erosion control, slope stabilization, access control, buffer zones, timing constraints, equipment restrictions, and other operational measures.

- The appropriate consent for surface access, including roads, must be obtained from existing landowners or occupants, prior to entry for development. On public land, the consent for surface access and development is obtained through a disposition under the Public Lands Act.

- Any exploration causing surface disturbance (e.g., motorized ground equipment, line cutting, drilling) will require a Metallic Mineral Exploration Approval pursuant to the Metallic and Industrial Minerals Exploration Regulation, prior to exploration. This requirement applies to public and non-public land.

- Environmental reservations may exist on some of the lands for the purpose of protecting environmentally sensitive areas. In addition, any Integrated Resource Plans (IRPs) in effect for the area will provide guidance on land use zoning, land management and potential access restrictions on public land. Areas of potential concern include, but are not limited to, fish and wildlife habitat, topography, soil and ground conditions, buffer zones, watershed protection, slope stability, erosion control, natural areas and recreation sites. Surface access will be restricted depending on the location and nature of exploration. Any restrictions that are considered appropriate by the public land manager will appear as conditions of the Approval. Surface access for development of mineral resources may not be available in some areas due to land use zoning in any applicable Integrated Resource Plan.

- Alberta Culture and Tourism's regulatory requirements can be satisfactorily addressed through Sections 31 and 37(2) of the Historical Resources Act. Depending on the location and extent of mineral exploration and the nature of the historical resources, there may be restrictions as well as the need for a Historical Resources Impact Assessment (HRIA).

In essence, it is the responsibility of the mineral rights holder to seek clarification from the appropriate public land management agency as to any land use or environmental concerns that may restrict surface access for exploration and potential future development.

4.5 Royalty Rates

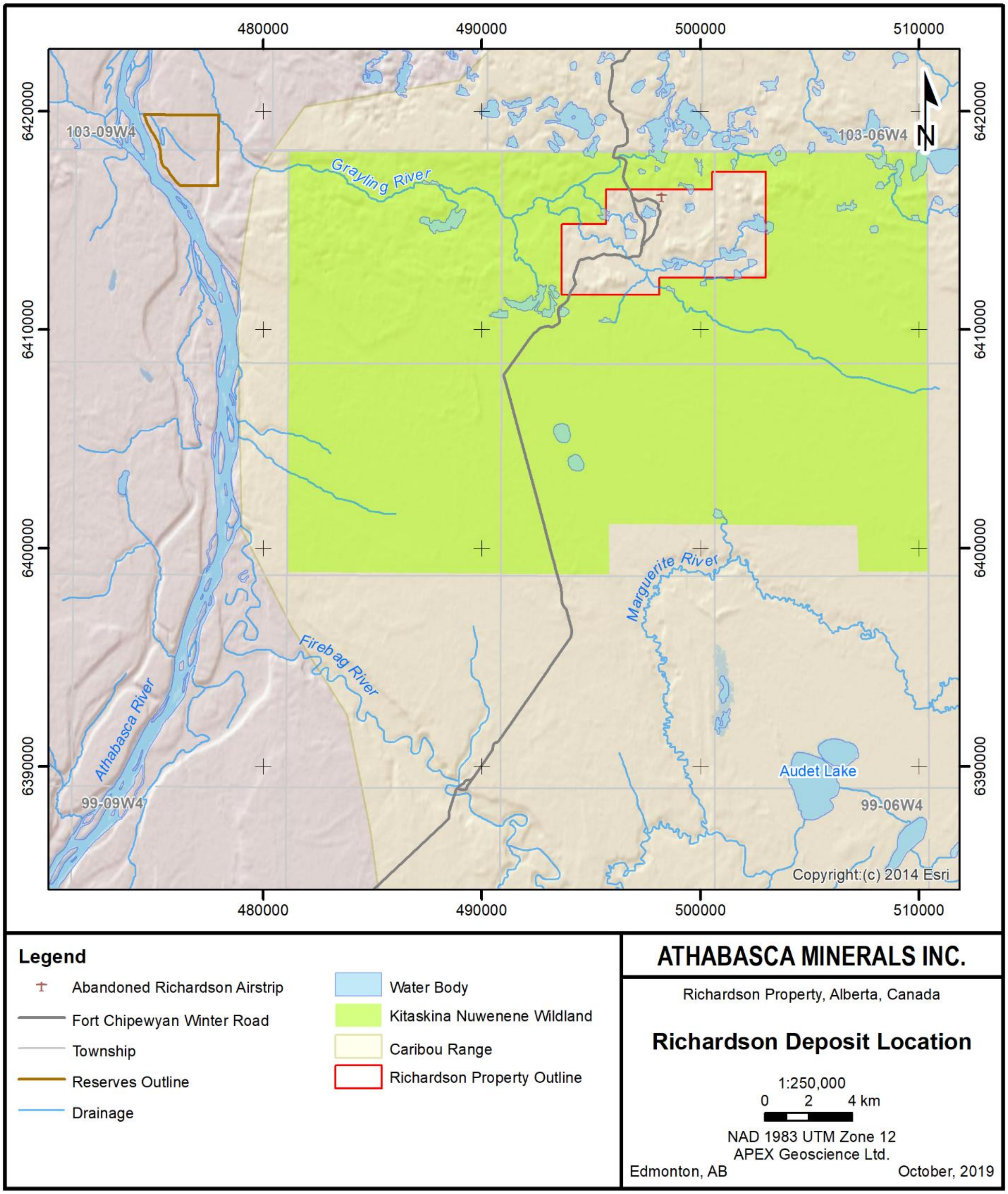
Royalty reporting requirements in Alberta are documented in the Metallic and Industrial Minerals Royalty Regulation (Alberta Regulation 350/1993). If development were to occur, Athabasca Minerals is required to fill out a mine royalty form for start-up of any new mine operation. Historically, royalty rates for “aggregate” from limestone, adheres to the limestone royalty of $0.0441 per tonne. For “aggregate” from gravel, the royalty is set by Alberta Environment and Parks, but general guidelines indicate royalty fees of $1.20 per cubic yard for gravel or a combination of sand and gravel as per the *Public Lands Act* (RSA 2000).

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Access and Infrastructure

There are no all-weather roads to the Property, however, a 280 km winter road extending from Fort McMurray to Fort Chipewyan provides intermittent access as it traverses through the western portion of the Property (Figure 3). Within the Property, the Fort Chipewyan Winter Road leads to the abandoned Richardson airstrip, which is located on the northern part of the Property. The winter road is only passable to vehicle traffic during the winter months, due to having to cross the Firebag River to the South of the Property. Year-round access to the Property can be accomplished by all-terrain vehicles (ATV). Fall and spring exploration programs would be possible (October to December and March to May) but is not often favourable due to insufficient frozen ground access and thin snow cover.

Figure 3. Winter road access and Athabasca Minerals Richardson Property.



Athabasca Minerals Inc.'s Richardson Property can be accessed by fixed wing and helicopter aircrafts from the city of Fort McMurray, which is located approximately 130 km south-southwest of the Property. Fort McMurray is nearly 500 km north of Edmonton, Alberta and accessible by road or by regular daily commercial flights from several international airports (e.g., Toronto, Calgary, Edmonton) and other communities.

Rail shipping services to Fort McMurray are offered by the Canadian National Railway Company. Canadian National operates the line that runs from the city of Edmonton and passes though the communities of Boyle, Lac La Biche, Conklin, Leismer, Chard, Cheecham and Anzac to its terminus at Lynton, which is southeast of the Fort McMurray airport (approximately 12.5 km west of Highway 63 on Highway 69). The line received a $135 million upgrade in 2008.

Exploration work in the Fort McMurray region, including the multi-billion-dollar oil sands industry, is facilitated by nearby support services and supplies, including medical and equipment supplies, rotary air support, expediting and communications. Telephones and radio communications are good quality, and cellular phone reception has good coverage in many areas, including within the Richardson Property area.

Accessibility to various areas throughout the region is fairly good, enabled by a system of highways, secondary roads and cut seismic lines that service the oil sands industry. The access routes are used year-round as winter and rush roads, and occasionally by all-terrain vehicles in the summer. The 2014 exploration program was undertaken from a trailer camp set up on the abandoned Richardson airstrip.

5.2 Physiography, Vegetation and Climate

The physiography of the Fort McMurray area is generally characterized by a flat to low relief terrain with land elevation varying between 240 m and 360 m above sea level ("m asl"). The Property is located within the Athabasca Plain and the Central Mixed Wood Natural Sub-regions of the Boreal Forest Natural Region (Downing and Pettapiece, 2006). The Central Mixed Wood Natural Sub-region occupies 25% of Alberta and is characterized by gently undulating to flat plains, upland forests (white spruce, aspen and mixed wood) and wetlands (treed fens). The Athabasca Plain Natural Sub-region is characterized by dune fields, sandy plains and gravel-cored hills populated by low shrubs and jack pine forests.

The principal waterways in the region are the Athabasca River and Clearwater River, fed by numerous small rivers and streams. Water at the Richardson Property area was sourced from nearby lakes and streams, although the ideal source of nearby fresh water is the Athabasca River, located approximately 15 km from the Property, because of its size and flow continuity.

The closest weather station producing long-term climate data (years 1971 to 2000) is located in Fort McMurray, and is available on the Environment Canada website (Government of Canada, 2014). Temperatures in the winter average -18.8 degrees Celsius ("°C") and a daily minimum temperature of -24.0° C during the coldest moth of January. In general, winters are long, having on average daily minimum temperatures below zero between the months of October and April, and below -10° C between

November and March. Summer temperatures are generally warm, averaging 16.8° C with an average daily maximum temperature of 23.2° C during the warmest month of July. Annual precipitation in Fort McMurray averages 455.5 mm, up to 81.3 mm in July and as little as 15.0 mm in February. Oil sands operations, and any aggregate operations in support of the oil sands, can operate year-round as can most exploration methods.

6 History

6.1 Historical Exploration with the Boundaries of the Richardson Property

Historical exploration work at the Richardson Property is defined by 2013 and 2014 drill programs completed by Athabasca Minerals. Collectively, these programs drilled a total of 12 drillholes totalling 1,078 m. The intent of the drill programs was to test the Devonian carbonate and Precambrian basement at the Richardson Property. The drill program cored complete stratigraphic sections of the uppermost carbonate lithostratigraphic unit (the Winnipegosis Formation) with the majority of the holes terminated in Precambrian basement granite. Because these drillholes form the main basis for the 3D geological model and mineral resource estimation presented in this Technical Report, the drilling description and results are presented in Section 10, Drilling.

6.2 Historical Exploration in the Northeast Alberta and Outside of the Richardson Property

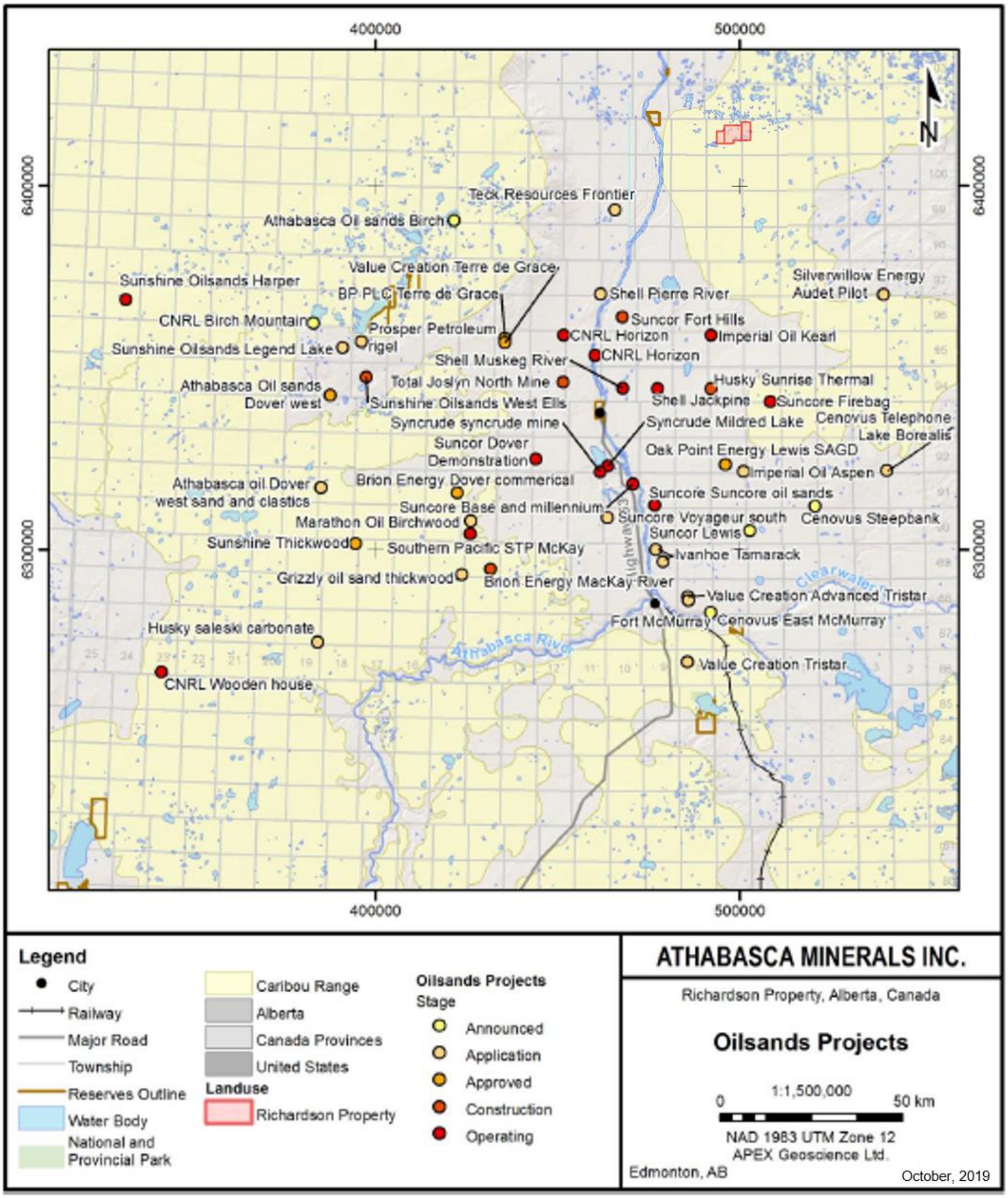
The authors have been unable to verify the information presented in this historical off-Property section, and therefore, the reader should be aware that the information is not necessarily indicative of the mineralization on the Richardson Property.

The Fort McMurray region is best known for its vast resource of bituminous oil sand. Based on the present bitumen recovery technologies, these oil reserves are estimated at 168 billion barrels (Alberta Government, 2013). The oil sands industry is a significant driver in the search for new sources of aggregate. That is, vast quantities of aggregate materials are required to supplement ongoing oil sands infrastructure construction demands. The location and status of oil sands operations in the general Richardson Property are shown in Figure 4. A total of six energy-related (oil sands) wells are known to have previously been drilled by companies other than Athabasca Minerals near the Richardson Property (Table 4).

Table 4. Historical energy-related wells that were drilled adjacent to the Richardson Property.

Well ID (UWI)	Operator	Spud Date	Total well depth (m)	Formation intersected at end of well	Status
1AA/02-05-101-07W4/00	Silverbirch Energy Corp.	14/02/2007	101.9	Devonian Beaverhill Lake	Drilled & Abandoned
1AA/07-22-100-07W4/00	Value Creation Inc.	11/03/2008	77	Createaceous McMurray	Drilled & Abandoned
1AA/11-19-101-07W4/00	Silverbirch Energy Corp.	19/02/2007	77.9	Devonian Beaverhill Lake	Drilled & Abandoned
1AA/12-04-101-07W4/00	Silverbirch Energy Corp.	16/02/2007	81.9	Devonian Beaverhill Lake	Drilled & Abandoned
1AA/12-06-101-07W4/00	Silverbirch Energy Corp.	21/02/2007	89.9	Devonian Beaverhill Lake	Drilled & Abandoned
1AA/12-31-101-07W4/00	Silverbirch Energy Corp.	18/02/2007	68.9	Devonian Beaverhill Lake	Drilled & Abandoned

Figure 4. Oil sands operations in the Athabasca Oil Sands region of northeastern Alberta, which are located directly south of the Richardson Property area.



While the energy industry is the main driver of the Alberta economy, several non-hydrocarbon mineral exploration discoveries have been made in northeastern Alberta since the 1990's. A summary of the various mineral commodity and deposit types in northeastern Alberta are summarized in the following text and in Figure 5 with consideration for their location with respect to Athabasca Minerals Richardson Property. With the exception of crush rock aggregate, which is the focus of this Technical Report, none of these resources and/or occurrences is known to occur at the Richardson Property, nor do the authors infer that the commodity types might exist on the Property. Rather this information is provided as general background knowledge for northeastern Alberta.

6.2.1 Crush Rock Aggregate, and Sand and Gravel Aggregate

South of the Richardson Property, Hammerstone Corporation operates the Muskeg Valley Limestone Quarry (also known as the Hammerstone Project), which provides aggregate and limestone products for construction aggregate and for flue-gas desulphurization for the oil sands extraction process (Figure 5). The quarry has four limestone units, each of which produces products with distinct chemical and physical properties.

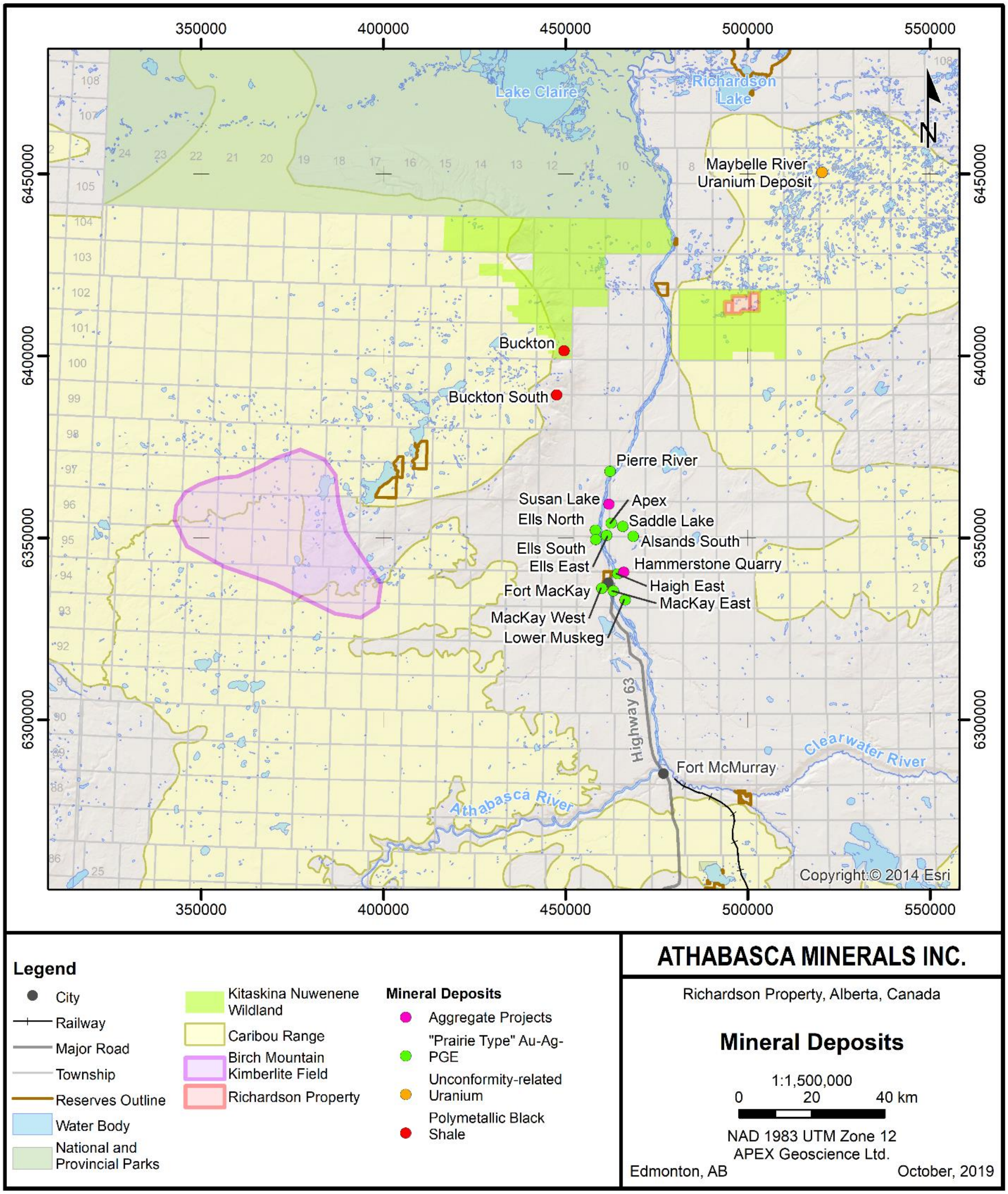
In addition to the Richardson Crush Rock Property, Athabasca Minerals has been awarded Provincial contracts to manage the Susan Lake Public Aggregate Pit, which is now closed, and the Coffey Lake Public Aggregate Pit (Athabasca Minerals Inc., 2019). These pits are located southwest of the Richardson Property and are situated in near existing oil sands developments and have accessible year-round road infrastructure such that aggregate from the pits provides gravel to the majority of the oil sands companies operating in northern Alberta.

With respect to crush rock aggregate, the description of limestone aggregate and sand and gravel at Hammerstone Corporation's Muskeg Valley Limestone Quarry and aggregate from the Coffey Lake Public Pit is in no way implied to extend onto the Property, but is provided as supplemental information, and to make note of the potential for, and importance of, crush rock aggregate deposits in the expanding oil sands area north of Fort McMurray.

6.2.2 Polymetallic Black Shale

Southwest of the Property, the Birch Mountains area is known to host near-surface polymetallic Ni-cobalt (Co)-Zn-Cu-U-rare-earth elements (REE)- yttrium (Y) black shale (Figure 5). The mineralization is hosted in three late Upper Cretaceous shale units: Labiche, Second White Speckled Shale and Shaftesbury formations. The shale package comprises flat-lying, near-surface mineralization that is envisaged to extend over a vast area (100's of km^2) across the Birch Mountains.

Figure 5. Summary of selected industrial and metallic mineral projects and occurrences in northeastern Alberta.



6.2.3 Uranium

To the northeast of the Property, the Athabasca Basin accounts for roughly 15% of the world's annual uranium production. The majority of the unconformity-associated uranium mines and prospects occur in the eastern portion of the basin where ca. 1.7 to 1.5 Ga Athabasca Group clastic sedimentary rocks unconformably overlie the western Wollaston and Wollaston-Mudjatik basement domains. However, significant uranium discoveries such as the Cluff Lake Mine and Shea Creek Deposit near the Saskatchewan-Alberta border (underlain by the Clearwater Domain), and the Maybelle River prospect in Alberta (underlain by the Taltson Magmatic Zone), demonstrated the potential for similar unconformity-associated uranium deposits in the western part of the Athabasca Basin (Figure 5; Ruzicka, 1997; Jefferson et al., 2007; Pană and Olson, 2009). Pană and Olson (2009) concluded that shear/fault–controlled hydrothermal convection through a fertile granitoid basement which was sealed by the late Paleoproterozoic to early Mesoproterozoic Athabasca Group strata was the key mechanism in the origin of these deposits.

6.2.4 Prairie-Type Precious Metals

South of the Property, Birch Mountains Resources Ltd. proposed a 'Prairie-type' deposit model, in which reduced formational fluids interacted with sulphate-rich evaporite and red beds to become oxidized brines (Figure 5; Feng and Abercrombie, 1994). The latter leached gold and other metals from the basement and/or red bed units and carried the metals as chloride complexes. The metal-loaded solutions migrating across formations at the solution front of the Prairie Evaporite Formation and/or along fault-breccia zones deposited the metals either at a reducing interface (e.g., organic matter in the overlying carbonate and clastic rocks) or due to mixing with fluids of contrasting activity of electrons (Eh), activity of hydrogen ions (pH) or salinity (Abercrombie and Feng, 1997).

Feng and Abercrombie (1994) first documented 0.5–2 µm scale native gold (Au), silver (Ag), bismuth (Bi), cadmium (Cd), copper (Cu), lead (Pb), tin (Sn) and zinc (Zn), along with their alloys, sulphides, oxides, chlorides, carbonates and other compounds in the Precambrian basement granitoids and overlying Phanerozoic rocks of northeastern Alberta (Abercrombie and Feng, 1997).

6.2.5 Diamondiferous Kimberlite

During 1998-1999, eight kimberlitic intrusions were discovered in the Birch Mountains, which is located southwest of the Property (Figure 5). The Birch Mountains kimberlite field contains an eclectic mixture of alkaline to evolved kimberlite compositions, and therefore, has significantly lower diamond content than the Buffalo Head Hills kimberlite field, which is located in north-central Alberta (Eccles, 2011). All eight bodies were sampled for diamond and only two pipes, Phoenix and Legend returned minimal diamonds (Aravanis, 1999).

During 1998-2000, Ashton Mining of Canada Inc. ("Ashton") collected 168 till samples for kimberlite-indicator mineral ("KIM") analysis from their Athabasca Property, which encompassed a large region of northeastern Alberta (Skelton and Bursey, 2000).

Fifty-eight samples returned positive grain counts, however, none of the sample results contained higher than six total grains of combined pyrope, chrome diopside, olivine, chromite or picroilmenite. Within the Richardson Property, the Ashton survey sampled no sites. Ashton also conducted an aeromagnetic survey. Unfortunately, the Ashton assessment report does not include any geochemical data associated with the KIM grains (i.e. only grain counts are recorded).

7 Geological Setting and Mineralization

7.1 Regional Geology

The regional inferred basement geology, bedrock geology and stratigraphic table of formations are presented in Figures 6 and 7 and Table 5, respectively, and summarized in the text that follows.

The majority of Alberta is underlain by sedimentary sequences of the Western Canada Sedimentary Basin (“WCSB”), which is bounded to the west by the Rocky Mountains and to the east by the Canadian Shied. In Alberta, the WCSB is composed of a Phanerozoic wedge of strata overlying the crystalline Precambrian basement. This wedge measures up to 7,000 m in thickness adjacent to the foothills and diminishes to its zero edge along the Canadian Shield to the northeast (Mossop and Shetsen, 1994).

7.1.1 Precambrian Basement Geology

Basement rocks typically are masked by sedimentary rocks of the WCSB, and as such, the basement domains underlying much of Alberta are inferred from the few oil and gas wells that have penetrated to basement, and the chronological studies performed on relatively few cores; as a result the basement terrains are defined predominantly from regional, widely-spaced aeromagnetic data (Thériault and Ross, 1991; Ross et al., 1991; Ross et al., 1994).

With the exception of the easternmost portions of the Property, basement rocks on the Richardson Property are generally covered by WCSB sedimentary rocks. The basement rocks underlying the WCSB in the Property area consist of two main lithotectonic zones: the Taltson Magmatic Zone and the Rae Province (Figure 6). The Taltson Magmatic Zone is characterized by a 150 to 200 km wide, north-trending belt of positive aeromagnetic anomalies (Ross et al., 1991, 1994). The Taltson magmatic zone contains a wide belt of meta-plutonic rocks that can be split into ca. 1.986-1.959 Ga magnetite-series (I-type) or continental-arc plutons (e.g. Bostock et al., 1987; McDonough et al., 2000) and ca. 1.955-1.910 Ga peraluminous (S-type) plutons (e.g. Bostock et al., 1987; McDonough et al., 2000). These plutons intruded a narrow belt of Mesoarchean to Paleoproterozoic orthogneisses and granitoid rocks (e.g. McNicoll et al., 2000), termed the Taltson basement complex.

Figure 6. Inferred basement domains in the Richardson Property area. From Ross et al. (1994).

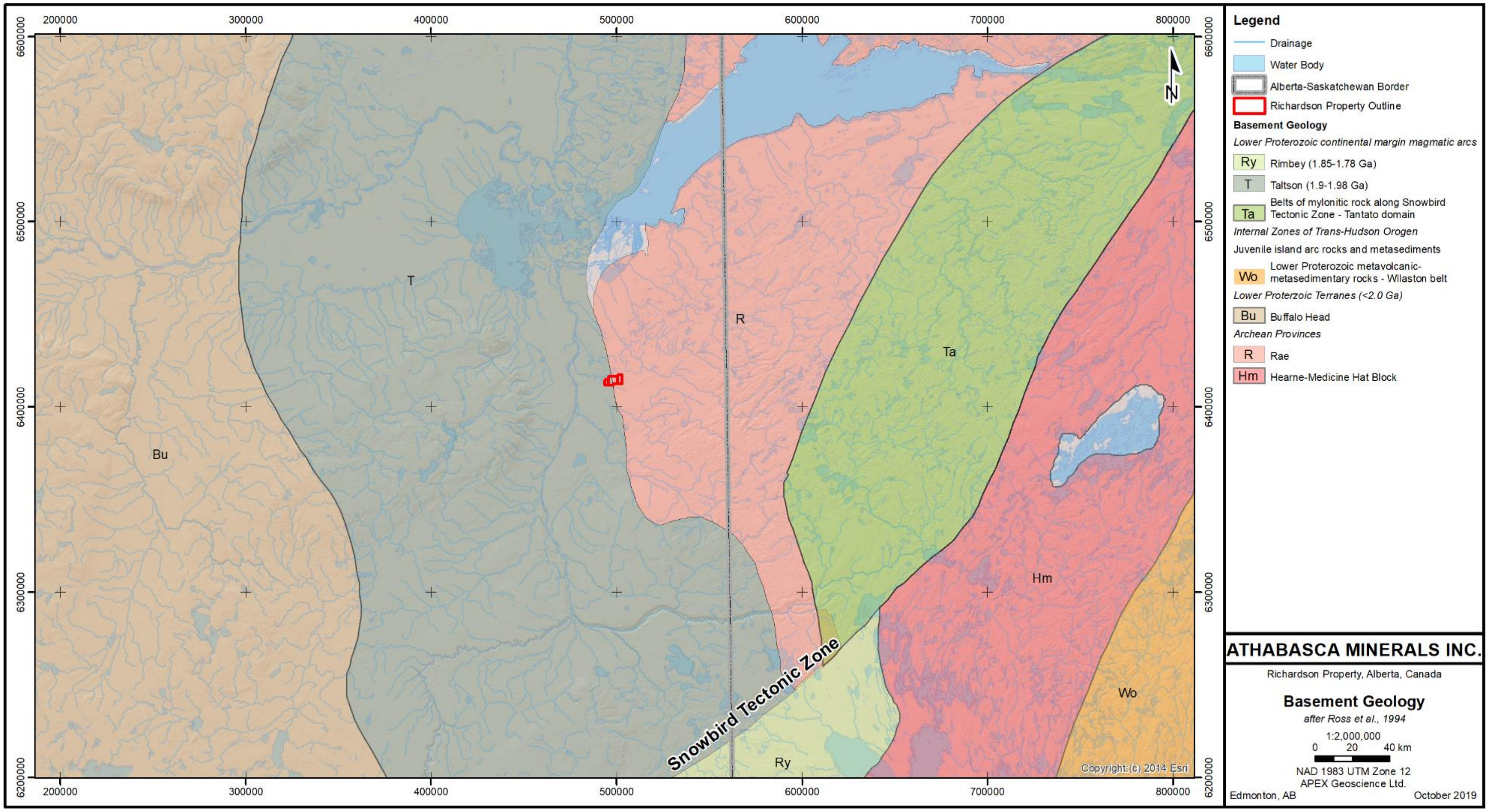


Figure 7. Regional bedrock geology of the Richardson Property area. From Prior et al. (2013).

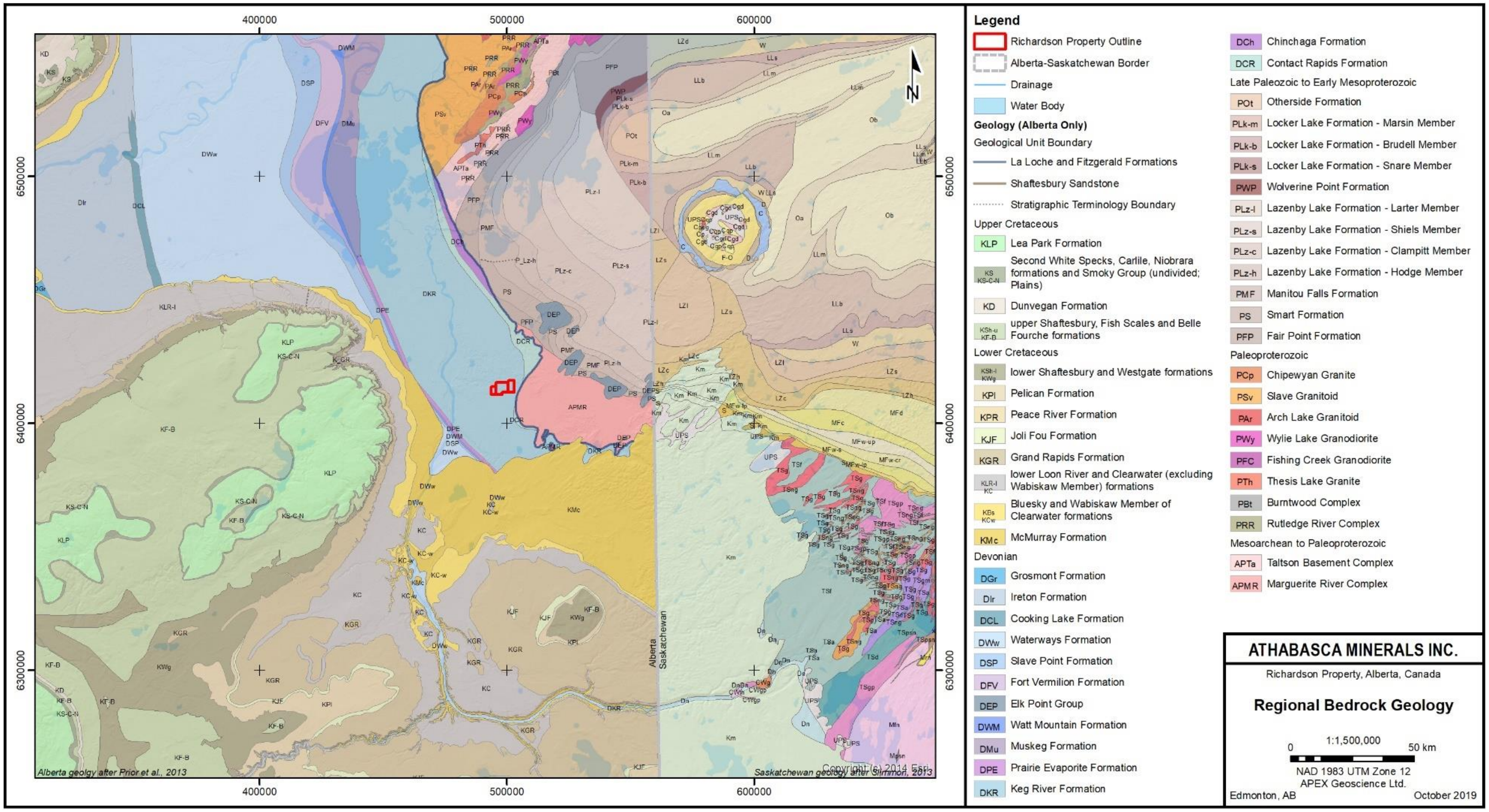


Table 5. Stratigraphic Table of Formations in northeastern Alberta. The bedrock geology at the Richardson Property area is confined to the lower portion of the table in Precambrian and Middle Devonian rocks.

System or Subsystem	Group	Formation	Member
Quaternary			
Upper Cretaceous	Smoky		
	La Biche	La Biche	
		Shaftesbury	
Lower Cretaceous	Mannville	Grand Rapids	
		Clearwater	Wabiskaw
		McMurray	
Upper Devonian	Woodbend	Grosmont	
		Ireton	
		Cooking Lake	
	Beaverhill Lake	Waterways	Mildred
			Moberly
			Christine
			Calumet
			Firebag
Middle Devonian		Slave Point / Fort Vermillion	
	Upper Elk Point	Watt Mountain	
		Prairie Evaporite	
		Winnipegosis / Keg River	
	Lower Elk Point	Contact Rapids	
		La Loche	
Precambrian	Marguerite River Complex		

*Modified after Halferdahl (1985); Cotterill and Hamilton (1995)
~~~~~ Erosional Unconformity
- - - - - Paraconformity

Rocks south of, and underlying, the western Athabasca Basin have historically been included in the Rae Province (e.g., Ross et al., 1991, 1994). The Rae Province is comprised of five domains (Zemlack, Beaverlodge, Tantato, Lloyd and Clearwater domains) consisting mainly of deformed and metamorphosed granite and granitoid gneiss (Sibbald, 1974; Lewry and Sibbald, 1977; Ross et al., 1994; Hanmer, 1997). The Clearwater Domain is an elongated basement trend contiguous with the 1.85-1.78 Ga Rimbey Arc in Alberta (Ross et al., 1994), a basement feature that coincides with the 560 km long Leduc-Homeglen-Rimbey-Meadowbrook reef chain.
~~~~~

7.1.2 Bedrock Geology

With the exception of the easternmost part of the Property where basement rocks crop out, Precambrian metamorphic and igneous rocks in the Property area are unconformably overlain by Devonian rocks of the WCSB (Table 5; Norford et al., 2004; Meijer Drees, 1994). Lower Devonian rocks found within the WCSB are only remnants of what once where extensive sedimentary rock layers deposited over the majority of the Craton, which were subsequently almost entirely eroded. The Lower Devonian sedimentary rocks generally consist of shallow-water carbonates and minor evaporate and clastic rocks, with a sharp change to basinal limestone and shale along the western border (Norford et al., 2004).

Stratigraphic sequences of the Lower to Middle Devonian Elk Point Group are more common and generally occur throughout the Interior Plains. Elk Point Group strata are composed of carbonate, evaporate, red bed and clastic rock units. Unconformities representing periods of erosion, subaerial exposure and non-deposition separate the sequences from one another (Bebout and Maiklem, 1973; Meijir Drees, 1980). Three erosional unconformities, the pre-Devonian, the sub-Headless and the sub-Watt Mountain subdivide the Elk Point Group (Moore, 1988; Morrow and Geldsetzer, 1988; Meijer Drees, 1990). The Elk Point Group measures up to 1000 m thickness in the Mackenzie Mountains and as little as 215 m in the southern plains. It is exposed in the Cordilleran Orogen and along parts of the WCSB's northeastern margin. Upper Elk point Group formations are extensive and define the Elk point Embayment which extends from North Dakota through southern Manitoba and Saskatchewan to northeast British Columbia (Meijer Drees, 1994).

The Middle to Late Devonian Beaverhill Lake Group occurs throughout much of Alberta and reach thicknesses up to 240 m. It is unconformably deposited over the Elk Point Group and is unconformably to conformably overlain by the Woodbend Group. Two stratigraphic phases subdivide the succession into a transgressive reefal phase dominated by the Slave Point and Swan Hills carbonate formations, and a regressive basin-fill phase dominated by argillaceous carbonate and shale of the Waterways Formation. The transgressive phases occurred first during sea-level rise, depositing sedimentary rocks of the Watt Mountain Formation, and carbonate and evaporate of the Fort Vermillion Formation, and carbonate of the Slave Point Formation. Three reef complexes (the Hay River Bank, the Peace River Arch Fringing reef Complex and the Swan Hill Complex) developed after the formation of a platform. During the regression phase, the Souris River Formation (Souris River Shelf) was formed, followed by progradational deposition of the Waterways Formation (Oldale and Munday, 1994)

The Woodbend and Winterburn groups of the Late Devonian are composed of cyclic clastic and carbonate with minor cyclic carbonate and evaporite sequences. Deposition of the Woodbend Group occurred during a period of gradual deepening of the WCSB, filling the basin with marine shale deposits. Alternatively, the Winterburn Group was deposited during a period of shallowing and basin filling. Together, the Woodbend and Winterburn groups can measure up to 850 m in thickness. They are recognizable by the thick (over 275 m) Leduc Formation reef complex and the Muskwa and Duvernay formations; both known to be source rocks high in bitumen. Subsequent transgressive cycles lead to the deposition of the Lower Ireton, the Upper Leduc, the Upper Ireton, the Nisku, and the Blue Ridge intervals, although regression was dominant and resulted in relatively flat topography (Switzer et al., 1994).

In 1990, the Woodbend and Winterburn groups were known to contain roughly 11 and 32 percent of the oil-equivalent gas reserves and initially established conventional oil within Paleozoic strata in the Alberta Basin, respectively (Energy Resources Conservation Board, 1990). In general, these pools of oil and gas are characteristic of ancient reef complexes formed by different depositional settings, size, shape and facies composition (Alberta Society of Petroleum Geologists, 1960, 1966 and 1969).

The Wabamun Group is the youngest Devonian strata of the WCSB found in the subsurface of British Columbia, and in southern Alberta and Saskatchewan. It is composed of a number of cycled shelf and ramp carbonate and associated evaporite deposits. These rocks sub crop from Manitoba to Alberta along a 700 km belt. The Wabamun Group’s northern and eastern margins are characterized by pre-Mesozoic erosion. Two major stratigraphic sequences represent the Wabamun Group; the Stettle Formation composed of a low and high-stand carbonate sequence unconformably overlain by the Big Valley Formation composed of a siliclastic-carbonate low stand of the Banff assemblage (Halbertsma, 1994).

7.1.3 Surficial Geology

Surficial deposits in northeastern Alberta are dominated by diamicton (till), glaciofluvial and lacustrine deposits, which were deposited directly by glacial ice comprised of a mixture of clay, silt, sand and minor pebbles to boulders. Factors influencing the location of thick accumulations of sediment in northern Alberta are: 1) preglacial valleys; 2) bedrock highlands and remnants; 3) ice marginal still-stands; and 4) bedrock contacts or scarps (Fenton et al., 2013). Glacial advances in northern Alberta originated from the Laurentide Ice Sheet, which generally flowed across Alberta in a southwesterly direction (Dyke et al., 2002).

7.2 Property Geology

The Richardson Property area lies along the passive, eastward thinning margin of the WCSB where sedimentary successions unconformably overly and on lap the southwest dipping Precambrian basement. Within the Property, Precambrian basement, Devonian carbonate and surficial deposits are exposed or occur near surface.

7.2.1 Precambrian Basement Geology at the Property

The crystalline basement in the Richardson property area is part of the Taltson Magmatic Zone and Rae Province. Basement rocks in Alberta typically are observed from oil and gas wells that have penetrated through the WCSB to basement. A total of twelve oil and gas wells were drilled historically on the Richardson Property (all prior to 2013). None of these wells penetrated basement, and as such the depth from surface to basement, originally, was estimated at zero to 200 m (Wright et al., 1994). In the greater Richardson Property area, a total of three wells have penetrated bedrock, the closest of which, is located approximately 15 km north of the Property and intersected the Precambrian at 70.1 m depth.

Precambrian basement rocks consisting of meta-igneous and granitoid lithologies are known to crop out in the Property area. Exposures of the Mesoarchean to Paleoproterozoic Marguerite River Complex are found on the eastern edge of the Property, through Permits 9312060387 and 9312060388. The Marguerite River Complex comprises of undifferentiated granite, Arch Lake-type granitoid, hornblende-quartz monzonite and granitoid gneiss rocks (Dufresne et al., 1994; Prior et al., 2013).

Based on exposures of granite and drill cores, the Precambrian basement at the Richardson property area is comprised of a medium to coarse grained granite with a weak foliation defined by the alignment of biotite grains. The granite is variably potassic altered ranging from light blue grey to salmon pink. Coarse grains of quartz and alkali feldspar dominate the granite.

7.2.2 Bedrock Geology at the Property

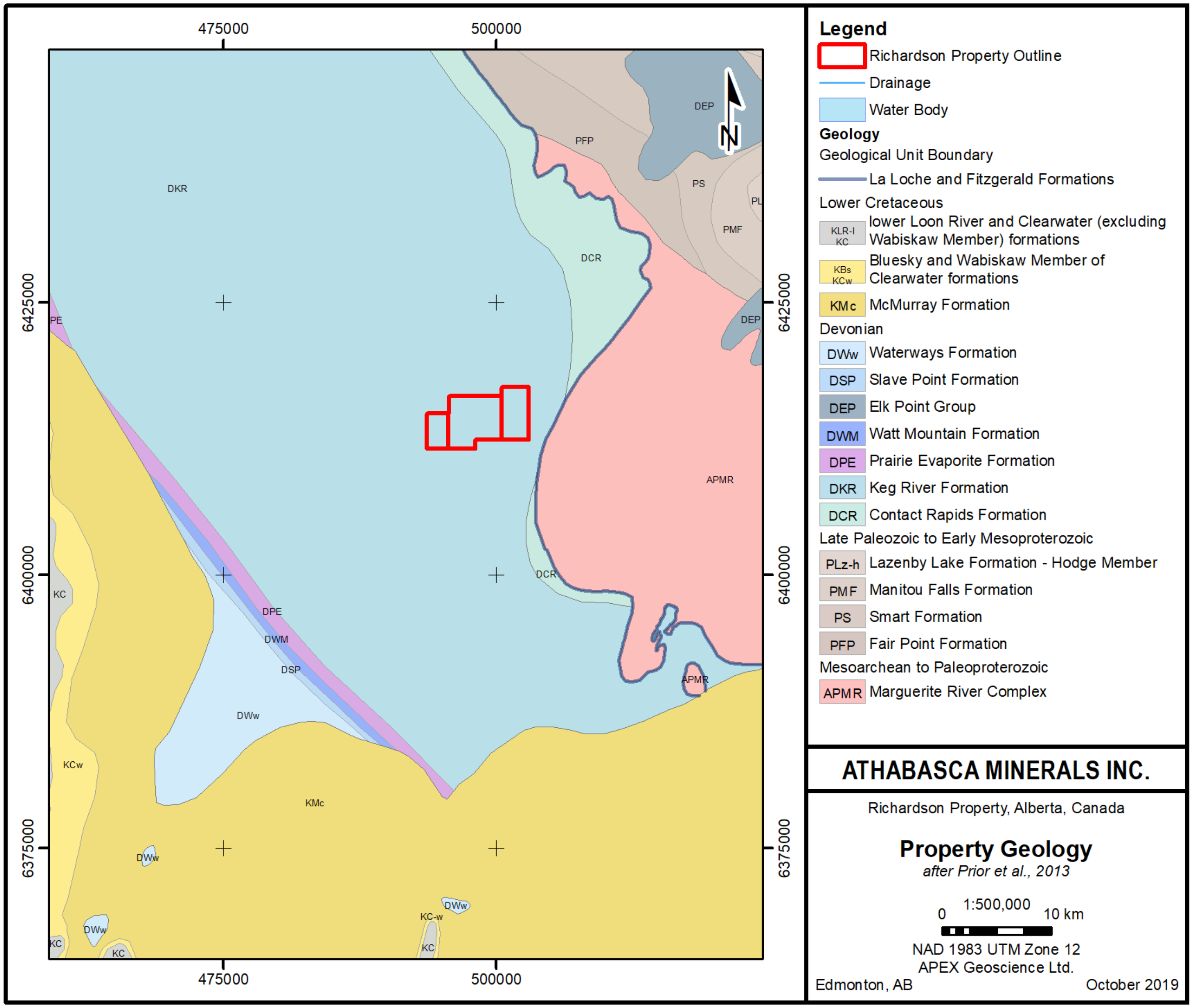
The majority of the basement rocks within the Richardson Property are overlain by Devonian bedrock (Figure 8; Table 5), in addition to Quaternary surficial deposits. Most of the bedrock found on the Property comprises the Middle Devonian Winnipegosis Formation of the Elk Point Group. The Winnipegosis Formation reflects an open-marine platform and reef system and is composed of thickly bedded brownish to yellowish-grey dolostone containing various fossils (Macoun, 1877; Bassett, 1952).

The Winnipegosis Formation can be separated into two different members, a thinly-bedded lower member and a massive upper member. The lower member consists of a thick, finely crystalline light brown and moderately vuggy calcareous dolostone containing local grey chert nodules and silty crenulated laminae. The upper member consists of finely crystalline light brown to mottled medium and light brown, massive to irregularly thick-bedded vuggy dolostone which contains greenish-grey chert in its lower section. Sparse brachiopod, bivalve and gastropod fossils can be found within the Winnipegosis Formation (Norris, 1963).

Specific to the Property area, and as interpreted in this Technical Report, the Winnipegosis has not been subdivided into two members. While the Winnipegosis Formation does comprise variable texture, chemical and physical rock properties (e.g., RQD) over its entire length, the formation overall, is extremely consistent and there does not seem to be a readily identifiable break between and upper and lower members. While the lithological units vary from mudstone to packstone to boundstone, there was no single consistent stratigraphic position where one particular property was dominant over the other (i.e., where one texture was dominant enough to define upper and lower members).

Underlying the Winnipegosis Formation, the Contact Rapids Formation is comprised of marginal marine dolomitic silty shale, argillaceous dolostone and shale-siltstone with brachiopods, tentaculites and small spores (Sherwin, 1962; Meijer Drees, 1994). A conformable gradational to sharp contact separates the Contract Rapids Formation from the Winnipegosis Formation (Norris, 1963). The Contact Rapids Formation reportedly occurs on the Property between near the Marguerite River Complex (Permits 9312060387, 9312060388 and 9312110408; Prior et al., 2013).

Figure 8. Bedrock geology at the Richardson Property (after Prior et al., 2013).



A discontinuous zone of detrital basal feldspathic sandstone and conglomerate known as the La Loche Formation (equivalent to the Granite Wash) typically occurs between the Contact Rapids Formation and the crystalline Precambrian basement.

The La Loche Formation is of Early Devonian age or older, and comprises fine to medium-grained pale brown, irregularly lenticular to thinly-bedded arkosic sandstone, cemented with hematite and containing sub-rounded to angular coarse quartz and feldspar fragments (Sherwin, 1962; Norris, 1963). Core interpretation indicates that the upper and lower contacts of the formation the basement rocks and the overlying Contact Rapids Formation are gradational (Norris, 1963).

7.2.3 Surficial Geology at the Property

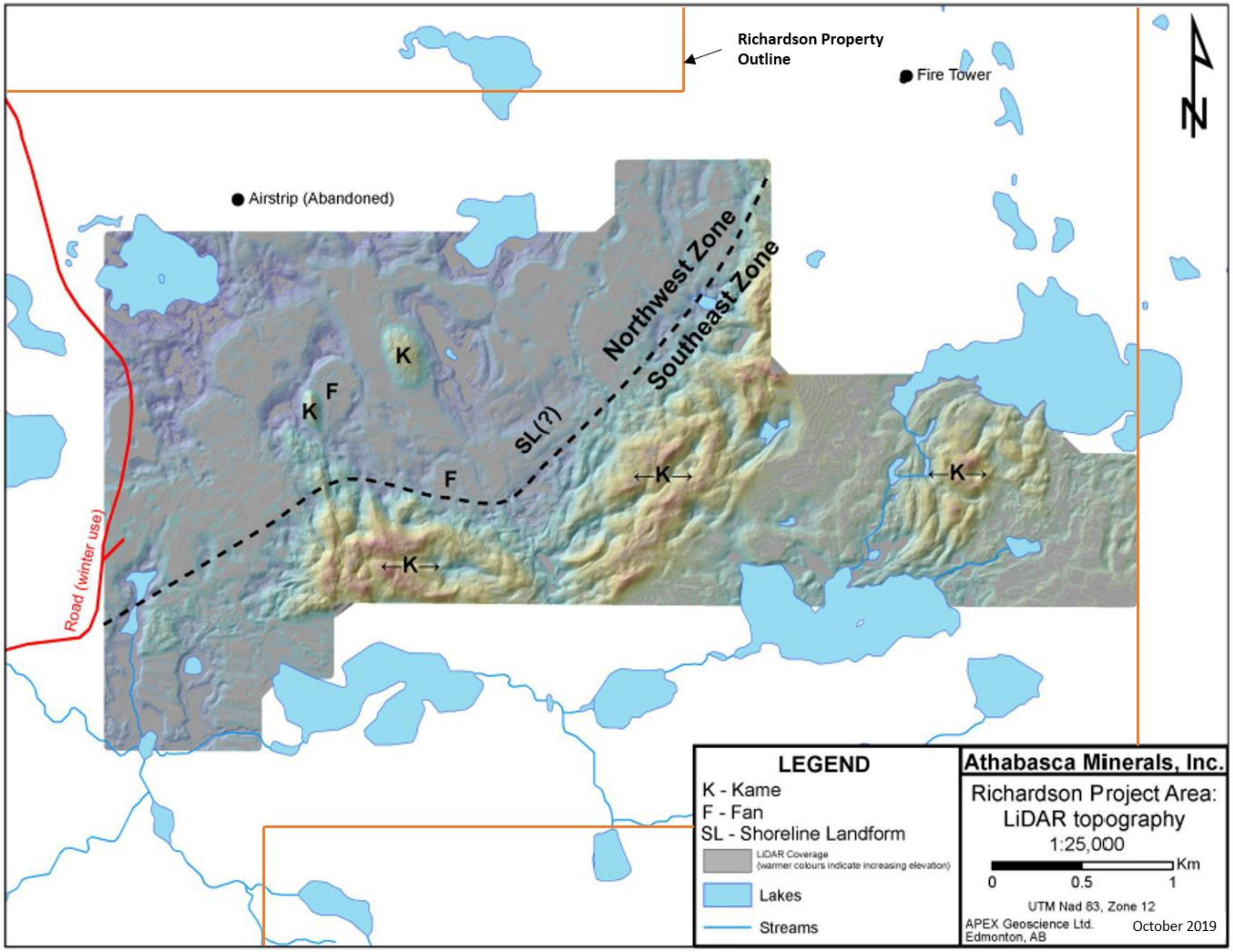
A preliminary surficial geology interpretation of a part of the Property (the area of exploration interest; see Figure 9) was completed by APEX prior to selecting drill collar locations for the 2014 drill program. Using LiDAR data, the Richardson Property is dominated by uneven landforms typical of ice-contact glaciofluvial processes, such as kettle depressions and kame deposits (Figure 9). Glaciolacustrine processes have also affected the Property topography, typically redistributing sediments into low-lying areas and erosion.

Two topography zones have been defined using LiDAR data; a Southeast Zone consisting of hilly topography, and the Northwest Zone consisting of relatively flat topography (Figure 9). The Southeast Zone is characterized by large hills and valleys measuring hundreds of metres in width, generally trending northeast-southwest up to ten km long and up to 40 m in elevation. In the Southeast Zone, shoreline features seem to be present at an elevation of approximately 295 m, near the base of kame hills. Two kame drainage streams have created outwash fans, causing moderate dissecting of the kames. Small and sporadic gravel lags may be present within stream valleys (McMillan, 2013).

The Northwest Zone is characterized by a mostly flat landscape commonly littered with depressions and lesser hills. The flat landscape likely reflects wave action erosion. A number of small moraine ridges formed during retreat of the Laurentide Ice Sheet. Two kame deposits are present, likely consisting of mixed sand and gravel material. The deposits trend northwest-southeast and measure up to 200 m wide and 400 m long and are about 325 m in elevation. Depressions exceeding 50 m (often 100 m) wide and 3 m deep appear to correlate with one another in linear patterns over several hundred metres.

The division between the Southeast and Northwest Zones of the Richardson Property was created by the former shoreline of Lake McConnell; a glacial lake located along the western edge of the Laurentide Ice Sheet (Smith, 1994). Glacial Lake McConnell inundated the majority of the Northwest Zone, after approximately 10,500 years before present (Dyke and Prest, 1987; Smith and Fisher, 1993; Smith, 1994). The hilly topography of the Southwest Zone prevented it from being inundated by Lake McConnell.

Figure 9. Preliminary surficial geology interpretation of the Richardson Property.



In general, the soils on the Property are classified as leached, well-drained soils with occasional peaty soils. Soil differences occur where landscape varies between being sloped, hummocky and ridged. In the southeastern corner of the Property, soils have developed on a hilly landscape, where they drain quickly, contrary to the southern region of the Property, where organic-rich soils drain poorly.

7.3 Mineralization

One objective of this Technical Report is to assess the rock properties associated with the Winnipegosis Formation dolostone and Precambrian granite at the Richardson Property for their suitability as potential crush rock aggregate. Dolomite used as crush rock aggregate must be strong, durable and have a low porosity in order to limit water absorption (Brown et al., 2013). Good aggregate is associated with thick sections of pure dolomite that are well cemented (Ault, 1989). Carbonate rocks are generally strong due to their interlocking grain fabrics and carbonaceous mineralogy (Langer, 2006); although they can become stronger if they are subjected to silicification processes (Langer, 2006). Over time, carbonate rocks are often subjected to more recrystallization processes, which in turn increase their strength and decrease their porosity. Consequently, these older rocks are more favourable aggregate materials than younger ones (Bell, 1993).

Igneous rocks such as granites typically produce strong aggregates that are skid resistant and therefore, are favourable road aggregate materials (Brown et al., 2013). Igneous rocks of intrusive origin are generally strong and hard due to their mineralogy, grain intergrowth and small grain size. Ideal igneous rocks have been subjected to minimal weathering and contain few, if any, large grains and soft minerals (Langer, 2006).

Geotechnical and geochemical test work to assess the crush rock aggregate potential of the Winnipegosis Formation dolostone and Precambrian granite at the Richardson Property are reported in the Mineral Processing and Metallurgical Testing Section of this Technical Report.

8 Deposit Types

The main deposit type for consideration at the Richardson Property is crushed rock aggregate. However, because Athabasca Minerals is drilling some of the first drillholes to core Precambrian basement in this area, secondary consideration must also contemplate the potential for a variety of metallic mineral deposit types. While this list could be exhaustive, we have limited the discussion in this Technical Report to rare-earth element and Archean lode gold deposits.

8.1 Construction Aggregate

Construction aggregate refers to materials that are hard and granular and are suitable to be used alone or with other materials as binding agents. They are produced from a variety of construction materials that are usually produced as low-cost, high-volume and bulk minable commodities (Hack and Bryan, 2006; Brown et al., 2013). The most common uses of aggregate include: concrete in building construction; road stone;

railway track blast; or mortar. Limestone and dolomite sourced aggregate can also be used as a flux in iron and steelmaking, or to reduce coal sulphur dioxide emissions.

Generally, aggregates should be strong, hard, tough and sound materials with low porosity (Langer, 2006; Brown et al., 2013). Rock soundness is influenced by pore sizes, continuity and abundance, fractures and channels, degree of water saturation and the presence of particles that are weak, absorbing, swelling or have cleavages (McLaughlin et al., 1960; Langer, 2006). Important properties to consider include rock type, shape, size, orientation, and mineral grain proportions, contacts, layering, and porosity (Dolar-Mantuani, 1983; Langer, 2001). Rocks with high specific gravities generally have low porosity and therefore are often associated to high-quality aggregate material (Langer, 2006). Aggregates used in the load-bearing layers of roads must resist impact loads, crushing, and weathering. They must also have good drainage properties, which are determined by pore size distribution, grading and pavement laying methods. Pavement surfacing aggregates, on the other hand, must resist stripping and polishing (Brown et al., 2013).

Approximately 15 billion tons of aggregate is produced worldwide each year, primarily in the United States, the European Union, China, Russia, Japan and Canada (Langer, 2006). In the United States, approximately 2.6 billion tons of aggregate is produced annually, where crushed stone comprised 71% limestone, dolomite and marble, and 15% granite in 2000 (Hack and Bryan, 2006; Langer, 2006).

In Canada, Alberta accounts for approximately 67,200 kilotonnes ($1.75 billion), or 30%, of the total volume of Canada's sand and gravel production (Natural Resources Canada, 2014). Most of the aggregate resources have glacial origins, with only a small amount (approximately 10%) of the provincial aggregate resources resulting from recent alluvial deposits (Edwards, 1995). It is fairly common, however, that aggregate production in Alberta is disproportionately reliant on alluvium as these sources are generally near surface, and consequently, easier to locate and cheaper to extract. Bedrock is extracted from below the surface in those areas of Alberta where aggregate is not readily available, and/or specific end product qualities are required. For example, in the vicinity of the Richardson Property, limestone is currently being extracted for crush rock aggregate and for quicklime processing to remove impurities such as sulphur dioxide from smokestack emissions associated with oil sand operations.

8.2 Dolomite Crush Rock Aggregate

Dolomite is a bedded to massive, often slightly porous sedimentary rock composed primarily (over 90 %) of the carbonate mineral dolomite (Freas et al., 2006; Highley et al., 2006; Ministry of Energy, 2013). Dolomite is generally a secondary replacement rock that typically forms through alteration processes of calcium carbonate sediment or rock caused by saline brines, although they can occasionally form by the precipitation of seawater (Freas et al., 2006). Dolomite typically form large tabular rock bodies often found within thick sedimentary sequences and associated with dolomitic limestone, limestone, sandstone, evaporate and argillite, but can also be associated with sills, tuffaceous rocks, palagonite breccia, submarine lavas and chert interbeds and layers (British Columbia Ministry of Energy and Mines, 2013).

Carbonate rocks can vary from Precambrian to Holocene age and constitute low-value, high-volume commodities. Carbonate rocks have been quarried or mined in every state in the US, and in all but one province in Canada (Freas et al., 2006). Examples of dolomite quarries include Pilot Point and Rock Creek, British Columbia, Stony Mountain, Manitoba, Guelph, Ontario, Havre-Saint-Pierre, Quebec, Keystone, Washington, York, Pennsylvania, and a number of quarries throughout the United Kingdom, Italy and France (Ministry of Energy, 2013). In 2001, the United States sold and used a total of 101,000,000 tons of crushed dolomite, over 90% of which is used as construction aggregate (Hopkins, 2002; Freas et al., 2006).

8.3 Rare-Earth Elements

Rare-earth elements (“REE”) include: lanthanum (“La”); cerium (“Ce”); praseodymium (“Pr”); neodymium (“Nd”); promethium (“Pm”); samarium (“Sm”); europium (“Eu”); gadolinium (“Gd”); terbium (“Tb”); dysprosium (“Dy”); holmium (“Ho”); erbium (“Er”); thulium (“Tm”); ytterbium (“Yb”) and lutetium (“Lu”); scandium (“Sc”); and yttrium (“Y”). The majority (up to 80%) of light REE (“LREE”; La to Eu) are produced from bastnäsite-(Ce), although monazite (Ce) is also a main source of LREE. Heavy REE (“HREE”; Gd to Lu) are generally sourced from xenotime (Y) and ion-adsorption clays. The abundance and distribution of individual REE in ore is highly variable between different ore bodies and is dependent on structural constraints such as the coordination of cations and availability of REE during crystallization (e.g., Humphries, 2013; Linnen et al., 2014). Highly concentrated REE, Y, niobium (“Nb”) and zircon (“Zr”) are found in silica-undersaturated peralkaline granitic rocks. Deposit examples include: Khibiny and Lovozero intrusions, Russia; Ilímaussaq intrusion, Greenland; Thor Lake Nechalacho layered suite, Northwest Territories; and Strange Lake intrusion, Quebec.

8.4 Archean Lode Gold

Archean lode gold deposits, or shear-zone-hosted gold, generally occur within steeply dipping shear zones near contacts with volcanic and sedimentary sequences, typically anastomosing, sub-parallel to stratigraphy or continuous and measure over 30 km and up to 2 km wide. Gold in these deposits is hosted within quartz and possibly carbonate veins and less commonly stockworks or silicic and/or carbonate replacement zones, which contain electrum, auriferous arsenopyrite or pyrite, native gold, and occasionally telluride minerals hosting gold. Silver (“Ag”) is often associated with the gold mineralization in this setting. Common host rocks include supracrustal rocks, which have been metamorphosed and highly altered, and competent lithologies abundant in iron, such as gabbro and banded iron formations (BIF’s; Klein and Day, 1994; Yeats and Vanderhor, 1998). Host rocks occasionally include felsic volcanic rocks, tonalite-granodiorite-quartz monzonite, conglomerate, greywacke and syenite dikes, plugs and stocks. Generally, these deposits are found within metamorphic terranes of the greenschist-facies, and rarely granulite-facies (Klein and Day, 1994).

Archean lode gold deposits account for over 9,900 million tons of global world production of gold. Examples these gold deposits include the Sigma mine in Quebec, the Campbell mine at Red Lake, the Pamour and Dome mines at Timmins and the Kerr Addison mine in Ontario, the Giant Yellowknife and Con mines in the Northwest

Territories, in Canada, the Kalgoorlie, Norseman and Golden Mile mines in Australia and in the United States ("US"), the Ropes Mine (Klein and Day, 1994). Typical deposits contain 0.5 to 1600 tons Au, grading over 1 gram per ton ("g/t") in open pit mines and over 5 g/t in underground mines (Yeats and Vanderhor, 1998). Mesothermal deposits are almost exclusively restricted in time to the Archean (~2.7 Ga) with only a few occurring in the Mesozoic.

9 Exploration

9.1 2013 and 2014 Drill Programs

Exploration at the Richardson Property is focused on near surface Devonian and Precambrian aged bedrock. The Devonian stratum is comprised of dolomitic units belonging to the Winnipegosis (and Contact Rapids) formations. The Devonian rocks sit unconformably over Precambrian granite. The units are being explored for their mineral potential and as a source for aggregate crush rock.

During 2012 and 2013, Athabasca Minerals staff visited the Richardson Property numerous times by ATV and helicopter, produced a field data compilation and drilled four diamond drillholes. Geological mapping determined that granite out crop is exposed bedrock in the eastern part of the Property. During 2014, Athabasca Minerals retained APEX to complete an eight drillhole program (totalling 843 m) to obtain additional sample material and conduct a resource estimate of the Devonian Winnipegosis Formation and make resource estimate inferences on the underlying Precambrian granite.

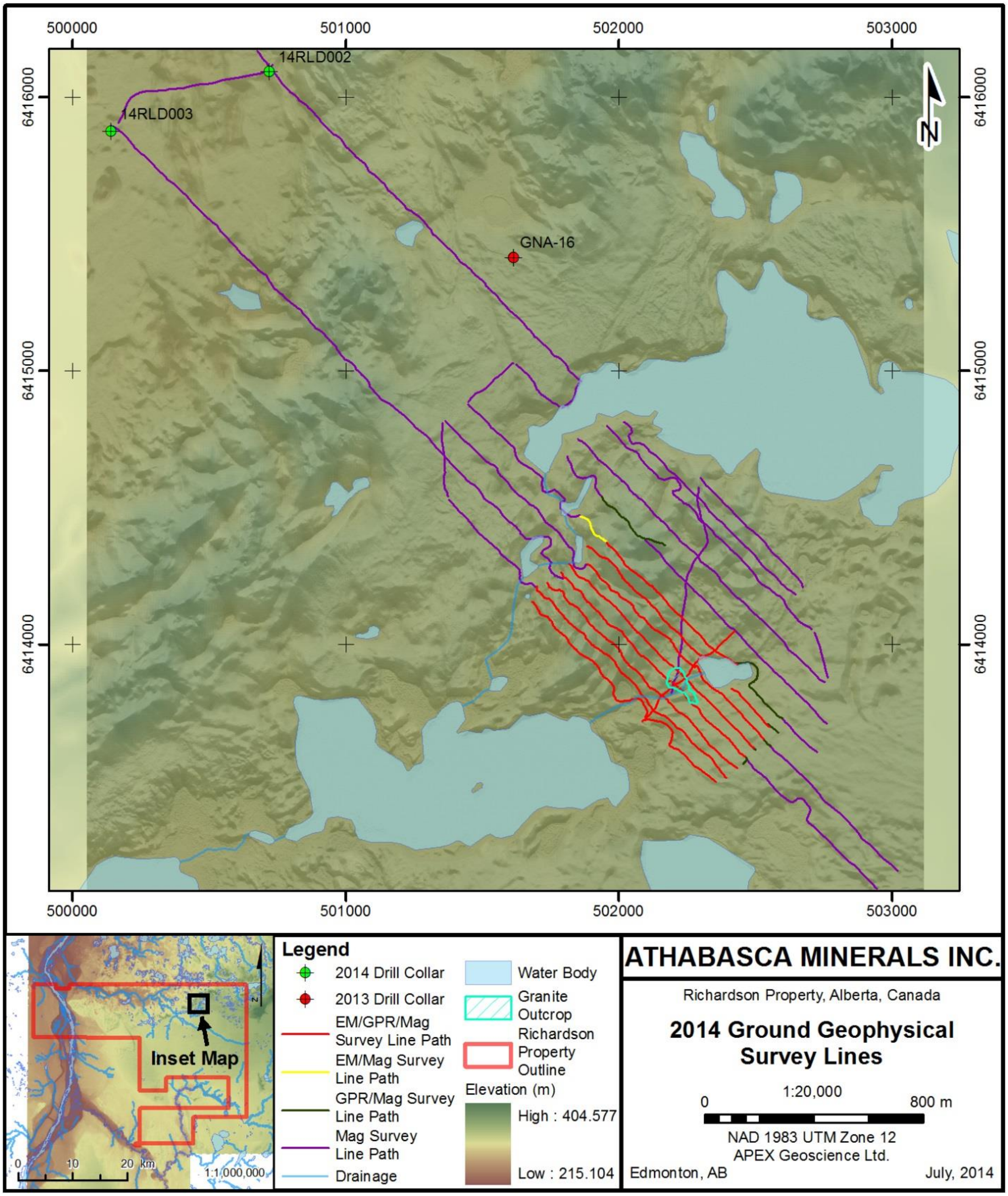
Summaries of the 2013 and 2014 drilling, core logging, geotechnical measurements, sampling and analytical test work are presented in several sections of this Technical Report, including: Drilling; Sample Preparation, Analyses and Security; and Mineral Processing and Metallurgical Testing.

9.2 Multi-Technique Geophysical Survey

During 2014, a multi-technique geophysical survey was conducted at the Richardson Property by APEX Geoscience Ltd. (on behalf of Athabasca Minerals). A series of surface geophysical surveys were performed over the area immediately surrounding a known granite outcrop on the eastern part of the Richardson property, including: ground penetrating radar (GPR); frequency domain electromagnetics (EM); and ground magnetics surveying (Figure 10). The goal of the surface geophysical surveys was to: 1) test the effectiveness of three easily employable surface geophysical tools for identifying and characterizing potential aggregate deposits at the Richardson Property; and 2) make inferences on the dimensions of the granite body, including the relationship between the granite with the overlying overburden and Devonian Winnipegosis Formation dolostone.

The geophysical surveys support the LiDAR surficial geology interpretations in this Technical Report (see Section 7.2.3; Figure 9) and depict several distinct geologic zones that merit follow up work, including drilling, at the Richardson Property. The methodology and results of the geophysical work is summarized in the text that follows.

Figure 10. Location of the 2014 ground geophysical survey grids in relation to the known granite outcrop.



Several geophysical survey methods and survey instruments were considered and evaluated for their ability to characterize and map the near sub-surface at the Richardson Property. Distinct geophysical survey methods deemed suitable for this geologic setting and selected for field testing include: GPR, EM and ground magnetic surveying. More specifically, three geophysical properties were investigated and used to characterize the near surface ground at the Richardson Property: bulk dielectric permittivity, recorded using an UltraGPR ultra-wide band ground penetrating radar system; bulk electrical resistivity, recorded using both a Geonics EM-31 frequency domain electromagnetics instrument and the UltraGPR system; and bulk magnetic susceptibility, recorded using a GSM-19W walking magnetometer.

The geophysical survey instruments were selected for a variety of reasons: they have the ability to measure physical properties which would provide information useful for identifying bedrock and possible aggregate deposits; the survey equipment requires no more than two operators; a lack of line-cutting would not be detrimental to the survey operations and results; the instruments would append the GPS coordinates to the geophysical response measurements; and the signal and noise levels of the instruments would not prevent the sought after contrasts of the geophysical signatures from being easily discerned. The depth of geologic features was estimated using the GPR and EM responses, while the lateral extent of geologic zones was estimated using the magnetic and EM responses.

9.3 Surface Geophysical Survey Methodology

A survey grid was established with proposed traverse lines centred over a granite outcrop. The grids have a bearing of Azimuth 135º/315º and a line spacing of 50 m (Figure 10). Using a Garmin GPSmap 62 handheld receiver that was pre-loaded with the proposed traverse lines, the line paths were followed as closely as possible by the GPS operator, who was followed by the geophysical operator conducting the geophysical survey. The paths occasionally deviated from the proposed line paths because of: inherent errors of the GPS coordinate; water-bodies located within the survey area; and no line-cutting was completed. The deviations from the proposed line paths are not an issue because the goals of this survey required that the three geophysical surveys be conducted over the same line paths in real space. While the surveys were being conducted, the traverse lines that were marked with biodegradable flagging tape to ensure accurate overlapping of the three geophysical surveys.

9.3.1 Ground Penetrating Radar Survey – Ultra GPR System

The GPR survey at the Richardson property was completed by APEX between July 7th and July 14th, 2014 and resulted in 9.7 line-km of UltraGPR data collected over nine traverse lines and one tie line (Figure 10). The resulting GPR data was processed and interpreted for sub-surface geologic contacts by Jan Francke of Ground Radar Inc. (Toronto, ON); the GPR responses were converted from two-way travel times, measured in nanoseconds and depths were measured in metres. Deliverables from Ground Radar Inc. work included XYZ coordinates of the interpreted layer surfaces and databases containing the cross-sectional responses recorded along the traverse lines.

9.3.2 Frequency Domain Electromagnetic Survey - EM31 System

The Frequency Domain Electromagnetic Survey (FDEM) survey using the EM31 system was completed at the Richardson property between July 7th and July 14th, 2014. The EM31 was operated in vertical dipole mode with the boom oriented longitudinally along the traverse lines. In total, 8.7 line-km of FDEM data were collected over eight traverse lines and one tie line with the EM31 recoding at a frequency of one reading per second (Figure 10). Effort was taken to keep the boom parallel to the ground as measurements were being taken, so that the coils proximity to the ground would not severely affect the apparent conductivity measurements. The GPS coordinates were placed at the mid-point between the transmitter and coil.

The apparent conductivity was measured over a test line before each day of surveying so that any instrumental drift could be accounted for. During the test line measurements, the recorded profiles were found to be within acceptable noise levels such that no further calibrations were required.

9.3.3 Total Field Magnetics Survey - GSM 19-W magnetometer

Using a Gem System GSM 19-W walking magnetometer, the magnetic survey was conducted between July 7th and July 14th, 2014. The survey resulted in 24.5 line-km of survey data, which was collected along 13 traverse lines and two tie lines (Figure 10). The data was collected at a frequency of one reading per second at an elevation of between 1.75 and 2 m above the ground (i.e., the height of the operator). The survey included the immediate area around the granite outcrop, which mimicked the area surveyed by GPR and EM31.

In addition, two survey lines were extended to the northwest, along lines 8 and 19. This extension added approximately 1,700 m of magnetometer readings along lines 8 and 19 that were intended to tie in the magnetometer survey northwards to two 2014 drill holes that were completed by Athabasca Minerals (drillholes 14RLD003 and 14RLD002 respectively).

The goal of these two regional magnetic survey lines was to investigate the region between the granite outcrop (main focus of the geophysical survey) with the 2014 drill program to: 1) determine if any major structures occur in this area; and/or 2) make some inferences on the continuity of strata between the geophysical survey area (i.e., granite outcrop) and the area of drilling and resource delineation, the latter of which is the subject of this Technical Report.

9.4 Geophysical Survey Results

9.4.1 Ground Penetrating Radar

The results of the GPR survey are presented in Figures 11 to 13. The GPR responses, as recorded along traverse lines 6, 8, 10 and 99, are displayed as grayscale cross-section images in Figure 11. The cross-sections illustrate three distinct reflectors that are caused by contrasts in the conductivity and dielectric constant of the sub-surface and are attributed to layers of different rock types and/or compositions. The reflectors are assumed to exist between traverse lines because the depth to these reflectors does not change drastically from one traverse line to the next and are therefore interpreted to be the interfaces between distinct geologic layers.

The three reflectors have been labelled in order of their depth as “Layer 0”, “Layer 1”, and “Bedrock”, where “Layer 0” is the shallowest reflector, and “Bedrock” is the deepest reflector (Figure 11). Based on the known geology (from the 2014 drill program and fieldwork mapping and testing), these three reflectors are interpreted to represent the following geological units:

- Layer 0 to Layer 1 - overburden (Layer 0), which includes kame and glacial outwash deposits unconformably overlie the Winnipegosis Formation (Layer 1) reflector;

- Layer 1 to Bedrock – this area corresponds to the Devonian Winnipegosis Formation (Layer 1) reflector down to the Bedrock (Bedrock) reflector, or the Precambrian crystalline basement granite.

- Bedrock and below – the Precambrian crystalline basement granite.

Anything above the Layer 1 reflector in Figure 11 is designated as overburden surficial deposits. The Layer 0 reflector in the southeastern portion of the survey area must relate to a distinct subset of the overall overburden that was identified by the GPR survey (i.e., from surface to the top of reflector Layer 1). This reflector will require further investigation, however, to be properly explained. Initial interpretations of the overburden (Layer 0) reflector is that it is due to zones of high-water content in the glacial deposits, but Ground Radar Inc. suggests it is too strong of a reflection to be entirely attributed to a change in water content in the glacial deposits. In addition, the southeast survey area is characterized as the driest area on the grid and there is still no re-growth after a large 2011 wildfire. Hence, Layer 0 could reflect a very dry layer (i.e., a thick sequence of sand), but it’s unlikely that the water content changes vary that much and that abruptly. The problem, possibly, is that the GPR system is too powerful, and operates at too low a frequency to make any details visible within that specific overburden horizon.

The depths to the Layer 1 and Bedrock reflectors have been gridded to show how the depths of these interpreted geological layers varies over the survey area (Figures 12 and 13, respectively). The layers are shown to be generally flat lying. The thicknesses of the overburden surficial material (anything above the top of reflector Layer 1), is generally attributed to correspond to glacial features (i.e., the kame deposit) that has been observed and mapped in the LiDAR data (see Section 7.2.3, Surficial Geology at the Property).

Based on the GPR results, the estimated areas of combined surficial overburden and Winnipegosis Formation dolostone material that is situated on top of the Precambrian granite and is within 5 m, 10 m, 15 m, 20 m and 25 m of surface is approximately: 4,600 m^2; 15,200 m^2; 45,100 m^2; 91,300 m^2; and 147,233 m^2, respectively (Figure 13).

Figure 11. Ground Penetrating Radar responses, as recorded along traverse lines 6, 8, 10 and 99, displayed as grayscale cross-section images. The uppermost parts of three distinct reflectors are marked on the cross-sections and refer to: Layer 0 – a sub-layer within the overburden; Layer 1 – the top of the Winnipegosis Formation dolostone; and Bedrock – the top of the Precambrian basement granite.

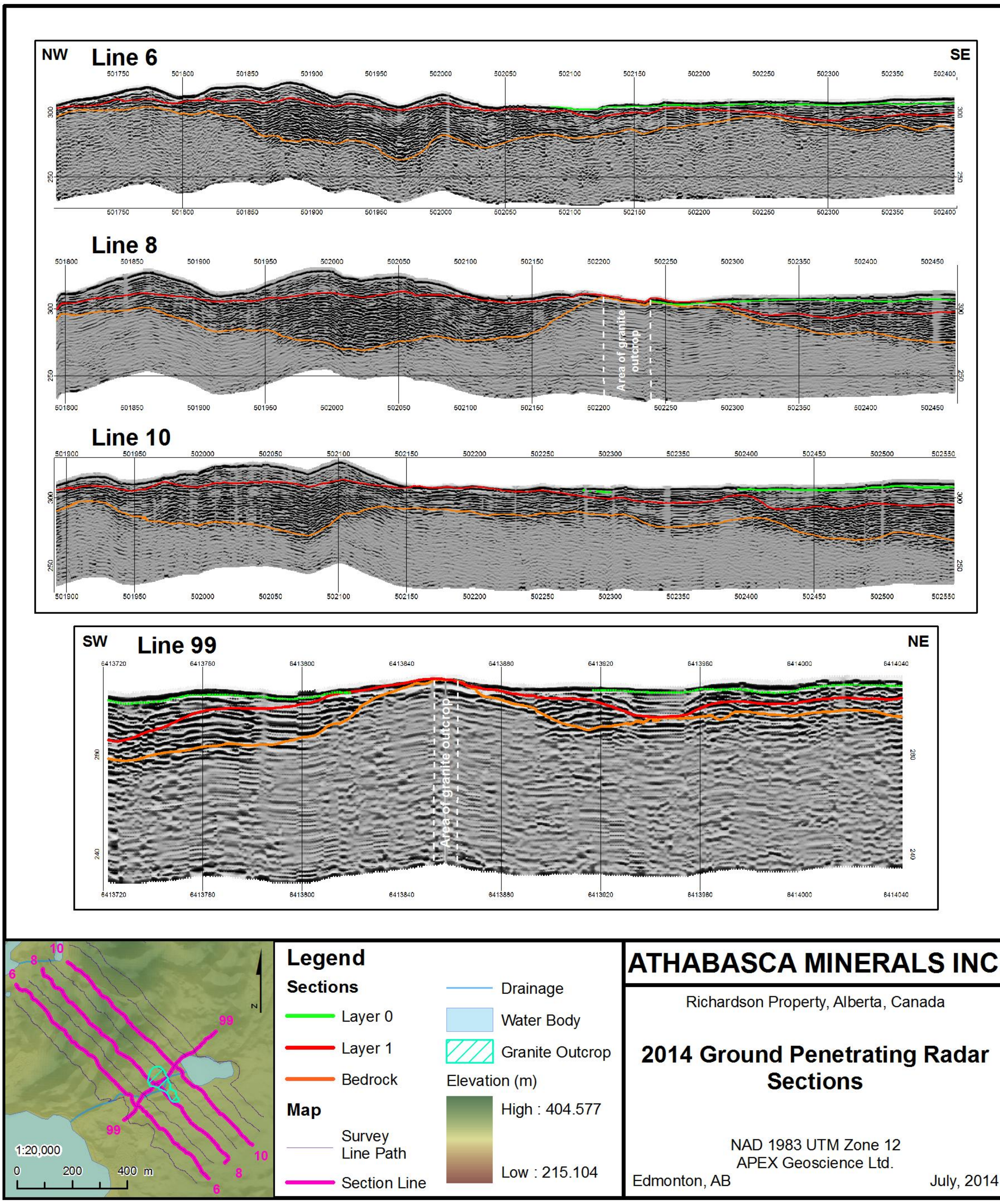


Figure 12. Gridded Ground Penetrating Radar responses to the top of the "Layer 1" reflector (or top of Winnipegosis Formation).

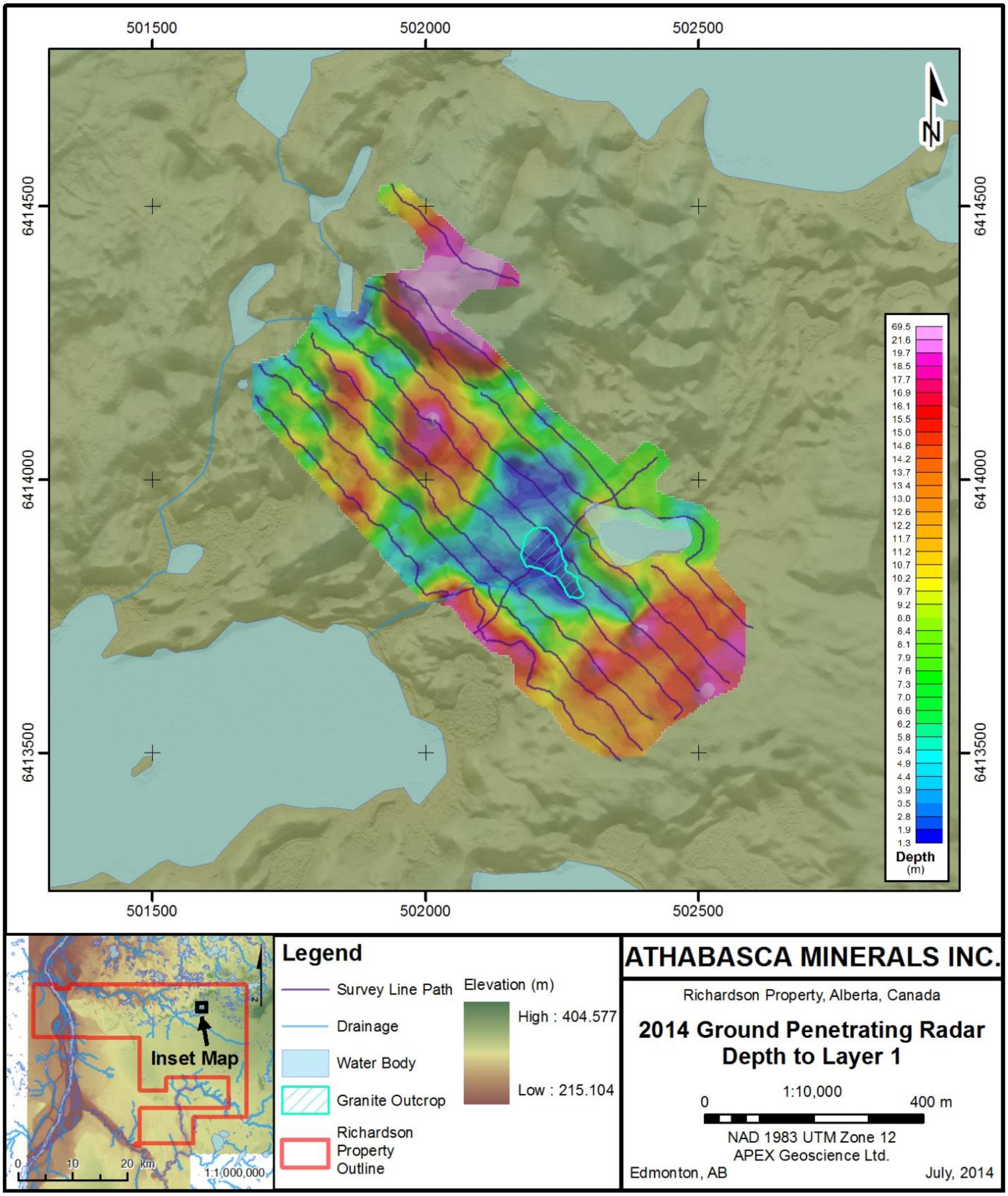
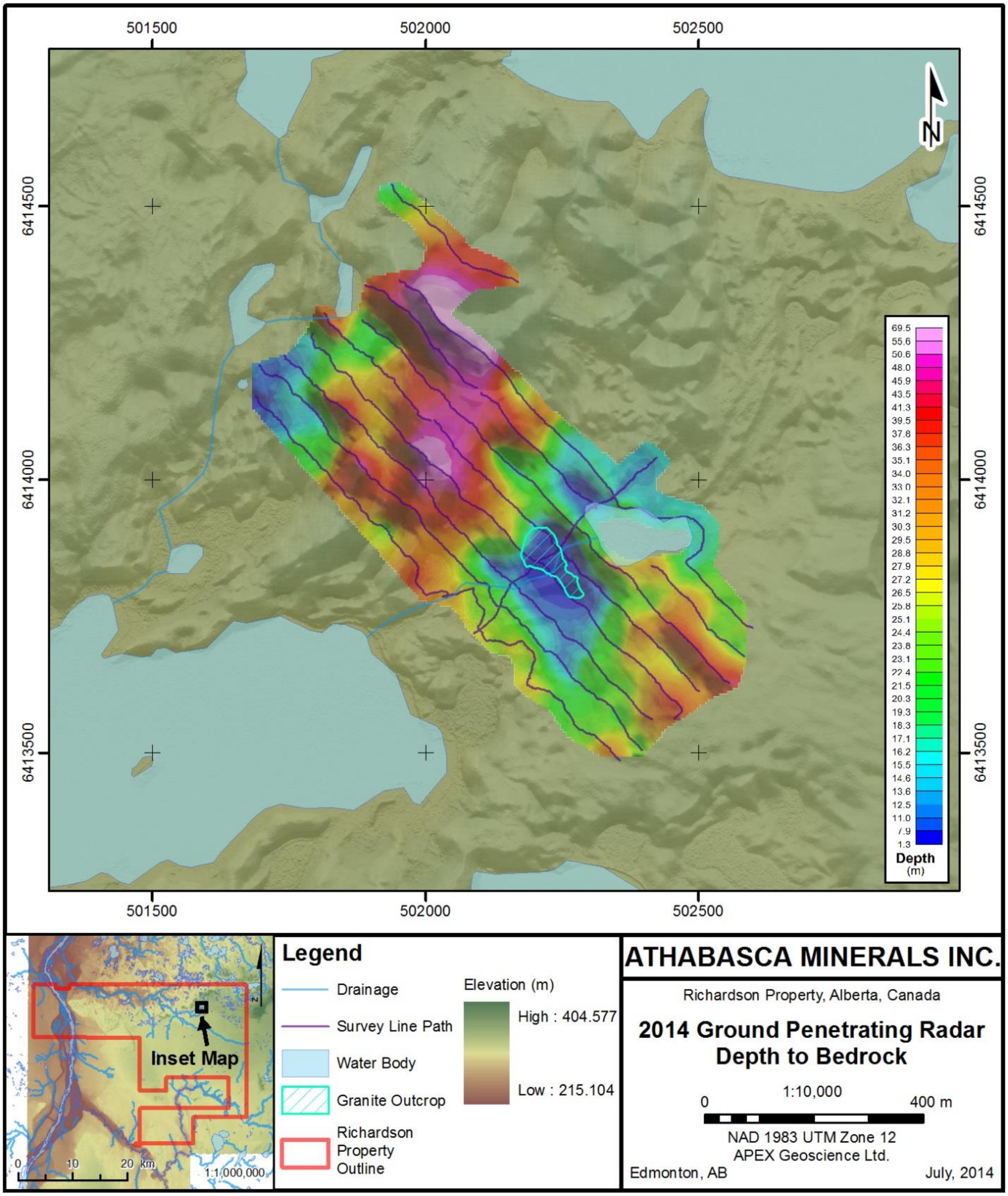


Figure 13. Gridded Ground Penetrating Radar responses to the top of the "Bedrock" reflector (or top of the Precambrian basement granite).



9.4.2 Frequency Domain Electromagnetic Survey (FDEM) EM31 System

The apparent conductance measured during this survey fell between -5.75 and 5.97 millisiemens per meter (mS/m), with a mean value of 0.32 mS/m and a standard deviation of 1.05 mS/m.

Processing of the in-phase data revealed a static shift along several of the lines (amounting to 1.9 line-km of in-phase data; Figure 14). Consequently, the in-phase data was not considered for interpretation (i.e., the in-phase component of the measured electromagnetic field is most valuable for highly conductive features, such as detection of buried metal objects).

In contrast, the EM31 quadrature response shows that the area is weakly conductive overall, but that there is a definitive conductive halo occurring in the area immediately surrounding the granite outcrop (Figure 15). The apparent conductivity map shows that the granite outcrop is a resistive body, and that the conductive halo is due to a conductive layer overlaying the granite bedrock. This conductive halo area is directly associated with a regional topographic low, which indicates the apparent conductance might be a due to a zone in the near surface with elevated water content.

The GPR data shows that the depth to the granite bedrock is relatively shallow in this area of increased conductivity, and it could be that the shallow bedrock is causing the water content to remain at relatively shallow depths that can be measured by the EM31 system (up to six m). The map of the EM31 quadrature response shows a second conductive zone on the northwest end of traverse lines 7 through 12 (Figure 15). The traverse lines end where the quadrature response is trending upward, and subsequently, this conductive response is thought to represent a gridding artifact where there has been no data collected. In addition, it should be noted that the traverse lines to the northwest end at the edge of a swamp, so it would be expected that the apparent conductance would be higher at this locale. This supports the belief that the conductive halo around the granite outcrop is due to near surface having high water content.

9.4.3 Magnetic Survey Results

The results from the magnetic survey are presented in Figures 16, 17 and 18. Processing of the magnetic survey data included reducing the data to residual magnetic intensity (RMI), which levels data that were collected on different days to a common reference line, removes spurious readings associated with low signal quality, and then grids the survey data to create colour images of the RMI amplitude (Figure 16). The geostatistics were calculated for the RMI response measured during the magnetic survey, and the range of magnetic field strength over the property is found to be 270.65 nanoTeslas (nT), with a standard deviation of over 53 nT. In addition, derivative filters such as the vertical derivative and analytical signal were applied to the gridded RMI map and were used to interpret edges and centres of the causative magnetic source bodies (Figures 17 and 18).

Figure 14. In-phase electromagnetic response of the Richardson survey grid using the EM31 system.

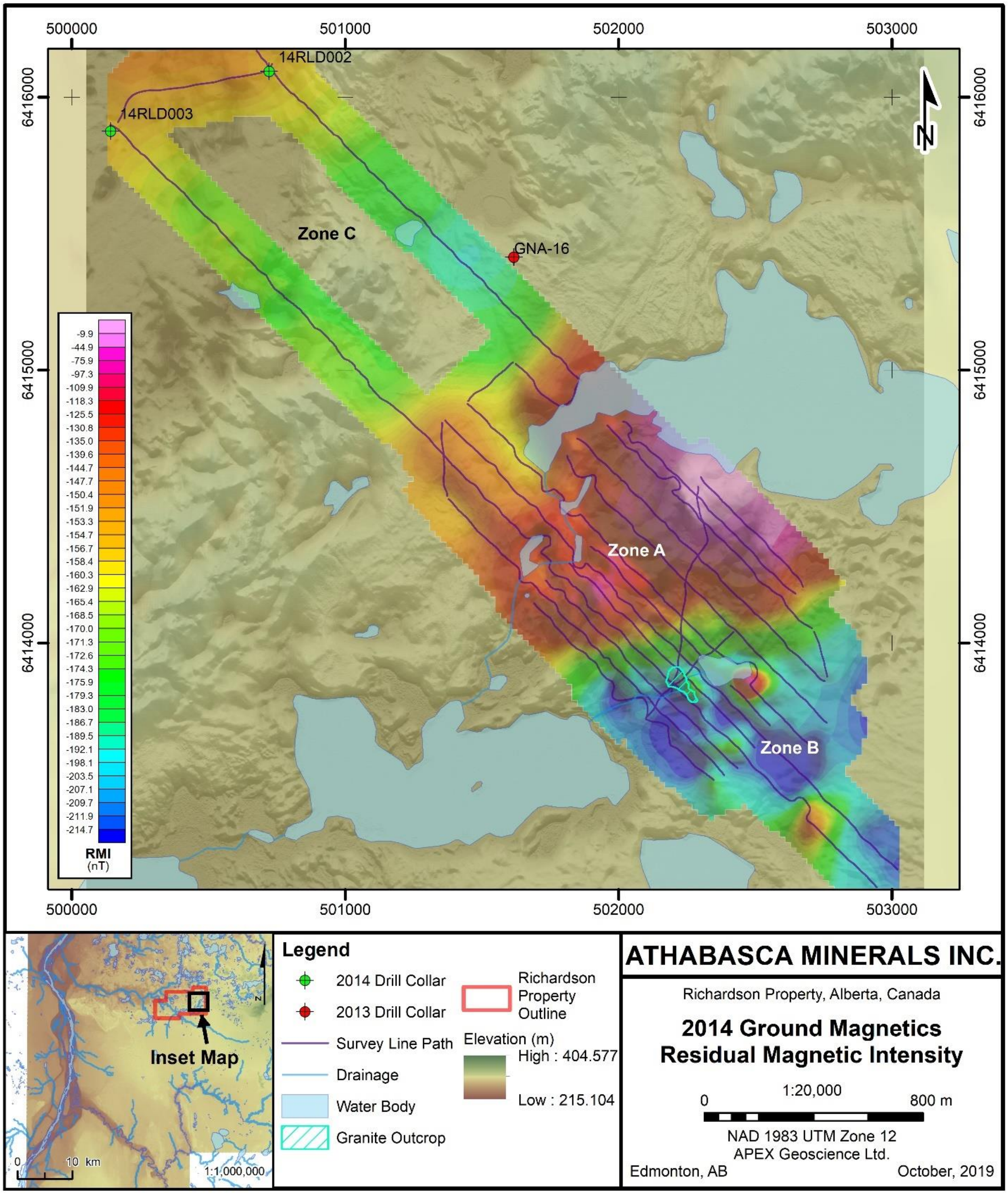


Figure 15. Quadrature electromagnetic response of the Richardson survey grid using the EM31 system.

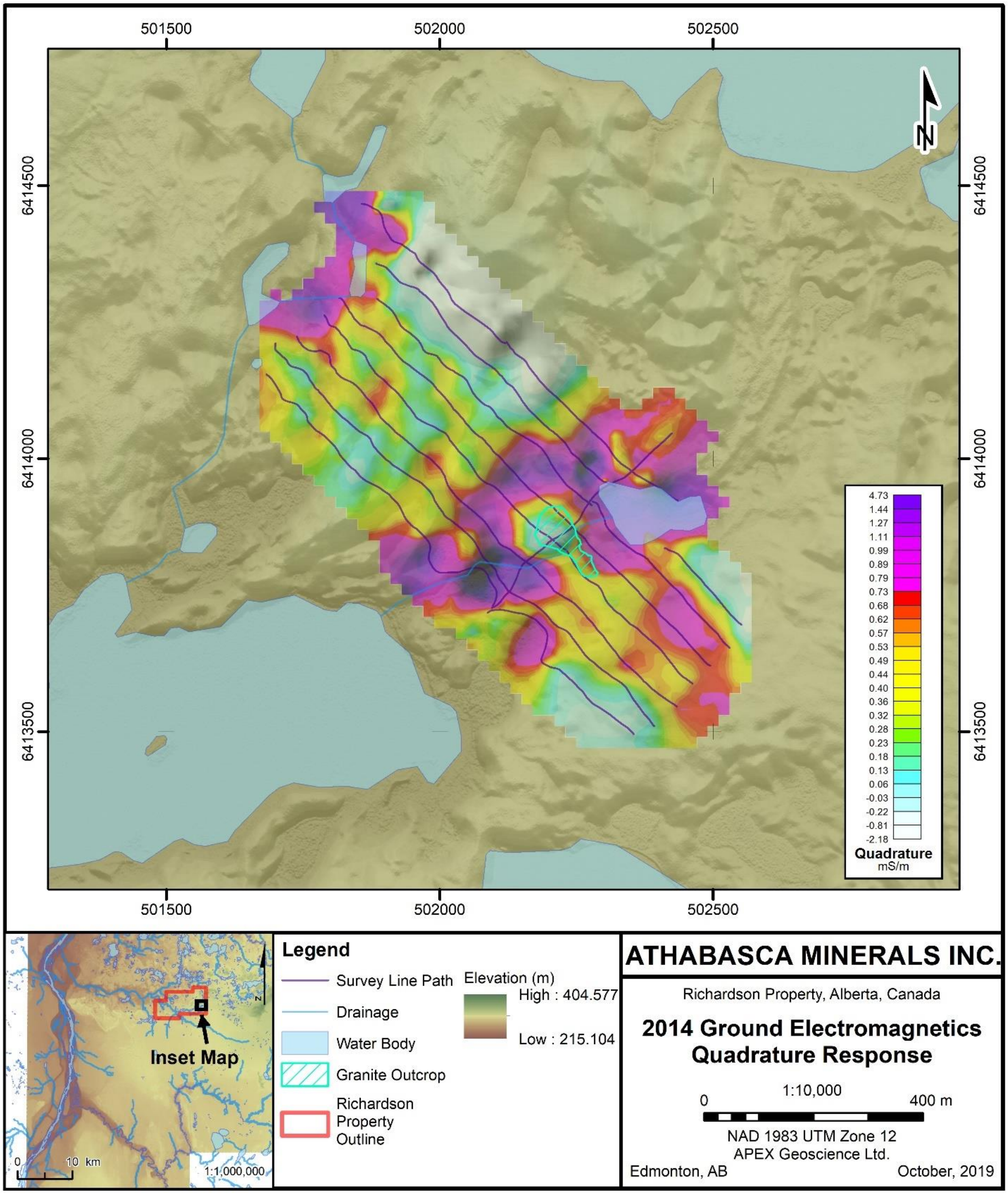


Figure 16. Residual magnetic intensity of the Richardson survey grid using the GSM 19-W walking magnetometer.

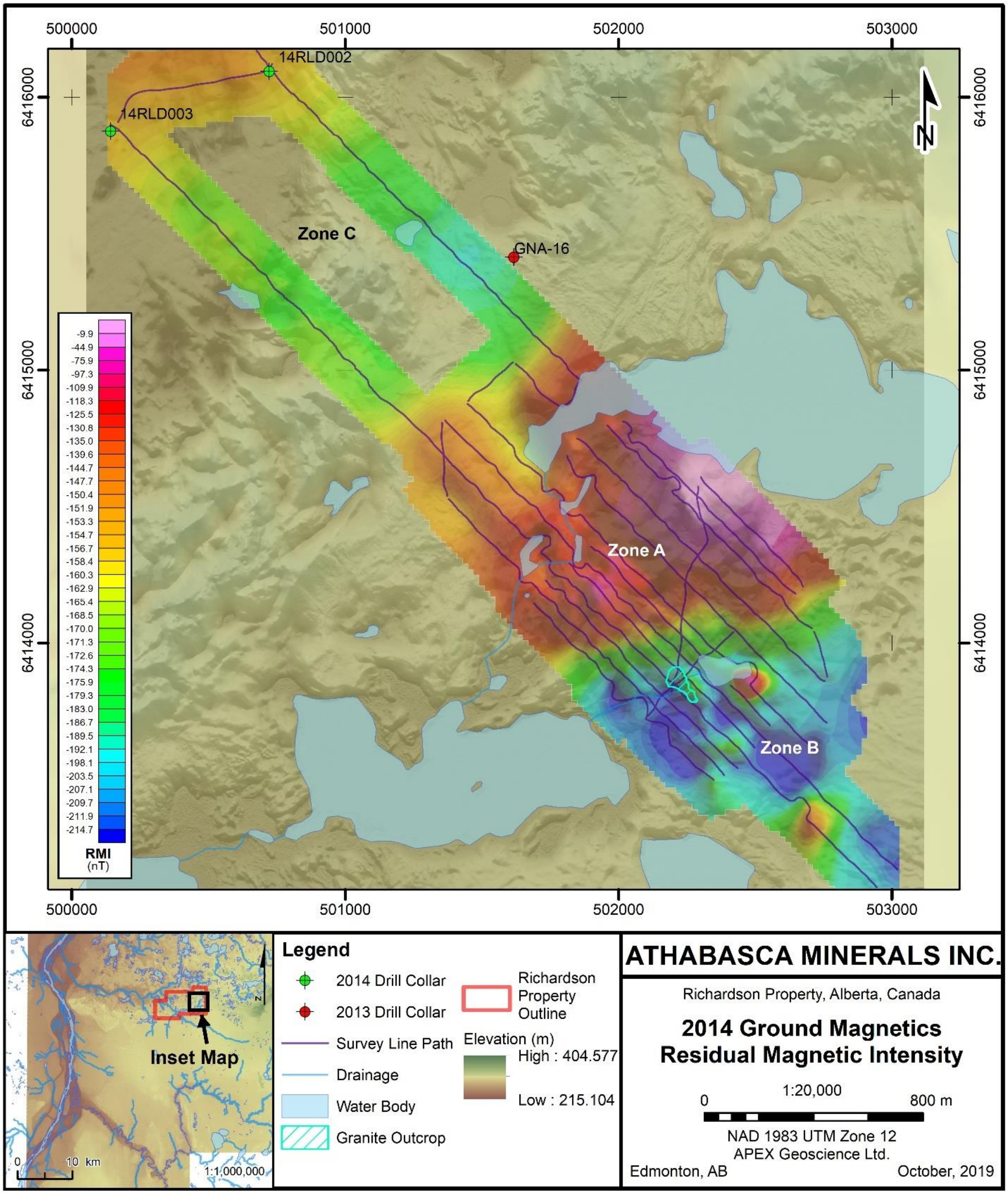


Figure 17. Vertical derivative of the Richardson survey grid using the GSM 19-W walking magnetometer.

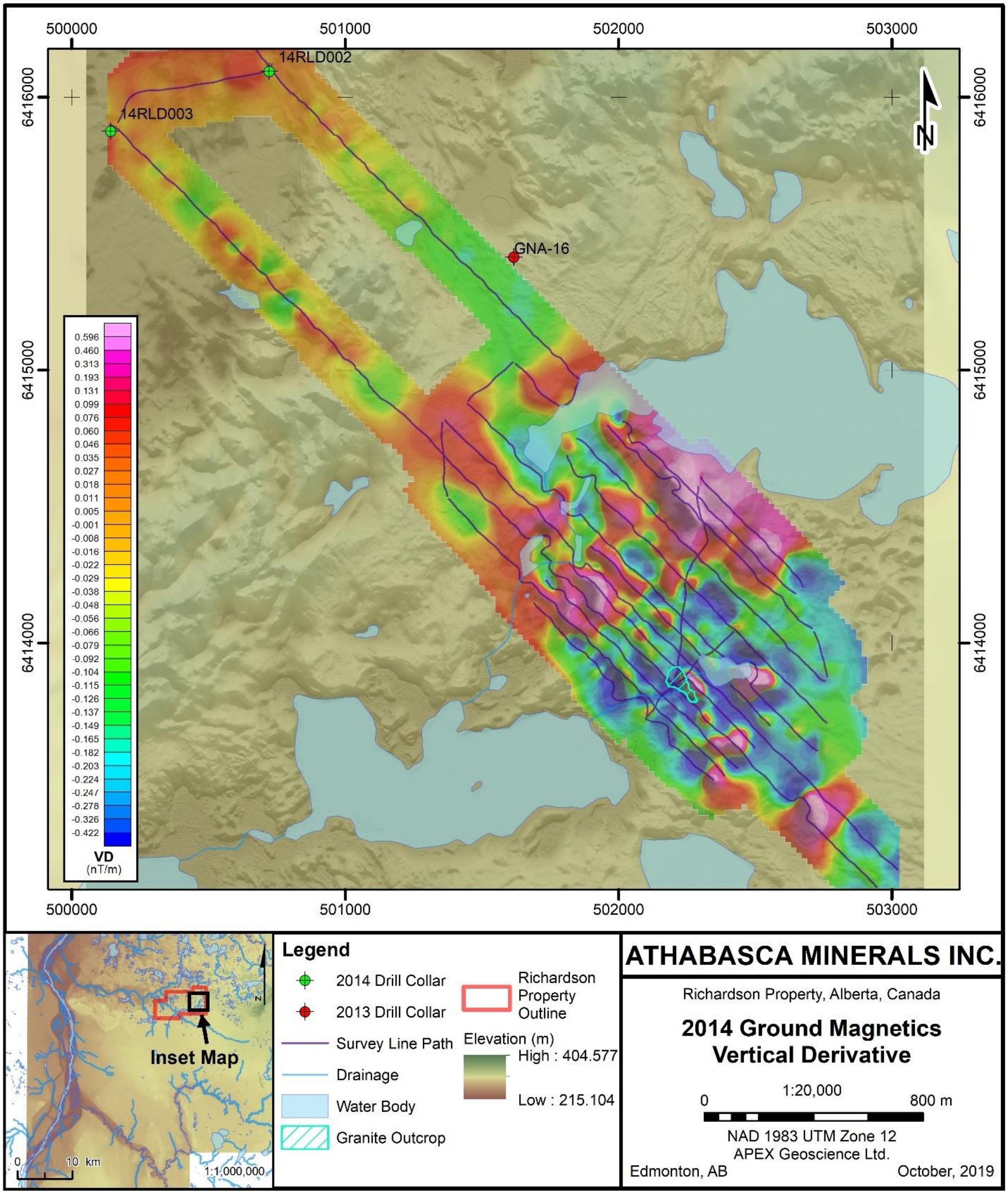
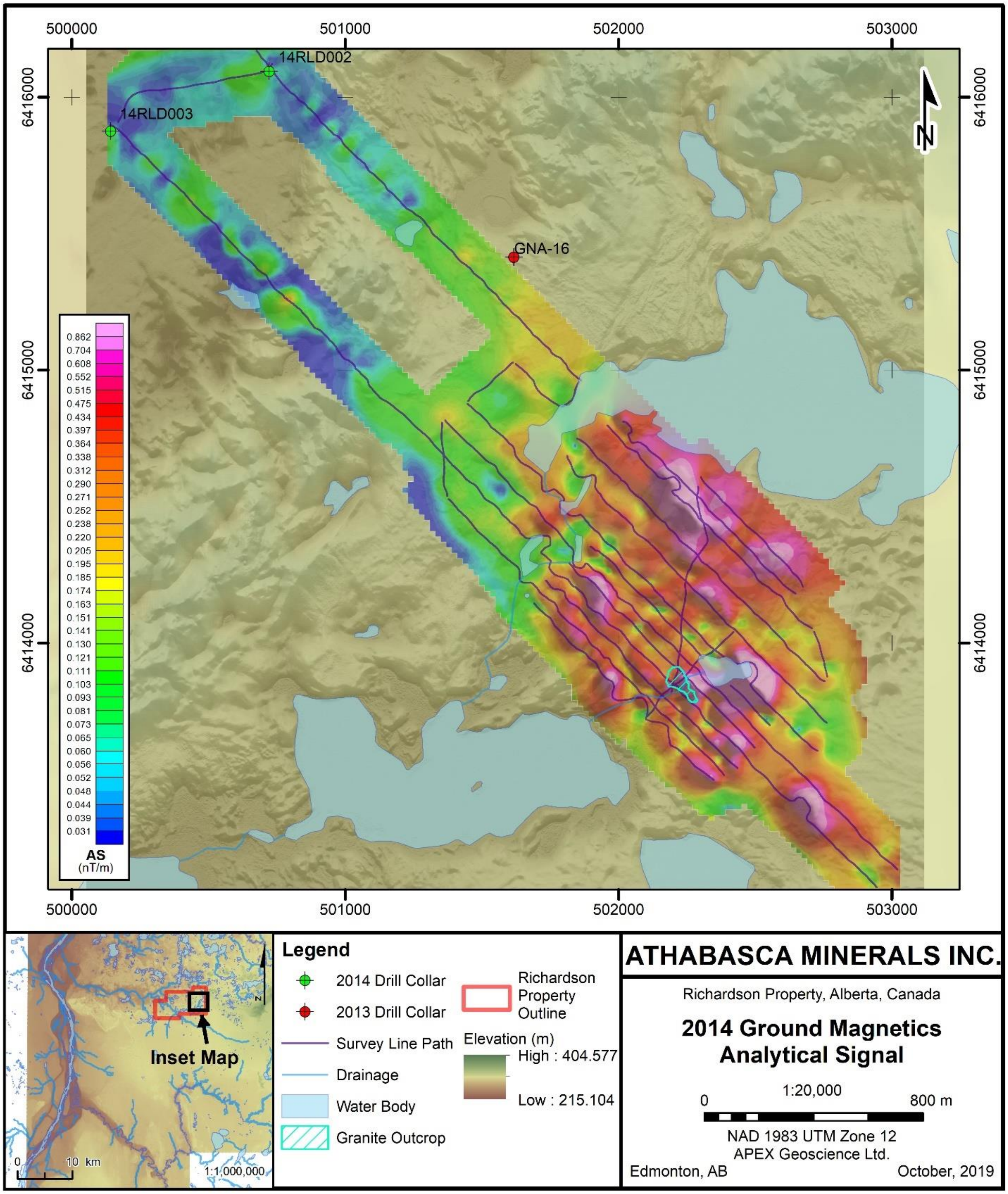


Figure 18. Analytical signal of the Richardson survey grid using the GSM 19-W walking magnetometer.



The ground magnetics survey data highlights three distinct litho-magnetic zones at the Richardson Property geophysical survey area (e.g., Figure 16), including:

1. The dominant magnetic feature occurring on the Richardson property can be identified as a zone with a strong positive magnetic response, occurring over the northern half of the EM31 and GPR survey lines – Zone A.

2. The magnetics data over the southern half of the EM31 and GPR survey lines identifies a zone with a moderate negative magnetic response – Zone B.

3. The area to the northwest of the magnetic anomaly (Zone A) is magnetically quiet, with a weak positive magnetic gradient occurring on the very end of the regional magnetic lines extending out to the 14RLD003 and 14RLD002 drill holes – Zone C.

The spatial extent of magnetic Zone A strongly correlates with the area identified as a kame deposit by McMillan (2013; see Section 7.2.3, Surficial Geology at the Property). The spatial extent of magnetic Zone B correlates with "Layer 0" in the GPR interpretation. This suggests that the overburden deposits throughout the survey area are not laterally homogeneous and lends further support to the presence of a unique kame deposit that is situated directly northwest of the granite outcrop (i.e., the Zone A magnetic high).

9.5 Geophysical Summary and Conclusions

The interpretations remain inherently ambiguous and require petrophysical data and other geological information to properly classify the identified litho-magnetic zones. Nevertheless, several preliminary interpretations can help to guide future exploration in the eastern part of the Richardson Property. The results of the geophysical surveys show that the spatial extent of several distinct geological features can be mapped using a combination of GPR and ground magnetics data. There is a strong correlation among the physical properties of the overburden (particularly the kame deposit), the Winnipegosis Formation and the granite bedrock.

The GPR was most useful for showing the depth to the geological layers, while the magnetics data identified lateral changes in the subsurface that were not observed in the GPR response. The GPR profiles display interpretable data to depths of up to 60 m. The granite outcrop is fairly constrained to the immediate area; however, the GPR profiles suggest that the area directly north of the outcrop yield the shallowest thickness of overburden and/or Winnipegosis Formation to the Precambrian basement granite. Hence, any further exploration on the granite as a potential source of crush rock aggregate can use the results of this geophysical survey to target drill locations.

Based on the GPR results, the estimated areas of combined surficial overburden and Winnipegosis Formation dolostone material that is situated on top of the Precambrian granite and is within 5 m, 10 m, 15 m, 20 m and 25 m of surface is approximately: 4,600 m^2; 15,200 m^2; 45,100 m^2; 91,300 m^2; and 147,233 m^2, respectively (Figure 13).

Using the interpreted GPR litho-units, in concert with surficial topography associated with the LiDAR data, a rough volume calculation of potential geological units over an area of 407,700 m^2 yields:

- 11,758,000 m^3 of total combined material (overburden and/or Winnipegosis Formation) from surface to the granite bedrock;
- 4,377,000 m^3 of overburden from surface to top of the Winnipegosis Formation; and
- 7,381,147 m^3 of potential Winnipegosis Formation.

With respect to lateral changes, the GPR was unable to identify changes in overburden type across the survey area (apart from vertical layering associated with Layer 0). However, the magnetic data clearly shows that there is a lateral change in the rock properties of the uppermost surficial materials, as explained by the contrasting magnetic zones A and B.

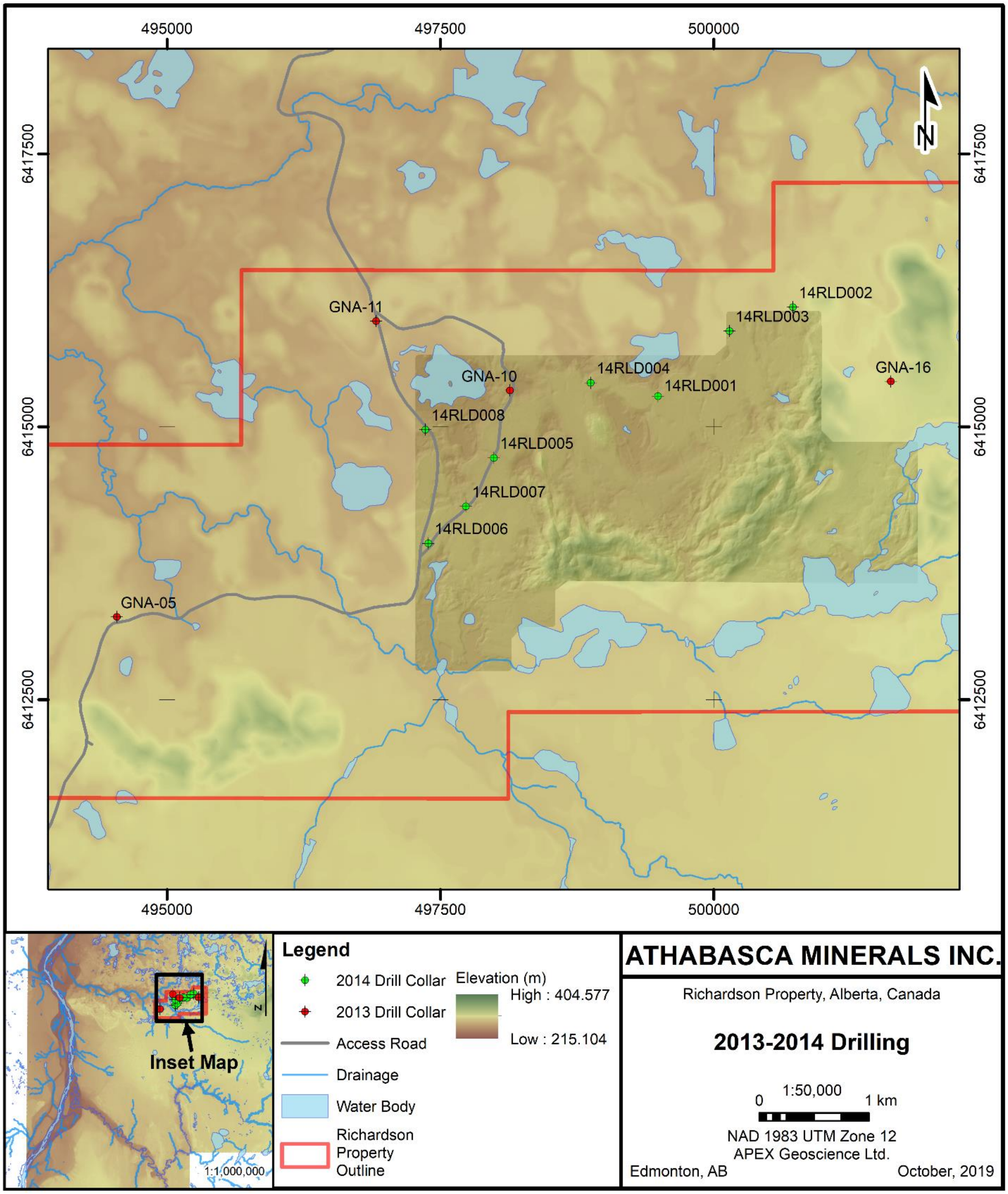
10 Drilling

Drill collar summaries of the twelve 2013 and 2014 drillholes completed by Athabasca Minerals at the Richardson Property is presented in Table 6 and Figure 19 and summarized in the text that follows.

Table 6. Drillhole collar summaries for Athabasca Mineral 2013 and 2014 drill campaigns at the Richardson Property with depth to the top of the Devonian (Winnipegosis and Contact Rapids formations), Granite Wash (La Loche Formation) and Precambrian basement rocks. All drillholes have an azimuth and dip of 0 and -90 degrees, respectively.

		(UTM, Z12, NAD83)			Depth to Formation top (m)					Thickness of units (m)		
Drillhole ID	Year drilled	Easting (m)	Northing (m)	Elevation (m)	Winnipegosis	Contact Rapids	La Loche	Precambrian basement	Total hole depth (m)	Winnipegosis	Contact Rapids	La Loche
GNA-05	2013	494542	6413258	295	n/a	n/a	n/a	n/a	29.5	n/a	n/a	n/a
GNA-10	2013	498134	6415333	288	21.34	65.00	75.60	76.12	101.0	43.66	10.60	0.52
GNA-11	2013	496912	6415967	283	18.00	n/a	n/a	n/a	21.0	n/a	n/a	n/a
GNA-16	2013	501617	6415414	313	47.80	82.69	n/a	n/a	83.6	34.89	n/a	n/a
14RLD001	2014	499488	6415279	295	31.33	77.30	92.48	94.37	106.0	45.97	15.18	1.89
14RLD002	2014	500722	6416094	301	30.00	77.94	90.76	92.44	100.0	47.94	12.82	1.68
14RLD003	2014	500142	6415875	301	39.00	73.98	81.22	85.96	96.0	34.98	7.24	4.74
14RLD004	2014	498872	6415401	296	30.00	73.16	83.76	84.98	96.0	43.16	10.60	1.22
14RLD005	2014	497988	6414715	296	30.00	77.05	84.39	86.88	117.0	47.05	7.34	2.49
14RLD006	2014	497390	6413931	296	41.45	83.80	93.96		95.0	42.35	10.16	n/a
14RLD007	2014	497733	6414269	295	39.00	85.70	97.96	98.65	144.0	46.70	12.26	0.69
14RLD008	2014	497361	6414972	294	64.92	73.22	80.26	83.00	89.0	8.30	7.04	2.74
		Overburden average thickness:			**35.71**			**Average thickness:**		**39.50**	**10.36**	**2.08**

Figure 19. Locations of drillholes completed at the Richardson Property during Athabasca Minerals 2013 and 2014 drill campaigns.



10.1 2013 Drill Campaign

In 2013, Athabasca Minerals conducted a drilling program that concluded with core being derived from four diamond drillholes totaling 235.1 m (out of 16 originally proposed drillholes). The program, which was conducted between January 21st and February 16th, 2013, had originally proposed 16 drillholes, but the program was shortened due to lost circulation problems within overburden and through bedrock. In addition, diamond drillholes GNA-05, GNA-11 and GNA-16 were abandoned prior to intersecting Precambrian basement due to poor drilling conditions. Hence, drillhole GNA-10 represented the lone drillhole from the 2013 drill program to penetrate through the entire lithostratigraphic section of Winnipegosis Formation and downward into Precambrian granite (Table 6).

10.2 2014 Drill Campaign

During February 2014, Athabasca Minerals undertook an 843 m core drilling program over a large section of the Richardson Property. Eight diamond holes (14RLD001 to 14RLD008) were completed over an area spanning 20 km^2 (Figure 19). With the exception of drillhole 14RLD006, the program successfully cored entire sections of the Winnipegosis Formation with all but one drillhole terminating in Precambrian basement granite (Table 6). The drilling termination strategy was generally to end the hole once 10 m of Precambrian basement was penetrated (Table 6). One drillhole (14RDL007) tested the granite to depth coring 44.5 m of Precambrian material. Drill collar locations were limited to existing access within the property and where possible collars were shifted in order to take advantage of natural and pre-existing clearings. Final collar locations were recorded with a handheld GPS unit. Drill pads were reclaimed by a combination of back blading to distribute and cuttings left on surface as well as redistributing any fallen timber by hand over the drill site. Collars were marked with an aluminum tag placed on the southwest corner of the drill pad.

Overburden thickness averaged 35.4 m and consisted largely of unconsolidated sand and boulders. The Devonian stratigraphy averaged 55.1 m in thickness and was comprised largely of competent, light brown dolostone with lesser wackestone, sandstone and shale. Bitumen content throughout the project area was highly variable ranging from minor (<5%) bitumen infilled vugs to moderate (e.g., 40%) amounts bitumen infilling vugs, fractures and karsts. The vuginess, sand-content and fracturing of the Devonian rocks appears to play a major role in bitumen distribution.

Minor karsting and bitumen content within the Devonian stratigraphy, as well as a conglomerate/pebble lag, mark the unconformity between the Devonian and Precambrian units. The granite consisted of light-blue grey coarse-grained weakly foliated granite, which remained fairly consistent throughout the property. The granite was subjected to variable potassic alteration. The unconformity marking the transition from the Devonian rocks to the Precambrian basement was marked by a zone of conglomerate lag, and/or brecciated and dolomitic-cemented granite.

Further reclamation may be required due to the sandy nature of the area and the development of small depressions that were created by flowing drill water associated with normal drill processes, therefore small depressions are likely to form at the collars in the spring.

10.3 Regional Stratigraphic Considerations (based on a compilation of oil and gas wells in conjunction with Athabasca Minerals drill results)

To test whether the Richardson crush rock aggregate deposit has the potential to be extended, a regional stratigraphic evaluation was undertaken on the Devonian and basement formation tops. Data compilation for the purpose of evaluating the continuity of Devonian and basement units include data from: 1) Athabasca Minerals 2013 and 2014 drill programs; 2) oil and gas well information from GeoSCOUT (an oil and gas information system that provides publicly available formation top data); and 3) historical metallic and industrial mineral assessment reports (e.g., Laanela, 1977, 1978; McWilliams and Sawyer, 1977; Bradley, 1978; Fortuna, 1979; McWilliams et al, 1977; Walker, 1980; Orr, 1986, 1989, 1991; Orr and Robertshaw, 1989).

The investigation consisted of an area encompassed by T96-T1-W4, and T106-R14–W4 (Figure 20). Within this area, 6,264 Devonian penetrating wells are known from GeoSCOUT; only five of these wells penetrated the basement illustrating the emphasis on the Cretaceous McMurray Formation as an oil sands prospect. From historic assessment reports, 140 and 65 drillholes penetrated the top of the Devonian and basement, respectively (Figure 21). A more refined study area measuring approximately 1,000 km^2 (inset map in Figure 21), contains 29 wells and drillholes that penetrated Devonian (including Athabasca Minerals 2013 and 2014 drillholes). The depth to the top of the Devonian within these wells and drillholes varies between 18 m and 89 m from surface and, in general, the depth to Devonian increases to the southwest to depths of 50 m or greater.

The Athabasca Minerals drillholes, and other historical wells and drillholes to the north of the 2013 and 2014 drillholes indicate Devonian depths between 18 m and 334 m, with only four historical drillholes with Devonian depths of between 48 m and 61 m, including Athabasca Minerals 2013 drillhole GNA-16 (depth of 47.80 m). This data suggests that the depth to the top of the Devonian as seen within 2013 and 2014 drillholes has general depth continuity toward the north and northwest of the Richardson Property.

During the investigation, drillhole and well collar elevations were taken into consideration. Within the refined area of interest, collar elevations varied between 262 m and 313 m asl. By adjusting Devonian depths to be calculated with respect to the 'lowest collar elevation of 262.1 m', the continuity of the Devonian can be evaluated (Table 7). This study shows that these units are not continually flat, but rather increase in depths to the north and south of the 2013 and 2014 drillhole locations. Based on the data compilation, the depth to the top of the Devonian in the area, as shown in Figure 21 (and Table 7), is relatively shallow within the Richardson Property, and in particular, toward the northeast. The depth to the top of the Devonian increases in thickness toward to southwest as distance from the Property increases.

Figure 20. Location of selected wells and drillholes used to determine the stratigraphic continuity of the top of Devonian and Precambrian basement in the Athabasca Minerals Richardson Property area.

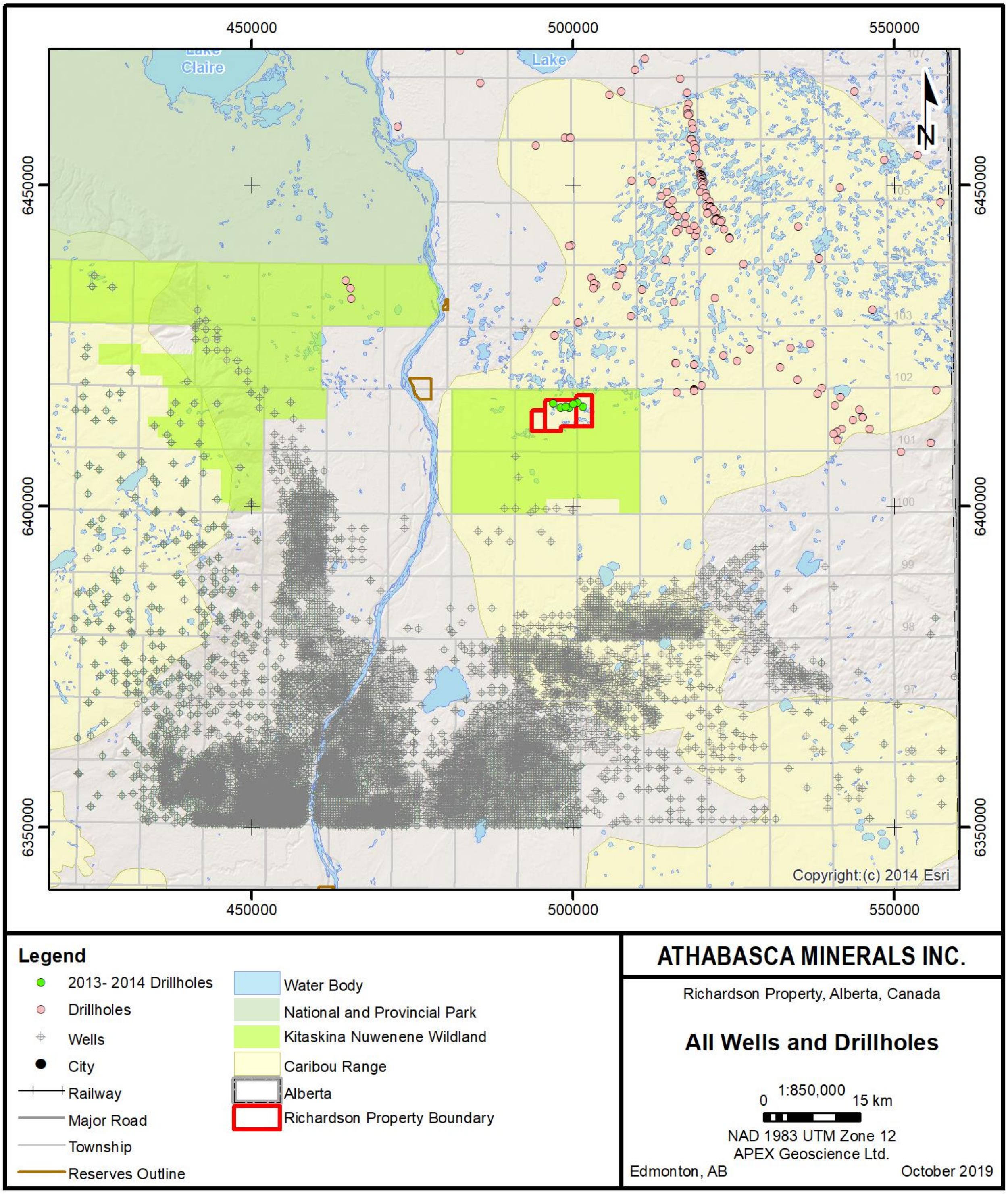


Figure 21. Results of a well and drillhole compilation to depict the top of the Devonian in the Richardson Property area.

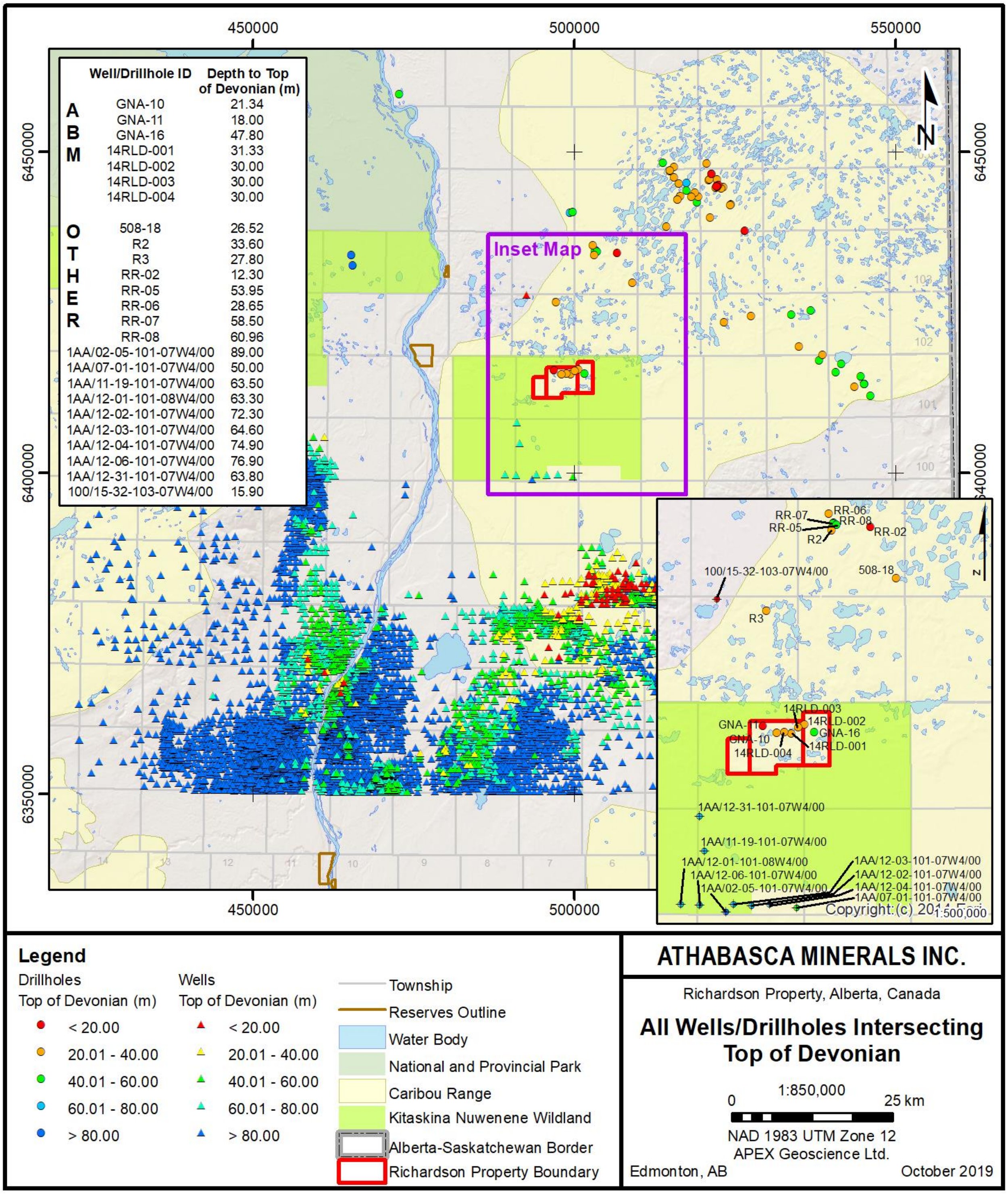


Table 7. Estimate depth to the top of the Devonian in the Richardson Property area; relative to the calculated lowest collar elevation.

Well/Drillhole ID	Depth to Top of Devonian (m)	Collar Elevation (m)	Collar Elevation minus 262.1 m	Depth to Top of Devonian - Calculated Elevation
GNA-10	21.34	288	25.9	-4.56
GNA-11	18	283.4	21.3	-3.3
GNA-16	47.8	313	50.9	-3.1
14RLD-001	31.33	295	32.9	-1.57
14RLD-002	30	301	38.9	-8.9
14RLD-003	30	301	38.9	-8.9
14RLD-004	30	296	33.9	-3.9
508-18	26.52	302	39.9	-13.38
R2	33.6	287	24.9	8.7
R3	27.8	288	25.9	1.9
RR-02	12.3	274.3	12.2	0.1
RR-05	53.95	262.1	0	53.95
RR-06	28.65	262.1	0	28.65
RR-07	58.5	298.7	36.6	21.9
RR-08	60.96	294.1	32	28.96
1AA/02-05-101-07W4/00	89	311	48.9	40.1
1AA/07-01-101-07W4/00	50	281	18.9	31.1
1AA/11-19-101-07W4/00	63.5	305	42.9	20.6
1AA/12-01-101-08W4/00	63.3	297	34.9	28.4
1AA/12-02-101-07W4/00	72.3	295	32.9	39.4
1AA/12-03-101-07W4/00	64.6	297	34.9	29.7
1AA/12-04-101-07W4/00	74.9	304	41.9	33
1AA/12-06-101-07W4/00	76.9	303	40.9	36
1AA/12-31-101-07W4/00	63.8	301	38.9	24.9
100/15-32-103-07W4/00	15.9	267	4.9	11

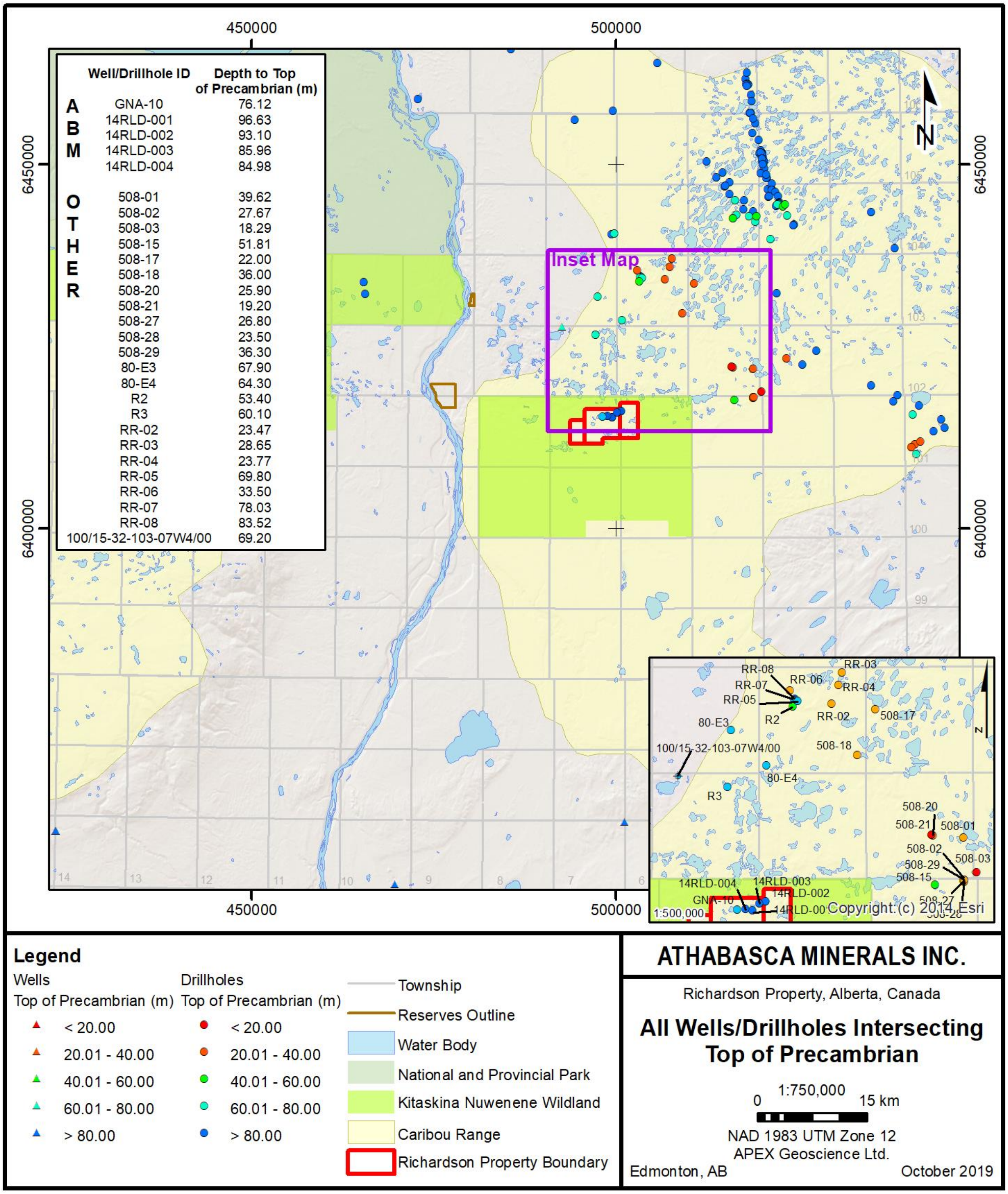
Data for the top of the Precambrian is limited toward the south, southeast, southwest and west of the Richardson Property, due to overall shallow nature of the oil and gas testing. The top of the Precambrian as represented in Figure 22, is relatively deep within the Property and shallows toward the east-northeast. A more refined study area measuring approximately 750 km^2 contains a total of 32 wells and drillholes that penetrate basement (Figure 22). The depth to the top of the Precambrian within these wells/drillholes varies between 19 m and 97 m from surface.

The Athabasca Minerals drillholes shows that the depth to the top of the Precambrian generally shallows toward the north and northwest of the Richardson Property and that the depth shown in the 2013 and 2014 drillholes is not continuous away from this area. Within the refined area, collar elevations varied between 262.1 m and 338.0 m asl. By adjusting Precambrian depths to be calculated with respect to the 'lowest collar elevation of 262.1 m', the continuity of the Precambrian supports previous observations that the top of the Precambrian decreases in depth to the northeast and east of the 2013 and 2014 drillholes (Figure 22, Table 8). However, this conclusion is tenuous because the granite is known to crop out in the eastern part of the Property.

Table 8. Estimate depth to the top of the Precambrian basement in the Richardson Property area; relative to the calculated lowest collar elevation.

Well/Drillhole ID	Depth to Top of Precambrian (m)	Collar Elevation (m)	Collar Elevation minus 262.1m	Depth to Top of Precambrian - Calculated Elevation
GNA-10	76.12	288	25.9	50.22
14RLD-001	96.63	295	32.9	63.73
14RLD-002	93.1	301	38.9	54.2
14RLD-003	85.96	301	38.9	47.06
14RLD-004	84.98	296	33.9	51.08
508-01	39.62	320	57.9	-18.28
508-02	27.67	330	67.9	-40.23
508-03	18.29	319	56.9	-38.61
508-15	51.81	338	75.9	-24.09
508-17	22	290	27.9	-5.9
508-18	36	302	39.9	-3.9
508-20	25.9	310	47.9	-22
508-21	19.2	310	47.9	-28.7
508-27	26.8	330	67.9	-41.1
508-28	23.5	330	67.9	-44.4
508-29	36.3	331	68.9	-32.6
80-E3	67.9	299.3	37.2	30.7
80-E4	64.3	301.1	39	25.3
R2	53.4	287	24.9	28.5
R3	60.1	288	25.9	34.2
RR-02	23.47	274.3	12.2	11.27
RR-03	28.65	281.9	19.8	8.85
RR-04	23.77	289.5	27.4	-3.63
RR-05	69.8	262.1	0	69.8
RR-06	33.5	262.1	0	33.5
RR-07	78.03	298.7	36.6	41.43
RR-08	83.52	294.1	32	51.52
100/15-32-103-07W4/00	69.2	267	4.9	64.3

Figure 22. Results of a well and drillhole compilation to depict the top of the Precambrian in the Richardson Property area.



11 Sample Preparation, Analyses and Security

11.1 Core Handling and Initial Geotechnical Preparation Procedure

The 2014 drill core was quick-logged during the drill program at the Richardson Property camp. Upon completion, the core boxes were tightly secured (to circumvent core displacement) on flatbed trailers and/or truck beds and transported by road from the Richardson Property to Athabasca Minerals warehouse in Edmonton, Alberta. Upon arrival, the core was stored inside a steel shipping container in a locked yard – together with cores from Athabasca Minerals 2013 drill campaign. The purpose for moving the drill core to Edmonton was to commence detailed core logging, geotechnical characterization and sampling in indoor, heated and well-lit work bays at Athabasca Minerals office. Core handling, geotechnical characterization, logging, sampling and shipping was completed by APEX staff under the direct supervision of R. Eccles who takes overall responsibility for the core procedures and the content of this Technical Report.

11.2 Geotechnical Characterization

This Technical Report includes a maiden inferred crush rock aggregate resource estimate of the Middle Devonian Winnipegosis Formation at Athabasca Minerals Richardson Property. In accordance with proper assessment of a crush rock aggregate deposit, which involves criteria that considers the materials strength, continuity, fractures and the presence of weakening particulate matter, this assessment has implemented an expanded geotechnical procedure for drill core evaluation as follows:

- Length and recovery measurements to record the actual length of core recovered from each logging interval. It was recorded in metres and as a percentage of the logging interval. The length of core was measured (eliminating gaps by pushing pieces together) between each set of blocks. Recovery (percent) was calculated by dividing the Theoretical Length (logged interval) by the Recovered Length and multiplying by 100.

- Rock Quality Description (RQD) is a modified measure of core recovery and is defined as the percentage of core in each log interval in which the spacing between natural fractures is greater than 10 cm.

- Fracture frequency and rock defects were measured by recording the number of bedding planes, joints, faults and shears (natural) per metre. The most common rock defect types were recorded as a numeric code and their angles were measured in degrees, with respect to the core axis.

- Discontinuity and fracture condition were examined and classified according to the Joint Roughness (Jr) and Joint Alteration (Ja) descriptors of the Tunnelling Quality Index Q (Barton et al, 1974).

- Rock weathering grade, which was based on rock discolouration extent, rock fabric condition, fracture condition and surface characteristics, were used for field estimation of weathering observed in drill core.

- Specific Gravity (SG) measurements were carried out once per every metre to calculate the weight (tonnage) of a volume of rock using the following formula:

  SG = Weight in air / (Weight in air – Weight in water)

- Portable X-Ray Fluorescence (XRF) analyzer measurements were taken every metre of core to provide an evaluation of the chemical homogeneity, potential aggregate strength of the core, and to evaluate the metallic mineral potential of the core. Major elements measurements were recorded directly onto a laptop computer with tube settings as follows: 15kV, 23µA, no filter and vacuum pump attached. Spectra was collected for a 60 second timed assay and data was sent for calibration and interpreted daily.

11.3 Core Documentation

Upon completion of geotechnical characterization, detailed lithological logging was completed by APEX geologists. Logging was entered directly into an Excel logging spreadsheet. Aggregate sample intervals were laid out by Formation. From each hole, composite samples were chosen from the Winnipegosis Formation, Contact Rapids Formation, and the Precambrian basement granite, when applicable.

The core was photographed dry and wet. The camera was mounted to a stand set up in the same location providing consistent zoom, angle and lighting. Photographs were saved directly to the camera and data would be transferred to computer as high-resolution jpeg images upon completion of a set. All pictures were checked and renamed as soon as possible to ensure quality and avoid potential data loss.

11.4 Core Splitting

A manual wheel splitter with a four-inch blade was used to halve and quarter the core. Composite samples were halved with the exception of the duplicate check and geochemical samples, which were quartered. The remaining core (half or quarter) was put back into the box to be kept as an archive. Effort was made by the splitter to ensure that the side of core sampled remained as consistent as possible, proper placement of core back into the box, cleaning between samples to prevent contamination, and proper bagging and recording. In rare instances, any interval that included >30 cm of pervasive bitumen saturation was not included into the splitting process or sample.

11.5 Sample Shipping

All sampling was completed by APEX. Samples for the individual geochemistry intervals were collected by placing the material in heavy grade plastic sample bags with the sample numbers written on both sides in permanent marker. Sample tags marked with the sample numbers were included inside each sample bag, which were sealed with plastic cable ties. Samples were then placed into a rice bags lined with a larger heavy grade plastic bag for shipment.

For composite samples, two large heavy grade sample bags were placed into a rice bag to create the composite for the respective drillhole and lithology. Composite samples typically consist of multiple rice bags with each bag weighing approximately 20 kg. The composite sample rice bags were sealed with a cable tie for transport to the laboratory. Laboratory instructions included crushing and homogenizing all samples within the single composite sample to homogenize the sample for test work.

A hard copy submittal form including sample inventory and instructions for the laboratory were placed inside the first bag of each shipment and sealed with plastic cable ties. Rice bags were stretch wrapped onto skids to be transported by courier from Athabasca Minerals office to the laboratories. The exception is the duplicate check sample taken directly to the laboratory by APEX personnel.

11.6 Analytical Test Work

The analytical sampling process consisted of two separate sample sets: 1) composite samples for aggregate test work; and 2) interval or channel samples for major- and trace-element geochemical analysis. The objective of the aggregate analytical test work – in the context of this crush rock aggregate resource estimate – was predominantly focused on the aggregate mechanical qualities for its use in aggregate road building and concrete. Geochemical analyses were also performed to make inferences on the potential hindrances to rock strength (e.g., modal clay abundance through elements like Al). A secondary component of the geochemical work was to test whether the basement granite rocks contain REE and/or precious- and base-metal potential.

The analytical test work was performed in accordance with the thickness and lithology of the various units. Drill core from some of the units (Contact Rapids and the Precambrian basement granite) did not penetrate thick enough intersections to create a large enough sample for certain test work. Consequently, the test work completed as part of this study is complicated, and Table 9 is provided to explain the number and type of individual analysis (aggregate test work and geochemical analysis) that was undertaken for specific lithological units and from each drillhole.

11.6.1 Aggregate Analytical Test Work

Composite aggregate samples were collected by taking a continuous ¼ to ½ split of core over the entire Winnipegosis Formation. The Winnipegosis unit was thick enough to create composite samples from each drillhole (n=10), including one duplicate sample from drillhole GNA-10. The composite samples typically comprised 60 kg to 150 kg of total material. Because the Contact Rapids and granite intersections are not as thick as the Winnipegosis it was not possible to collect a single composite sample from every drillhole. Subsequently Contact Rapids and granite composite samples encompass more than one drillhole that were amalgamated into a single sample to be analysed together (see Table 9). A single composite sample of Contact Rapids was collected using material from all 10 drillholes. Two composite samples of basement granite were collected from eight drillholes (from all of the drillholes that penetrated basement).

Table 9. Summary of aggregate test work and geochemical analyses that was completed by drillhole and by lithological unit.

		Analysis consistent with Alberta Transportation standard Table 3.2.3.2A and CSA standard Table 12							Density analysis to confirm specific gravity core measurements			Additional geochemical analysis	
Drillhole	Formation	Sieve Analysis - Fine Aggregate (<10 mm)	% Fracture by Weight	Plasticity Index	L.A. Abrasion (Coarse)	$MgSO_4$ Soundness (Coarse)	$MgSO_4$ Soundness (Fine)	Unconfined Freeze-Thaw Resistance of Coarse Aggregate	Relative Density (Specific Gravity) and Absorption - Fine	Bulk Density of Aggregate (Dry)	Relative Density (Specific Gravity) and Absorption - Coarse	Whole Rock Geochemistry	Portable X-Ray Fluorescence
GNA-10	Winnipegosis[1]	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓		✓✓	✓✓	✓✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
GNA-16	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a
14RLD-001	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-002	Winnipegosis[1]	/	✓	✓	✓	✓	/	✓	/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-003	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-004	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-005	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-006	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	n/a	n/a	n/a
14RLD-007	Winnipegosis[1]	/	✓	✓	✓	✓	/	✓	/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]
14RLD-008	Winnipegosis[1]	/	✓	✓	✓	✓	/		/	✓	✓	✓[4]	✓[6]
	Contact Rapids[2]	/	✓	✓	✓	✓	/		/	✓	✓		✓[6]
	Precambrian[3]	/	✓	✓	✓	✓	/		/	✓	✓	✓[5]	✓[6]

1 Winnipegosis composite sample: one composite sample per hole (using continuous material from 10 separate drillholes; i.e., 10 composite samples in total)
2 Contract Rapids composite sample: one composite sample (using continuous and combined material from ten drillholes; i.e., one composite sample in total)
3 Precambrian basement composite sample: two composite samples (using continuous and combined material from eight drillholes; i.e., two composite samples in total)
4 Winnipegosis geochemistry sample: a one metre long continuous interval sample was taken every ten metres
5 Precambrian basement geochemistry: one continuous interval sample per every two metres
6 Portable x-ray fluorescence analyzer: one spot analysis per every one metre

✓ - Single composite test sample tested at AMEC
✓✓ - Duplicate test sample of Winnipegosis dolostone: core splits were composited into two samples with one tested at AMEC and the other at Tetra Tech EBA
/ - Analysis not performed by AMEC (on core material from the Richardson Property)
n/a - drill core matieral not available for analysis

To summarize, the sample set consisted of the following 14 composite samples:

- 11 total Winnipegosis composite samples (10 samples from each drillhole that were analyzed at AMEC, and one duplicate sample from drillhole GNA-10 that was analyzed at Tetra Tech EBA);

- one Contact Rapids composite sample, which includes material from the 10 drillholes; and

- two Precambrian basement granite composite samples, which included material from the eight drillholes that penetrated basement (Table 9).

The sampling scheme was adopted to place emphasis on the road crush aggregate potential of Devonian Winnipegosis Formation, and secondarily, test the aggregate potential of the Precambrian basement granite. The Contract Rapids Formation was not considered a crush rock aggregate candidate; however, a single sample was analyzed to obtain is aggregate specification, particular because the unit occurs stratigraphically between the overlying Winnipegosis and underlying granite.

Aggregate samples were analyzed at AMEC in Calgary, Alberta. A separate laboratory ‘check aggregate sample’ (discussed in the Data Verification Section) was analyzed at EBA Tetra Tech in Edmonton, Alberta. The aggregate test work methodologies are in accordance with the Alberta Transportation aggregate standards for road aggregate and Canadian Standards Association (CSA) concrete standards. These test standards are better referenced as:

1. Alberta Transportation Specification for aggregate production and stockpiling (Alberta Transportation, 2010) – more specifically, Test Methods Used to Determine Material Characteristics (their Table 3.2.3.2 A, B, C); and

2. CSA-A23.1-09/A23.2-09 Concrete materials and methods of concrete construction/Test methods and standard practices for concrete (CSA, 2009) – more specifically, Limits for Deleterious Substances and Physical Properties of Concrete Aggregate (their Table 12, CSA A23.2).

The individual analytical techniques for the Alberta Transportation and CSA aggregate testing methods are presented in Table 10. Because the Winnipegosis dolostone and Precambrian basement granite materials are ‘hard rock’ and uncharacteristic of ‘typical’ sand and gravel-type aggregate, not all of the Alberta Transportation and CSA test methods were performed on the Richardson Property core samples. With the exception of sieve analyses, all of the Alberta Transportation specifications for aggregate test methods were conducted on the Winnipegosis, Contact Rapids and basement granite composite samples. With respect to the CSA standard test methods, only two Winnipegosis Formation composite samples were tested for unconfined freeze-thaw test. Due to the nature of the competent dolostone and granite rock, the majority of the CSA standard test methods were not analyzed. Hence, the testing should be viewed as a general aggregate testing, as opposed to fine- or coarse-aggregate testing. See Section 13.1 for an explanation of aggregate test work processing and a complete set of analytical results

Table 10. Summary of the Alberta Transportation and Canadian Standards Association test methods.

Alberta Transportation and CSA Testing Methods		
Specifications for Aggregate (Table 3.2.3.1)[1]	**Test Methods Used to Determine Material Characteristics (Table 3.2.3.2)[1]**	**Limits for Deleterious Substances and Physical Properties of Concrete Aggregate (Table 12, CSA A23.2)[2]**
Sieve analysis	Sieve analysis	Sieve analysis
% Fracture by weight	% Fracture	Clay lumps
Plasticity index	Plasticity Index	Low density material
Flakiness index	Flakiness index (one/source)	Material finer than 80 microns
L.A. Abrasion	L.A. Abrasion	Flat and elongated particles
	Determining the liquid limit of soils	Micro Deval **
	Dry strength (one/20,000 tonnes)	Unconfined freeze-thaw
	Coefficient of unconformity (not for des 1+2)	
	Detrimental matter, coarse aggregate (1/5,000 tonnes) *	
Additional Analysis Required for Resource Model and Estimate		
Relative Density (Specific Gravity) and Absorption - Fine		
Bulk Density of Aggregate (Dry)		
Relative Density (Specific Gravity) and Absorption - Coarse		

* Abbreviated petrographic analysis TLT-107

** equivalent to $MgSO_4$ soundness

1 Alberta Transportation Specification 3.2 for aggregate production and stockpiling (Alberta Transportation, 2010)

2 CSA-A23.1-09/A23.2-09 Concrete materials and methods of concrete construction/Test methods and standard practices for concrete (CSA, 2009)

11.6.2 Geochemical Analytical Test Work

Geochemical samples were taken as ¼ core splits of continuous material for 0.5-3 m intervals throughout the Precambrian basement granite and approximately every ten metres of the Winnipegosis Formation. These samples were sent to Acme Analytical Laboratories Ltd. (Acme) in Vancouver, British Columbia for analysis. Acme is an international accredited laboratory with International Standards Organization (ISO) Model for Quality Assurance ISO9001:2008 certification. The Vancouver facility is also accredited with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories.

Whole rock geochemical samples were prepared and analysed at Acme Analytical Laboratories in Vancouver, British Columbia. One kilogram of the crushed sample is passed through a 2 mm screen to +70%. A 250 g split of the sample is then pulverized to +85% passing through a 75 µm screen. The sample is then decomposed by Total Whole Rock Characterization analysis consisting of standard suite major oxides (21 parameters) by Inductively Coupled Plasma Emission Spectroscopy (ICP-ES) and standard suite trace elements (45 elements) by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). This is achieved through fusion techniques which completely decompose the sample, account for structural water and provide quantitative silicon values resulting in total element concentration data suitable for whole rock classification diagrams and molar element ratio studies (BVM, 2014).The sample preparation and analysis processes are subject to internal Quality Control and Quality

Assurance (QA/QC) protocols carried out by Acme during the progression of the service.

11.6.3 Density Analytical Test Work

In addition to Specific Gravity (SG) measurements, which were measured during the geotechnical work (one SG measurement per every metre), bulk and relative density and absorption tests were also conducted on the composite samples at AMEC and Tetra Tech EBA to determine the absorption of water on aggregate, bulk specific gravity and the saturated-surface dry bulk specific gravity of aggregate samples.

11.7 Quality Assurance/Quality Control Measure One

Portable X-Ray Fluorescence (XRF) analyzer measurements were taken every metre of core to provide an evaluation of the chemical homogeneity, potential aggregate strength of the core, and to evaluate the metallic mineral potential of the core. Geochemical samples, which were analyzed at Acme, were taken as ¼ core splits of continuous material over approximately one- to two-metre intervals throughout the Precambrian basement granite and for one sample for every ten metres of the Winnipegosis Formation.

The portable XRF analyzer is a semi-quantitative tool; however, several studies have shown that it performs adequately in comparison to laboratory analyses (e.g., Lesemann et al., 2011; Knight et al., 2011) and the handheld XRF is used for a variety of mining applications, including core analysis, mineral exploration, geochemical testing, and waste processing and metal contamination. The XRF measurements taken as part of the core geotechnical work generally consider the data as semi-quantitative. The measurements were taken predominantly to provide information on the homogeneity of the selected rock units, and in this regard, the XRF performed adequately (see Section 14.4, Data Type Comparison).

The technological comparison between the two geochemical methods is at odds; that is, the XRF uses a spot measurement versus the whole rock laboratory-analyzed geochemistry, which analyzed a one- to two-metre 'channel' sample of continuous core. Nevertheless, a brief comparison between the two methods is presented in Figures 23 and 24 to provide some measure of QAQC on the work that was conducted, and because analytical processing for industrial minerals such as the Richardson crush rock aggregate deposit is reliant on mechanical strength tests rather than conventional geochemical-type surveys that are more typical of metallic mineral deposits.

The results show that there is generally positive agreement between the XRF and the laboratory geochemistry, particularly for the granite samples. The Winnipegosis are more scattered with lower confidence between the two methods. Due to the different sampling criteria, as mentioned above, this comparison should be taken with a degree of skepticism. The fact that the granite XRF and lab data correlate nicely it is not surprising given that the mineralogical composition of the granite is more uniform than the Winnipegosis dolostone. The Winnipegosis is more variable that the granite in a textural sense, and therefore, is likely mineralogically variable as well (e.g., a larger amount of local fossil content). Subsequently, the poor correlation between the XRF and lab data for the Winnipegosis Formation is not overly surprising.

Figure 23. Comparison between portable XRF analyzer measurements and conventional laboratory geochemistry for selected elements from the Precambrian basement granite samples.

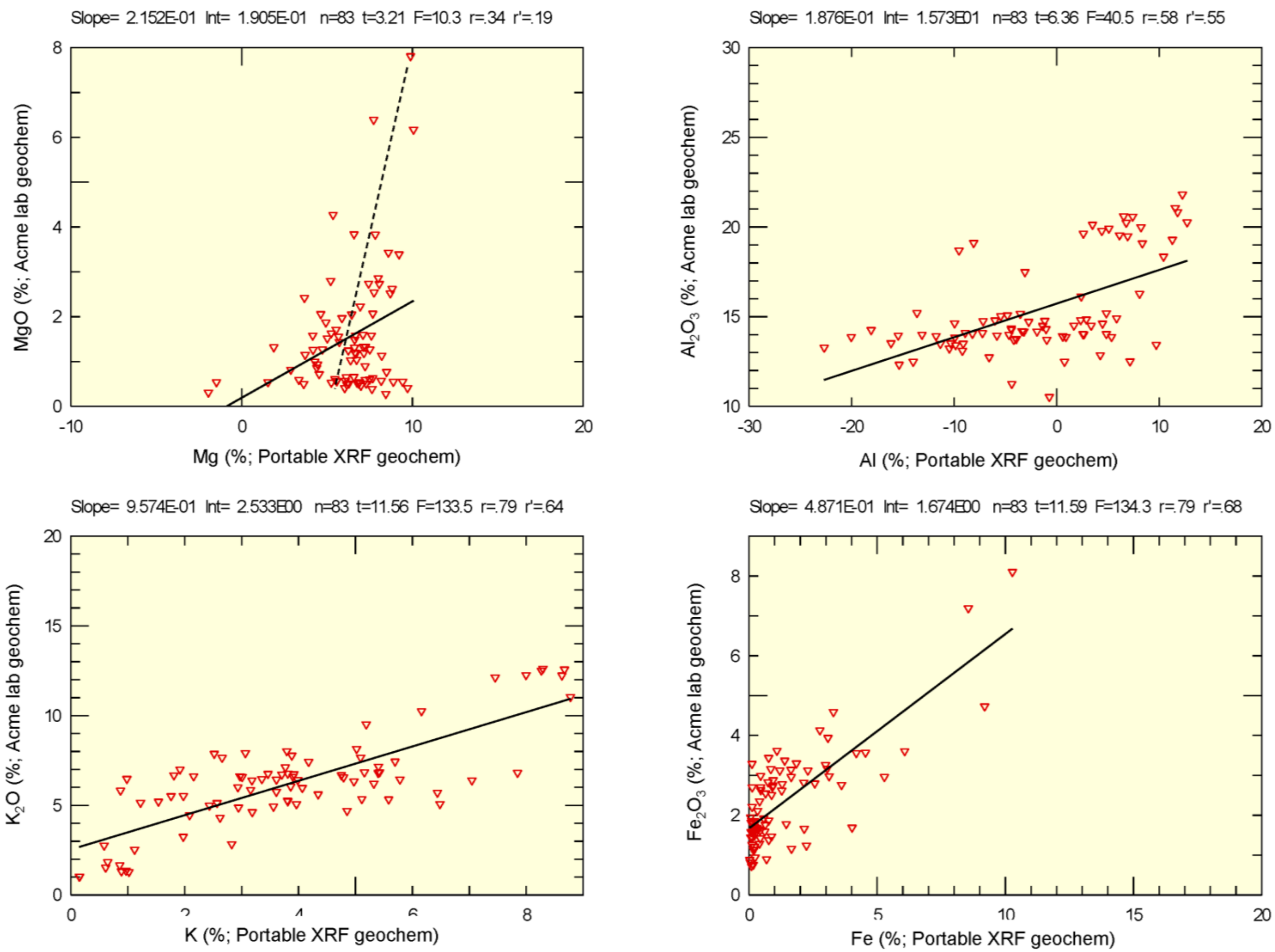
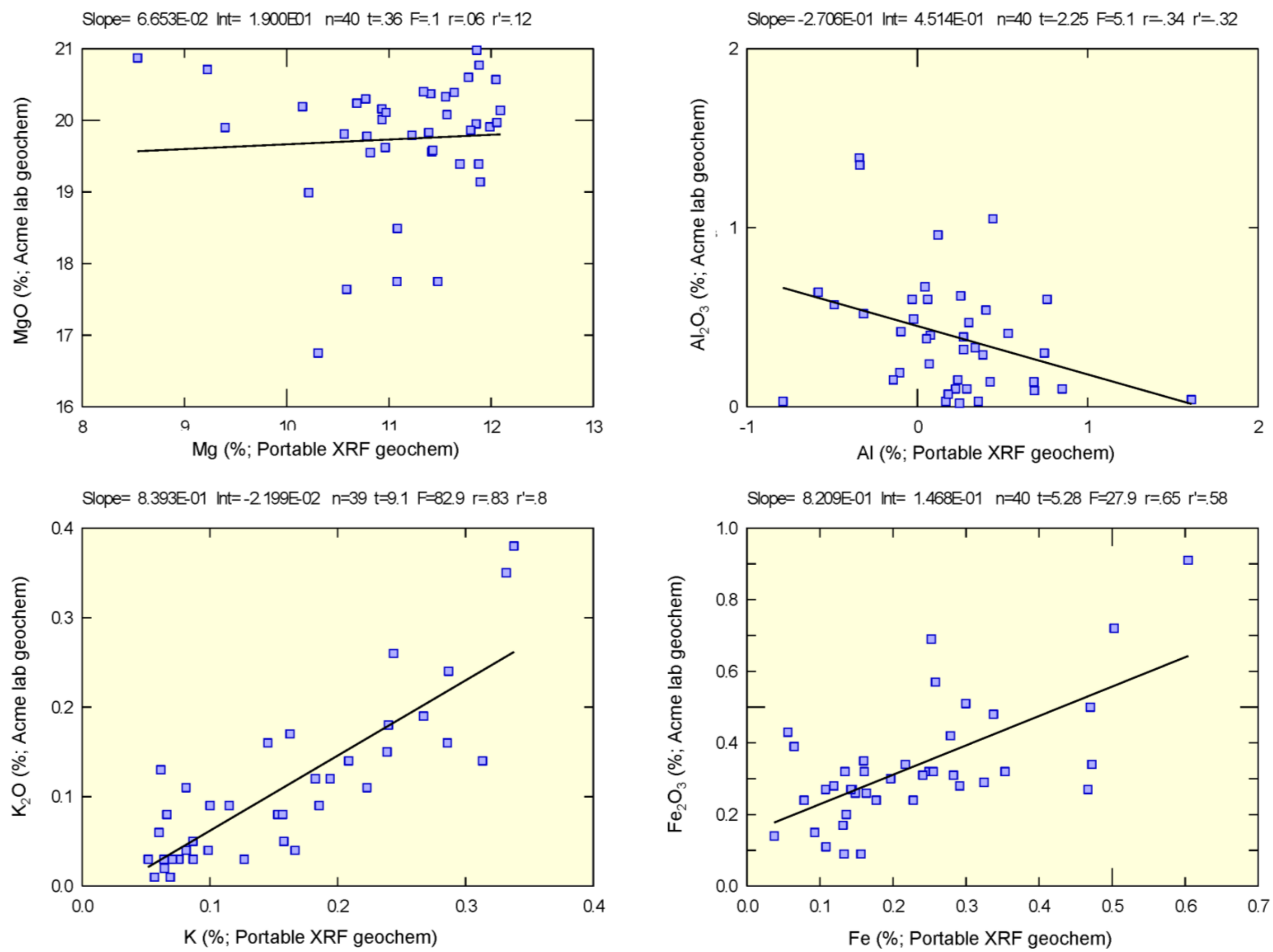


Figure 24. Comparison between portable XRF analyzer measurements and conventional laboratory geochemistry for selected elements from the Winnipegosis dolostone samples.



11.8 Quality Assurance/Quality Control Measure Two

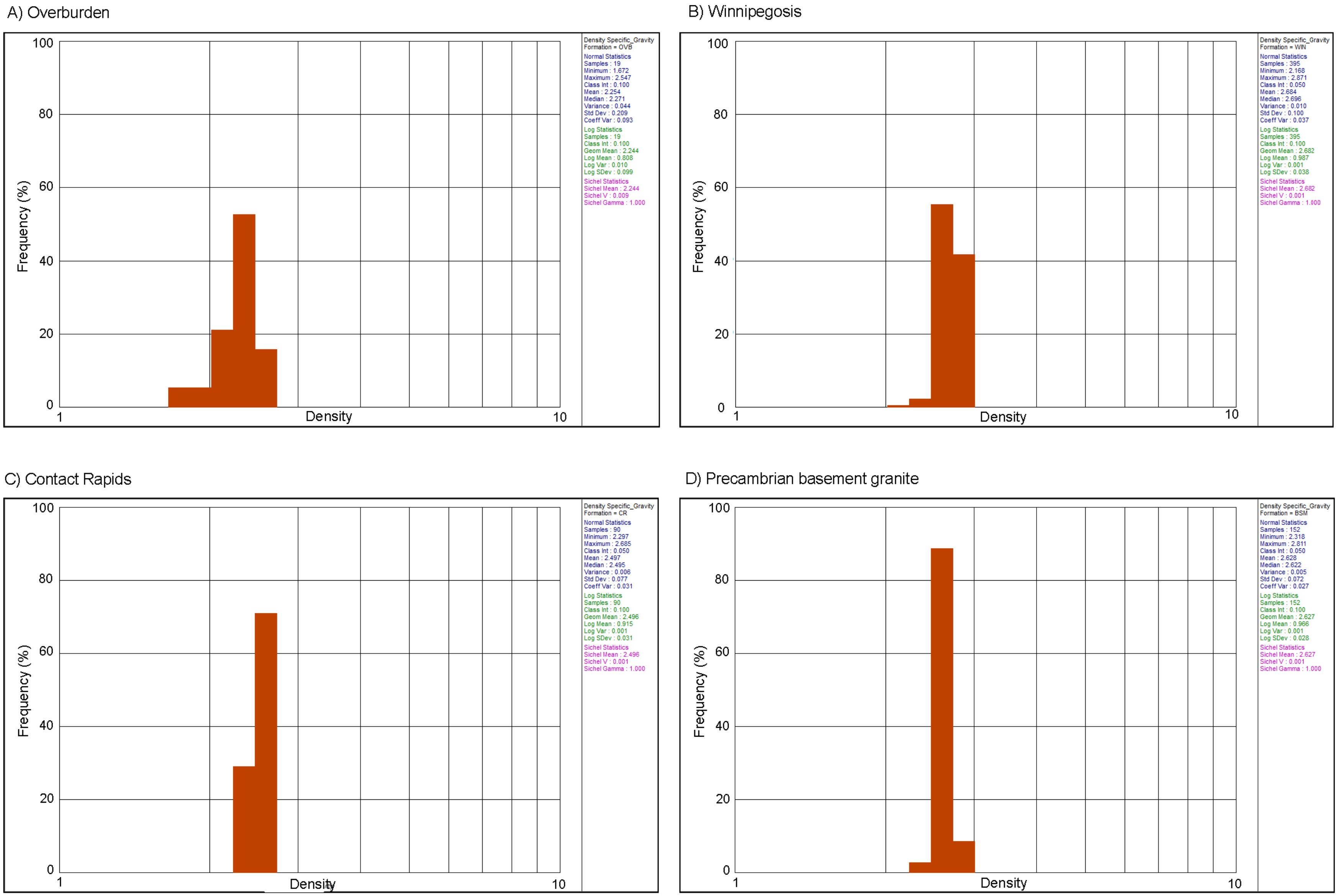
A total of 675 bulk density measurements were collected from drill core within the Richardson maiden inferred crush rock aggregate resource area. The measurements were conducted directly on drill core sample using the “hydrostatic” method, which involves weighing the item in air and then again while fully submerged in water. Density measurements were collected once every metre of drill core and were separated by formation to calculate an average bulk density for each formation within the resource area. The density data are presented as histograms in Figure 25. With respect to the Winnipegosis Formation, which is the primary formation target in this resource estimation, a total of 395 density measurements using the hydrostatic method were collected from the Winnipegosis core sections; these data have an average bulk density of 2.68 with a variance over the 395 measurements of 0.01.

The hydrostatic density measurements for the Winnipegosis Formation were compared against density measurements conducted at AMEC and Tetra Tech EBA as part of the aggregate test work (Table 11). The average bulk relative density, saturated surface dry relative density and apparent relative density of 10 Winnipegosis Formation samples yielded 2.65, 2.70 and 2.80, respectively, in the aggregate test work. Consequently, these densities are within 0.03 of the hydrostatic average value (2.68) that is used for resource estimations in this Technical Report. The nearly identical density values that were produced by APEX during core geotechnical work and at two separate laboratories provide assurance that the density value used in the Richardson maiden inferred crust rock aggregate resource estimate are realistic and represent a conservative density value for resource estimation.

Table 11. Comparison of density measurements that were conducted during geotechnical work (hydrostatic measurements) and during aggregate test work at AMEC and Tetra Tech EBA laboratories.

			From aggregate test work				From geotechnical core work		
Sample ID	Drilhole	Formation	From (m)	To (m)	Bulk Relative Density	SSD Bulk Relative Density [5]	From (m)	To (m)	Average bulk density
288401	GNA-16	Winnipegosis	47.8	81.37	2.70	2.74	47.80	82.69	2.71
288402	GNA-10	Winnipegosis	21.34	64.17	2.65	2.71	21.34	65.00	2.64
8636.C	GNA-10	Winnipegosis	21.34	64.17	2.62	2.68	21.34	65.00	2.64
288404	14RLD001	Winnipegosis	31.33	76.72	2.62	2.69	31.33	77.30	2.7
288405	14RLD002	Winnipegosis	30	76.96	2.77	2.79	30.00	77.94	2.71
288407	14RLD003	Winnipegosis	39	72.66	2.60	2.65	39.00	73.98	2.65
288408	14RLD004	Winnipegosis	30	72.01	2.62	2.67	30.00	73.16	2.69
288410	14RLD005	Winnipegosis	35	76.3	2.61	2.68	30.00	77.05	2.65
288411	14RLD006	Winnipegosis	41.45	83.01	2.64	2.70	41.15	83.80	2.69
288412	14RLD007	Winnipegosis	39	83.6	2.63	2.70	39.00	85.70	2.71
288413	14RLD008	Winnipegosis	64.92	72.94	2.64	2.71	64.92	73.22	2.61
		Winnipegosis desnity statistics							
				Minimum	2.60	2.65			2.61
				Maximum	2.77	2.79			2.71
				Average	2.65	2.70			2.67
				Variance	0.002	0.001			0.001
				Standard Deviation	0.05	0.04			0.04
				RSD%	1.85	1.39			1.33

Figure 25. Density histograms based on hydrostatic geotechnical core measurements of overburden, Winnipegosis, Contact Rapids and Precambrian basement granite.



11.9 Quality Assurance/Quality Control Measure Three

A duplicate composite core sample of the Winnipegosis Formation was collected from a single drillhole, GNA-10. The intent of this sample is to serve as an aggregate test work check sample. The sample was collected and analyzed by sending a ¼ split of core from the same drillhole and sample interval (i.e., the Winnipegosis formation) to one lab and the other ¼ split of core to another lab. The laboratories are of independent and competitive companies and were instructed to perform the same analytical tests.

A comparison of the results from the two separate analytical laboratories is presented in Table 12; and summarized as follows:

- The plasticity indices were both classified as non-plastic;
- The L.A. Abrasion loss were identical (i.e., a variance of 0.0);
- The $MgSO_4$ soundness loss had the largest discrepancy of the aggregate test work comparison with a variance of 10.125;
- The bulk relative density, saturated surface dry bulk relative density and apparent relative density all had a variance of 0.0004; and
- The absorption had a variance of 0.0032;

The test work check sample produced similar results. The only discrepancy was $MgSO_4$ soundness loss, which is likely a result of differences of size fractions analyzed. That is while all tests were conducted on the coarse fraction, the sizes were subject to some variation between the labs. With respect to the $MgSO_4$ soundness loss test, the AMEC sample produced an $MgSO_4$ soundness loss of 2.0 based on a 20 mm to 80 mm size fraction. In comparison, two $MgSO_4$ soundness loss results were reported by Tetra Tech EBA: one on a fine aggregate size fraction (160 µm to 10 mm) that yielded a loss of 3.2; and a coarse aggregate size fraction (5 mm to 80 mm) that yielded a loss of 6.5. It is likely, therefore, that a coordinated measurement on identical size fractions might produce a lower variance in this particular test measurement.

Table 12. Comparison of aggregate test work results between AMEC and Tetra Tech EBA for a duplicate composite Winnipegosis sample from drillhole GNA-10. Results are reported from coarse aggregate fractions.

Sample ID	Drilhole	From (m)	To (m)	Laboratory	Plasticity index classification	L.A. Abrasion: loss at 1,000 revolutions (%)	$MgSO_4$ soundness loss (%)	Bulk Relative Density	SSD Bulk Relative Density [5]	Apparent Relative Density	Absorption (%)
288402	GNA-10	21.34	64.17	AMEC	Non-plastic	21	2.0	2.65	2.71	2.82	2.28
8636.C	GNA-10	21.34	64.17	EBA	Non-plastic	21	6.5	2.62	2.68	2.79	2.20
		Variance of duplicate sample			**0.0000**	**0.0000**	**10.1250**	**0.0004**	**0.0004**	**0.0004**	**0.0032**

12 Data Verification

The QP's and/or APEX consulting geologists were not involved in Athabasca Minerals 2013 drill program. Verification procedures applied to assess the 2013 exploration work, as conducted by the senior author, included reviewing the original hardcopy driller notes, drill logs and laboratory certificates, and comparing this information against the electronic datasets. The 2013 drill results were also tested against the 2014 drill program, which was managed by APEX.

In some instances, APEX staff had to convert hard copy data to electronic format, in which case the QP reviewed all data conversion. There were no inconsistencies between the drill logs and the geology file, and analytical data and the estimation file.

Mr. Eccles P. Geol. oversaw the APEX-led 2014 exploration operations including the drilling, geotechnical core measurements, core logging, core sampling, aggregate test work and geochemical analytical work. APEX geologists managed the day-to-day operations of the Athabasca Minerals 2014 drill program. Mr. Eccles takes overall responsibility for reporting criteria in this Technical Report and the Richardson maiden inferred crush rock aggregate resource estimate.

Before commencing work on the core, APEX prepared a core handling, logging and sampling procedures protocol. This protocol outlined detailed instructions on the procedures used during the testing and data gathering process. These guidelines were adhered to by APEX geologist and geotechnical staff, ensuring accuracy and uniformity in data gathering during the program and provide an independent methodology for future work on the project. The verification procedure applied by the QP ensured that the logging, sampling and chain of custody procedures were documented in accordance to this protocol.

Determination of the chemical and physical characteristics of an industrial mineral often involves procedures and tests that are not part of the normal activity of an analytical laboratory. In order to conduct the proper tests on the Richardson Property drill cores, Mr. Eccles determined the appropriate physical and chemical analytical work that was relevant to the identification of the properties of interest in the intended application. The objective of the analytical test work – in the context of this crush rock aggregate resource estimate – was predominantly focused on the aggregate mechanical qualities for its use in aggregate road building and concrete. Mr. Eccles also ensured that the selected laboratories had the requisite experience and necessary equipment to conduct the required tests.

The sampling and test work processes employed during the 2013 and 2014 drill core sampling programs, meet industry standards for accuracy and reliability, and in the opinion of the authors of this Technical Report, are sufficiently accurate and precise for use in the Richardson maiden inferred crush rock aggregate resource estimate**.**

Many industrial minerals deposits are subject to a nugget effect. Within the context of the Richardson crushed rock aggregate deposit, a sufficient and appropriate number of samples were analyzed to ensure that meaningful average sample results were obtained. The Winnipegosis Formation dolostone has a demonstrated physical and chemical homogeneity. The one impurity to report is bitumen, which ranges in intensity from non-existent (in most of the core) to pervasive, the latter of which is evident in 25 cm to 90 cm wide ‘bituminous horizons’ that occur in the eastern drillholes 14RLD006 and 14RLD008. However, the overall consistency of non-bitumen-bearing dolostone provide justification that bitumen does not influence the viability of the Winnipegosis as an industrial mineral, at least in the evaluation of this early stage project.

With respect to analytical precision, the physical test work techniques and composite sampling methodology that were adopted to characterize the strength characteristics of the dolostone and granite make it difficult to quantify precision in comparison to standard chemical analyses. Slight variations in the quality assurance/quality control measures are documented in the three measures discussed in the previous text. These discrepancies were expected as they represent variations between laboratory procedures (aggregate test work at two separate laboratories) or analytical techniques (XRF versus laboratory geochemical analysis and SG geotechnical measurements versus laboratory density measurements) more than within the core itself. Importantly, this work has shown that the assay preparation and analytical processes produced valid results. Hence, no inconsistencies were observed between the datasets by the QP providing confidence to the stratigraphic continuity of the dolostone unit and the 3-D model used in the estimation process.

To conclude, the senior author has reviewed all geotechnical and geochemical data and found no significant issues or inconsistencies that would cause one to question the validity of the data. Hardcopy and electronic reviews by the QP confirmed the data were generated with proper procedures, has been accurately transcribed form the original source and is suitable for use in this Technical Report. The drill program, which was managed by APEX, and QA-QC testing conducted by the QP also increased the confidence level of the dataset.

With respect to verification limitations, the analytical test work protocol outlined in this Technical Report (summarized in Table 9) did not include standard blank samples, certified standards or duplicates samples. The authors justified this as the aggregate test work is a determination of the rock character rather than identifying a single elemental concentration toward resource evaluation. In addition, the geochemical data do not form part of this resource work; rather the geochemical analysis were implemented to see if there is any potential for metallic mineral studies at the Richardson Property.

To conclude and in the opinion of the QP, Mr. Eccles, P. Geol. is satisfied to include these data in resource modelling, evaluation and estimations as part of Richardson resource estimate presented in this Technical Report.

13 Mineral Processing and Metallurgical Testing

The objective of the aggregate analytical test work was focused on the aggregate mechanical qualities for its use in aggregate road building and concrete. Geochemical analyses were also performed to make inferences on the potential hindrances to rock strength (e.g., modal clay abundance through elements like Al). A secondary component of the geochemical work was to test whether the basement granite rocks contain REE and/or precious- and base-metal potential.

Geotechnical measurements, aggregate test work laboratory certificates and geochemical laboratory certificates are available as described in Appendix 1. The following Mineral Processing Section describes the aggregate test work results, followed by the geochemical results. The geotechnical and geochemical data are also discussed briefly in the Resource Section (see Section 14.7, Demonstration of Stratigraphic Homogeneity).

13.1 Aggregate Test Work Results

13.1.1 Introduction

The results of the aggregate test work for 14 composite samples are presented in their entirety in Table 13. These data include aggregate test results for:

- Winnipegosis samples (10 samples from each drillhole that were analyzed at AMEC, and one duplicate sample from drillhole GNA-10 that was analyzed at Tetra Tech EBA; n=11 total samples);

- One Contact Rapids sample and two Precambrian basement granite samples.

Published specifications and standards for any industrial mineral project should be used primarily as a screening mechanism to establish the marketability of an industrial mineral. The ultimate suitability of an industrial mineral for use in specific applications can only be determined through detailed market investigations and discussions with potential product users. To evaluate the suitability of Winnipegosis, Contact Rapids and Precambrian basement granite samples from the Richardson Property, we have made comparisons with Alberta Transportation (their Table 3.2.3.2C) and CSA (their Table 12) screening criteria as summarized in Table 13 and in the following text.

13.1.2 Aggregate Test Work Processing Note

Not all of the aggregate test methods that are outlined in Alberta Transportation's Table 3.2.3.2A and CSA's Table 12 were performed on the Richardson Property core samples. That is, several analytical methods were not recommended by AMEC – at this particular phase of evaluating an early stage crush rock aggregate project – including: sieve analysis; flat and elongated; flakiness index; and material finer than 80 µm test methods. To conduct these test methods, a preliminary crush of the drill core is required; however, there are drawbacks associated with this type of pre-processing in that any preliminary crush down could not replicate a typical crushing process in the field and would therefore produce test results that are different from that of the field. It is important to point out that the test methods adopted in this Technical Report (see Tables 9 and 13) do provide a good indication of the quality of the material. The only difference is that the composite Winnipegosis, Contact Rapids and Precambrian basement granite samples that were sent to AMEC were not tested by individual sieve sizes of material (due to AMEC's pre-crush cautioning). Hence, the testing should be viewed as a general aggregate testing, as opposed to fine- or coarse-aggregate testing. In accordance with discussions with AMEC, and in review other crush rock aggregate NI 43-101 Technical Reports, the authors of this report acknowledge that the test results obtained are valid and applicable to assessing the Richardson crush rock aggregate potential and to stating a maiden inferred resource estimate.

Table 13. Summary of aggregate test work completed at the Richardson crush rock aggregate Property.

Sample ID	Drilhole	From (m)	To (m)	Laboratory	Formation	Plasticity index classification	L.A. Abrasion: loss at 1,000 revolutions (%)	$MgSO_4$ soundness loss; coarse aggregate (%)	Unconfined freeze-thaw test (%)	Bulk Relative Density	SSD Bulk Relative Density [5]	Apparent Relative Density	Absorption (%)
288401	GNA-16	47.8	81.37	AMEC	Winnipegosis	Non-plastic	28.2	10.5	/	2.70	2.74	2.81	1.43
288402	GNA-10	21.34	64.17	AMEC	Winnipegosis	Non-plastic	21	2.0	/	2.65	2.71	2.82	2.28
288404	14RLD001	31.33	76.72	AMEC	Winnipegosis	Non-plastic	23.2	0.5	/	2.62	2.69	2.82	2.66
288405	14RLD002	30	76.96	AMEC	Winnipegosis	Non-plastic	23.6	4.6	0.19	2.77	2.79	2.84	0.90
288407	14RLD003	39	72.66	AMEC	Winnipegosis	Non-plastic	25.5	17.7	/	2.60	2.65	2.74	2.00
288408	14RLD004	30	72.01	AMEC	Winnipegosis	Non-plastic	26.6	12.1	/	2.62	2.67	2.75	1.84
288410	14RLD005	35	76.3	AMEC	Winnipegosis	Non-plastic	18.8	4.4	/	2.61	2.68	2.81	2.74
288411	14RLD006	41.45	83.01	AMEC	Winnipegosis	Non-plastic	23.7	4.6	/	2.64	2.70	2.79	1.99
288412	14RLD007	39	83.6	AMEC	Winnipegosis	Non-plastic	26.8	9.9	0.21	2.63	2.70	2.81	2.39
288413	14RLD008	64.92	72.94	AMEC	Winnipegosis	Non-plastic	29.1	17.6	/	2.64	2.71	2.83	2.52
8636.C	GNA-10	21.34	64.17	EBA	Winnipegosis	Non-plastic	21	6.5	/	2.62	2.68	2.79	2.20
288406	Multiple drillholes [1]			AMEC	Contact Rapids	Non-plastic	43.4	82.0	/	2.49	2.59	2.76	3.88
288403	Multiple drillholes [2]			AMEC	Granite	Non-plastic	17.7	9.0	/	2.62	2.63	2.64	0.33
288409	Multiple drillholes [3]			AMEC	Granite	Non-plastic	18.8	10.8	/	2.74	2.74	2.75	0.19
Maximum allowable standard specifications for aggregate [4]						NP to NP-8	35-50	12.0	6.0	/	/	/	/
						Winnipegosis statistics							
						Minimum	18.80	0.5	0.19	2.60	2.65	2.74	0.90
						Maximum	29.10	17.7	0.21	2.77	2.79	2.84	2.74
						Average	24.32	8.2	0.20	2.65	2.70	2.80	2.09
						Variance	10.532	34.3	0.00	0.002	0.001	0.001	0.300
						Standard Deviation	3.25	5.9	0.01	0.05	0.04	0.03	0.55
						RSD%	13.34	71.3	7.1	1.85	1.39	1.12	26.26
						Granite statistics							
						Minimum	17.70	9.0	/	2.62	2.63	2.64	0.19
						Maximum	18.80	10.8	/	2.74	2.74	2.75	0.33
						Average	18.25	9.9	/	2.68	2.69	2.70	0.26
						Variance	0.605	1.6	/	0.007	0.006	0.006	0.010
						Standard Deviation	0.78	1.3	/	0.08	0.08	0.08	0.10
						RSD%	4.26	12.9	/	3.17	2.90	2.89	38.07

[1] Amalgamated composite sample includes core from GNA-10 (64.17-75.60 m), 14RDL001 (76.72-92.48 m), 14RDL002 (76.96-90.76 m), 14RDL003 (72.66-82.45 m), 14RDL004 (72.01-83.76 m), 14RDL005 (76.30-84.39 m), 14RDL006 (83.01-95.76 m), 14RDL007 (83.60-97.96 m) and 14RDL008 (72.94-81.18 m).

[2] Amalgamated composite sample includes core from GNA-10 (76.12-101.0m), 14RDL001 (96.63-106.00 m), 14RDL002 (93.10-99.00 m) and 14RDL003 (85.96-96.00 m)

[3] Amalgamated composite sample includes core from 14RDL004 (84.98-96.00 m), 14RDL005 (86.88-117.05 m), 14RDL007 (98.65-147.00 m) and 14RDL008 (83.00-89.002 m)

[4] Published specifications and standards for industrial mineral should be used primarliy as a screeing mechanism to establish the marketability of an industrial mineral. The ultimate suitability of an industrial mineral for use in specific applications can only be determined through detailed market investigations and discussions w ith potential product users and customers (source: Alberta Transportation, Table 3.2.3.2C; CSA, Table 12). Also see the text as some aggregate designations have a range of maximum allow able standards.

[5] SSD - saturated surface dry

13.1.3 Los Angeles Abrasion Test

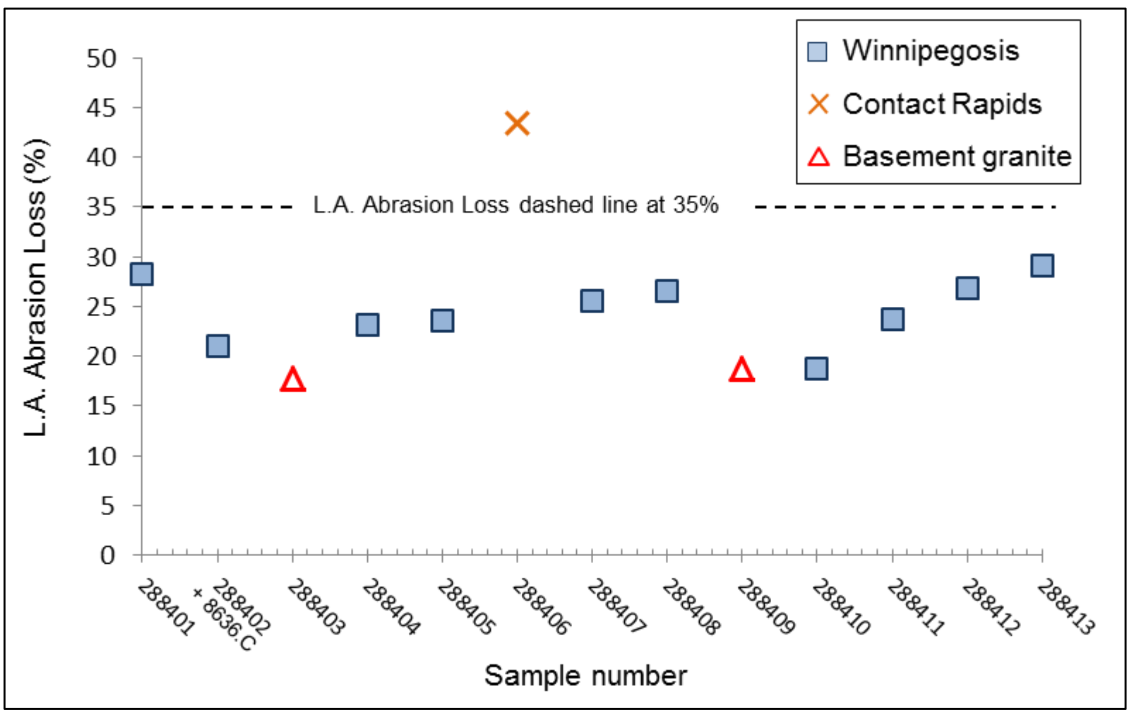
A common test used to characterize toughness and abrasion resistance is the Los Angeles (L.A.) abrasion test. In Alberta, the maximum abrasion loss value for:

- Designation 1 (asphalt concrete pavement) aggregate is 40%;
- Designation 2 (base course aggregate) aggregate is 50%;
- Designation 3 (seal coat aggregate) is 35%; and
- Designation 4 (gravel surfacing aggregate) does not have a maximum permissible abrasion loss value (Alberta Transportation, 2007, 2010).

Sample testing was in accordance with CSA A23.2-17A (ASTM C535). Preparation consisted of sieving the sample, which produced nearly identical weights for sieve fractions: -50 mm to +37.5 mm and -37.5 mm to +25 mm, followed by placing the fractions in a cylindrical mill with twelve spheres at 1,000 revolutions.

All Winnipegosis and Precambrian basement granite composite samples analyzed as part of this Technical Report yielded L.A. Abrasion values that were <29%. The Winnipegosis and granite samples yielded L.A. Abrasion ranging between 18.8% and 29.1% (averaging 24.32%; n=11), and 17.7% to 18.8% (averaging 18.25%; n=2), respectively (Table 13; Figure 26). These values exceed the maximum abrasion loss value within Alberta Transportations designations 1 through 4.

Figure 26. Los Angeles abrasion loss test results for Winnipegosis, Contact Rapids and Precambrian basement granite samples from the Richardson Property.



The Winnipegosis results fit within the typical L.A. Abrasion loss values for dolomite (18%-30%), but the granite samples are significantly lower than the typical L.A. Abrasion loss values for granite (27%-49%; Roberts et al., 1996). One sample from the Contact Rapids Formation had an L.A. Abrasion of 43.4%, which represents the highest abrasion value in this dataset and the only value with abrasion loss of >29%.

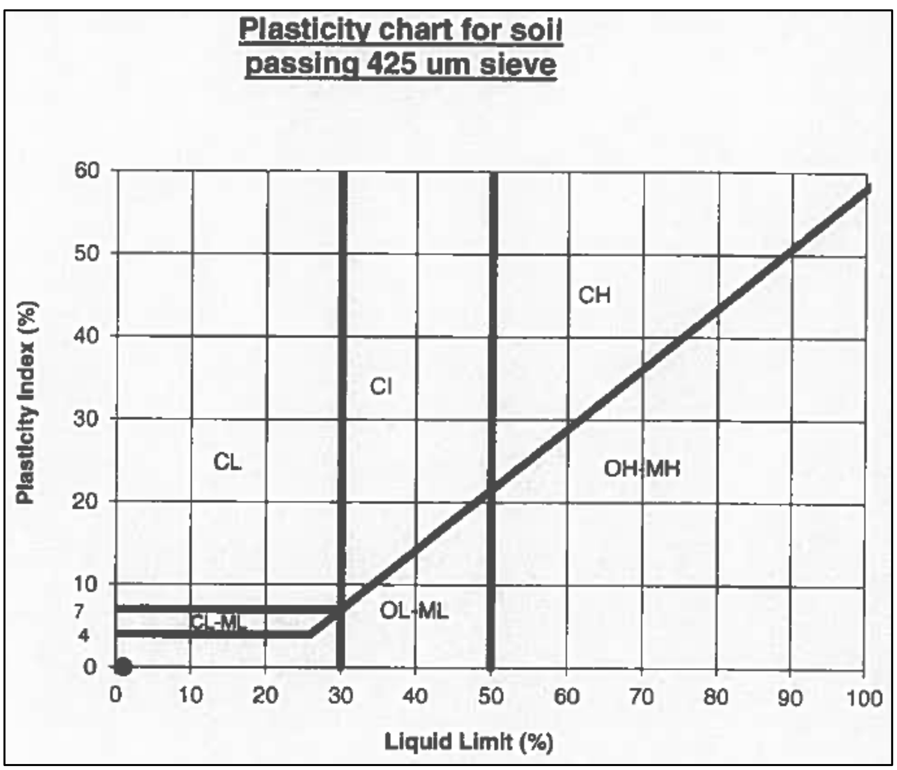
13.1.4 Plasticity Index Test

In Alberta, the maximum permissible plasticity index classification for:

- Designation 1 (asphalt concrete pavement) is "non-plastic";
- Designation 2 (base course aggregate) is "non-plastic" to "non-plastic-6";
- Designation 3 (seal coat aggregate) is "non-plastic-4"; and
- Designation 4 (gravel surfacing aggregate) is "non-plastic-8" (Alberta Transportation, 2007, 2010).

Sample testing was in accordance with ASTM D4318 – dry method. The plasticity index from all 14 samples tested, regardless of formation, was classified as zero, or "non-plastic" (Table 13). An example of the plasticity index for the Winnipegosis Formation from drillhole GNA-10 is shown in Figure 27.

Figure 27. Plasticity Index for a Winnipegosis Formation composite sample from GNA-10 shown on the Plasticity chart of U.S.B.R (1974). All samples analyzed were classified as non-plastic.

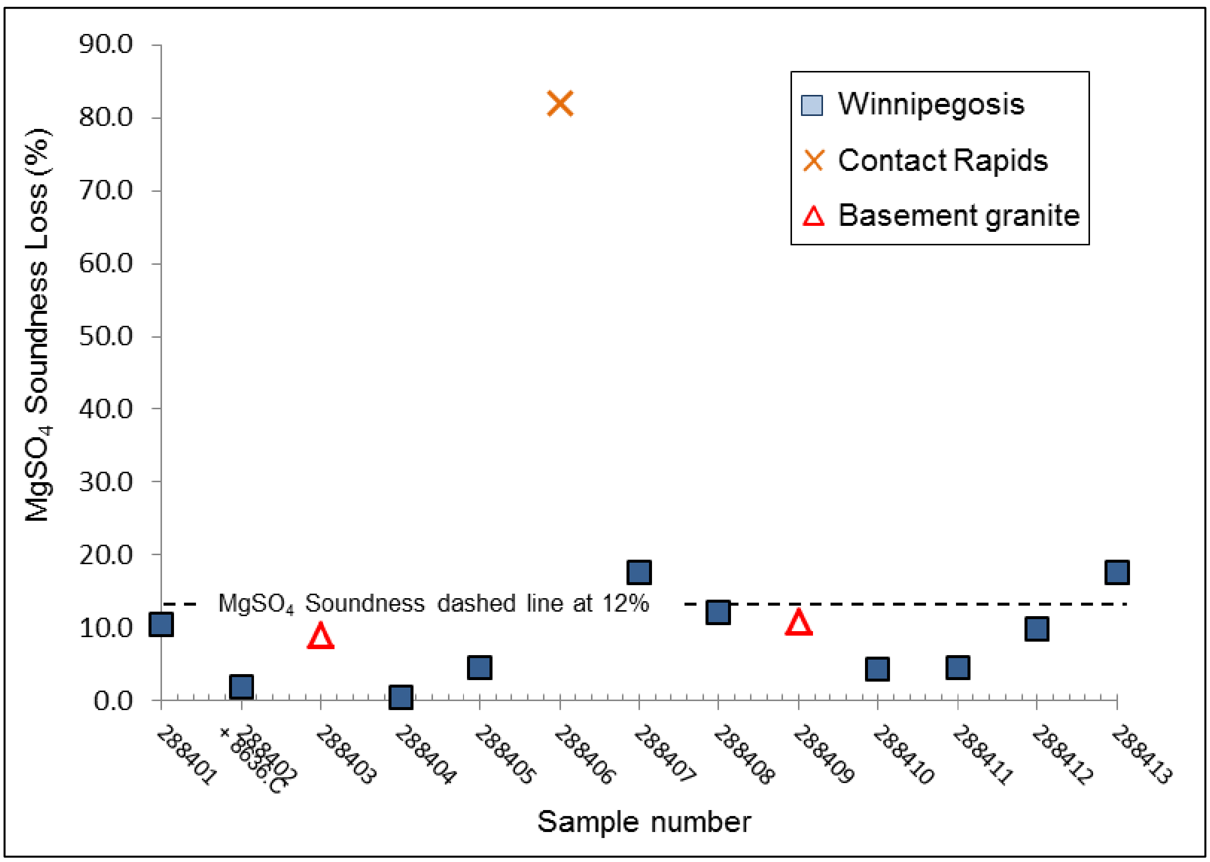


13.1.5 $MgSO_4$ Soundness Loss Test

Sulphate soundness testing was performed on coarse aggregate specimens (split into 80-40 mm and 40-20 mm fractions) in accordance with CSA A23.2-9A (ASTM C88). As per CSA A23.1, the maximum allowable $MgSO_4$ Soundness Loss is 12% for coarse aggregate exposed to freeze-thaw.

The majority of the Winnipegosis composite samples yielded an $MgSO_4$ Soundness Loss of 12.1% or less (n=9 of 11 samples; Table 13; Figure 28). Two Winnipegosis composite samples from drillhole 14RLD003 and 14RLD008 yielded $MgSO_4$ Soundness Loss of 17.7% and 17.6%, respectively, which are above the maximum allowable $MgSO_4$ Soundness Loss for coarse aggregate. The overall average $MgSO_4$ Soundness Loss for the Winnipegosis is 8.2% (n=11 samples). Two composite Precambrian basement granite samples yielded low $MgSO_4$ Soundness Loss of 9.0% and 10.8%. The Contact Rapids composite sample has an $MgSO_4$ Soundness Loss of 82%, which is significantly above the maximum allowable standard $MgSO_4$ Soundness Loss.

Figure 28. $MgSO_4$ soundness loss test results for Winnipegosis, Contact Rapids and Precambrian basement granite samples from the Richardson Property.



13.1.6 Unconfined Freeze-Thaw Test

In accordance with CSA A23.1, the maximum allowable unconfined freeze-thaw for coarse aggregate is 6%. Two composite Winnipegosis samples from drillhole 14RLD002 and 14RLD007 yielded unconfined freeze-thaw results of 0.19% and 0.21%, respectively, which are significantly below the maximum allowable unconfined freeze-thaw for coarse aggregate (Table 13).

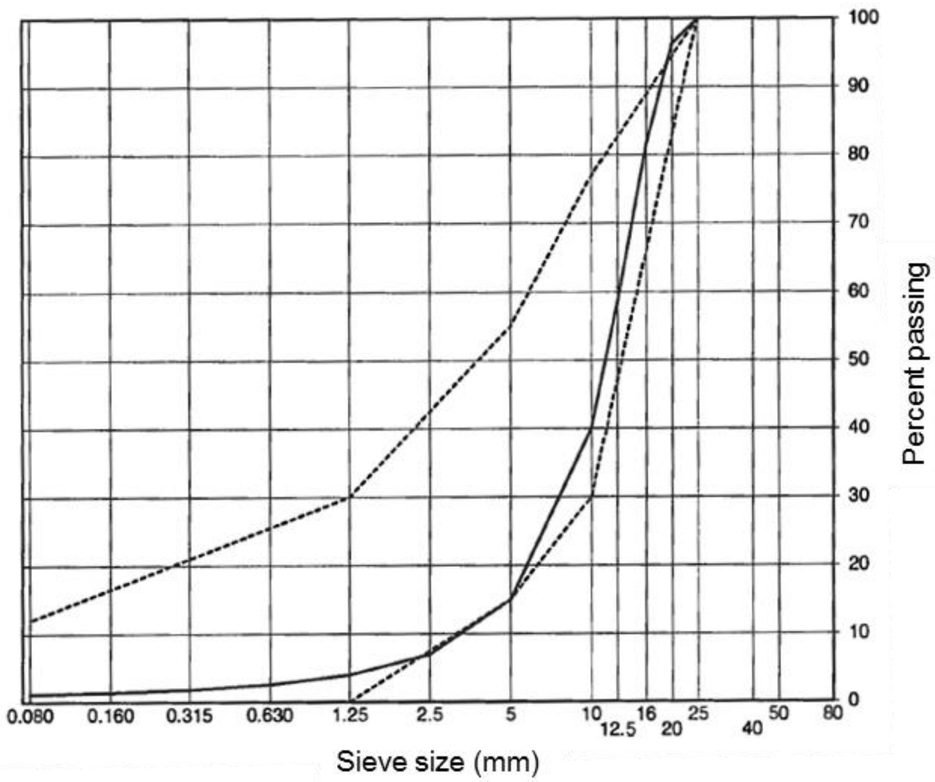
13.1.7 Sieve Analysis

A single composite Winnipegosis sample from drillhole GNA-10 was subject to sieve analysis. The sieve test was done on the duplicate sample at Tetra Tech EBA. At Tetra Tech EBA, the sample was preliminary crushed to the -25 mm fraction prior to sieve analysis, the result of which is shown in Figure 29. Sieve analysis was not conducted at AMEC because the material was submitted as drill core and not as processed material (sees Section 13.1.2, Aggregate Test Work Processing Note).

Figure 29. Sieve analysis from a single Winnipegosis composite sample from drillhole GNA-10.

Sieve analysis report: Washed sieve ASTM C136 and C117
AT D4-C25 gravel surfacing aggregate; drill core; moisture content 0.1% (as received)

Sieve Size	Percent Passing
25	100
20	96
16	82
12.5	59
10.0	40
5.00	15
2.5	7
1.25	4
0.630	3
0.315	2
0.160	1
0.080	1.2



13.2 Geochemical Results

The objective of the aggregate analytical test work – in the context of this crush rock aggregate resource estimate – was predominantly focused on the aggregate mechanical qualities for its use in aggregate road building and concrete. Elements that are typically elevated in marine sedimentary rocks (i.e., clay and/or mudstone), which can be detrimental to the overall strength capacity of a crush rock unit, are extremely low in the Winnipegosis Formation dolostone. For example, average Al_2O_3, Na_2O and K_2O (n=40 analyses) are 0.4 %, 0.1% and 0.1%, respectively (Table 14; Appendix 2a).

Table 14. Major element geochemical results for the Winnipegosis Formation dolostone from the Richardson Property.

Sample	Drillhole	From	To	Formation	Wgt	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Cr_2O_3	CaO/MgO
263101	GNA-10	26.00	27.00	Winnipegosis	1.81	1.37	0.14	0.27	20.19	29.91	0.02	0.04	<0.01	0.01	0.02	<0.002	1.48
263102	GNA-10	37.00	38.00	Winnipegosis	1.15	1.43	0.24	0.27	20.01	29.02	0.01	0.05	0.01	0.01	0.02	<0.002	1.45
263103	GNA-10	47.00	48.00	Winnipegosis	1.14	3.06	0.49	0.35	19.81	29.41	0.01	0.11	0.02	0.03	0.02	0.003	1.48
263104	GNA-10	59.00	60.00	Winnipegosis	1.32	3.45	0.67	0.5	19.78	29.4	0.02	0.19	0.03	0.07	0.03	<0.002	1.49
263117	GNA-16	56.00	57.00	Winnipegosis	0.92	1.66	0.09	0.43	20.57	29.9	0.02	0.03	<0.01	<0.01	0.02	<0.002	1.45
263118	GNA-16	64.00	65.00	Winnipegosis	0.93	7.62	0.64	0.29	18.99	27.75	0.02	0.16	0.03	0.04	0.02	<0.002	1.46
263119	GNA-16	75.00	76.00	Winnipegosis	1.46	2.29	0.6	0.34	20.11	29.64	0.01	0.15	0.03	0.01	0.03	<0.002	1.47
263120	14RLD001	35.00	36.00	Winnipegosis	1.45	0.28	0.03	0.11	20.87	30.6	0.01	<0.01	<0.01	<0.01	0.02	<0.002	1.47
263121	14RLD001	45.00	46.00	Winnipegosis	1.14	1.32	0.15	0.24	20.37	29.69	0.01	0.04	<0.01	<0.01	0.01	<0.002	1.46
263122	14RLD001	54.00	55.00	Winnipegosis	1.09	1.99	0.4	0.26	20.3	29.47	0.03	0.09	0.02	0.03	0.01	<0.002	1.45
263123	14RLD001	64.00	65.00	Winnipegosis	1.13	6.18	0.6	0.39	19.39	28.19	0.01	0.13	0.03	0.05	0.02	<0.002	1.45
263124	14RLD001	74.00	75.00	Winnipegosis	1.13	2.3	0.54	0.31	20.33	29.49	0.01	0.14	0.03	0.02	0.02	<0.002	1.45
263130	14RLD002	34.00	35.00	Winnipegosis	1.19	0.14	0.03	0.15	20.98	30.57	0.01	0.02	<0.01	<0.01	0.01	<0.002	1.46
263131	14RLD002	46.00	47.00	Winnipegosis	0.83	3.39	0.19	0.24	20.16	29.2	0.01	0.05	0.01	0.02	0.02	<0.002	1.45
263132	14RLD002	57.00	58.00	Winnipegosis	1.07	2.22	0.29	0.32	20.39	29.67	0.01	0.06	0.02	0.03	0.02	<0.002	1.46
263133	14RLD002	64.00	65.00	Winnipegosis	1.09	2.57	0.47	0.34	20.08	29.42	0.01	0.12	0.03	0.04	0.02	<0.002	1.47
263134	14RLD002	74.00	75.00	Winnipegosis	1.1	2.41	0.6	0.32	19.79	29.52	0.01	0.16	0.03	0.02	0.02	<0.002	1.49
263138	14RLD003	42.00	43.00	Winnipegosis	1.1	2.46	0.3	0.27	19.91	29.25	0.02	0.09	0.01	0.02	0.02	<0.002	1.47
263139	14RLD003	56.00	57.00	Winnipegosis	1.11	1.1	0.1	0.32	20.14	29.74	0.02	0.03	<0.01	0.05	0.02	<0.002	1.48
263140	14RLD003	67.00	68.00	Winnipegosis	1.07	2.49	0.62	0.57	19.56	29.59	0.02	0.18	0.04	0.06	0.02	<0.002	1.51
263150	14RLD004	33.00	34.00	Winnipegosis	1.28	0.2	0.04	0.09	20.71	30.52	0.01	0.03	<0.01	0.01	0.02	<0.002	1.47
263151	14RLD004	42.00	43.00	Winnipegosis	1.05	3.31	0.1	0.26	19.58	28.93	0.01	0.03	<0.01	0.01	0.02	<0.002	1.48
263152	14RLD004	55.00	56.00	Winnipegosis	1.22	3	0.32	0.3	19.83	29.19	0.01	0.08	0.02	0.05	0.02	<0.002	1.47
263153	14RLD004	64.00	65.00	Winnipegosis	1.01	14.48	1.39	0.72	16.75	24.76	0.02	0.38	0.07	0.07	0.03	<0.002	1.48
263154	14RLD004	70.00	71.00	Winnipegosis	1.1	2.03	0.41	0.27	19.97	29.53	0.01	0.11	0.02	0.02	0.03	<0.002	1.48
263164	14RLD005	37.00	38.00	Winnipegosis	0.67	0.45	0.07	0.2	20.4	30.68	0.01	0.03	<0.01	<0.01	0.02	<0.002	1.50
263165	14RLD005	46.87	47.87	Winnipegosis	1.17	1.16	0.14	0.42	19.95	30.08	0.02	0.03	<0.01	0.04	0.02	<0.002	1.51
263166	14RLD005	54.00	55.00	Winnipegosis	1.1	2.2	0.38	0.32	19.62	29.36	0.01	0.09	0.02	0.05	0.02	<0.002	1.50
263167	14RLD005	64.00	65.00	Winnipegosis	1.3	6.33	0.96	0.48	18.49	27.82	0.02	0.24	0.05	0.08	0.03	<0.002	1.50
263168	14RLD005	73.00	74.00	Winnipegosis	2.45	2.21	0.52	0.28	19.55	29.75	0.01	0.14	0.03	0.03	0.03	<0.002	1.52
263185	14RLD006	46.00	47.00	Winnipegosis	1.13	1.41	0.02	0.14	20.6	30.16	0.02	0.01	<0.01	<0.01	0.01	0.02	1.46
263186	14RLD006	57.00	58.00	Winnipegosis	1.1	7.7	0.1	0.28	19.14	27.77	0.02	0.03	<0.01	<0.01	0.02	0.037	1.45
263187	14RLD006	68.00	69.00	Winnipegosis	1.11	10.92	0.39	0.32	17.75	26.02	0.02	0.08	0.02	0.04	0.02	0.087	1.47
263188	14RLD006	76.00	77.00	Winnipegosis	1.11	4.05	1.05	0.69	19.39	28.43	0.02	0.26	0.05	0.07	0.02	0.151	1.47
263189	14RLD007	46.00	47.00	Winnipegosis	1.02	0.37	0.03	0.09	20.77	30.2	0.01	0.01	<0.01	<0.01	0.01	<0.002	1.45
263190	14RLD007	57.00	58.00	Winnipegosis	1.2	12.29	0.15	0.17	17.75	25.69	0.01	0.04	<0.01	0.02	0.02	<0.002	1.45
263191	14RLD007	65.00	66.00	Winnipegosis	1.14	2.34	0.33	0.24	19.86	29.08	0.01	0.08	0.02	0.02	0.02	<0.002	1.46
263192	14RLD007	79.00	80.00	Winnipegosis	1.31	2.53	0.57	0.31	19.9	29.19	0.01	0.17	0.03	0.02	0.03	<0.002	1.47
263220	14RLD008	64.92	65.77	Winnipegosis	0.85	11.31	1.35	0.91	17.64	25.82	0.02	0.35	0.07	0.12	0.05	<0.002	1.46
263221	14RLD008	69.00	70.00	Winnipegosis	1.07	1.89	0.42	0.51	20.24	29.61	0.01	0.12	0.02	0.05	0.03	<0.002	1.46
				Count		40	40	40	40	40	40	39	26	32	40	5	40.00
				Min		0.14	0.02	0.09	16.75	24.76	0.01	0.01	0.01	0.01	0.01	0.003	1.45
				Max		14.48	1.39	0.91	20.98	30.68	0.03	0.38	0.07	0.12	0.05	0.151	1.52
				Average		3.498	0.398	0.332	19.74	29.05	0.014	0.106	0.029	0.038	0.022	0.06	1.47
				Standard Deviation		3.472	0.34	0.169	0.928	1.378	0.005	0.088	0.016	0.025	0.007	0.06	0.02
				%RSD		99.26	85.46	50.86	4.7	4.742	38.56	82.73	53.81	66.41	34.21	100.6	1.30

With respect to the Precambrian basement granite, the geochemical summary statistics of 83 granite core samples is presented in Table 15 (complete analytical results are presented in Appendix 2b). As suspected, the granite is dominated by silica (SiO_2 averaging 67% and up to 77%), which is favourable for the overall strength capacity of the rock type and subsequently, for crush rock aggregate.

Table 15. Summary statistics of major element geochemical results for the Precambrian basement granite from the Richardson Property.

	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	Cr_2O_3	CaO/MgO
Count	83	83	83	83	83	83	83	83	83	63	37	83.00
Min	50.86	10.53	0.73	0.28	0.2	0.12	1.02	0.07	0.04	0.01	0.002	0.12
Max	77.12	21.81	8.1	7.81	7.83	7.88	12.61	0.94	0.96	0.13	0.028	4.52
Average	67.27	15.38	2.377	1.539	1.665	2.736	6.196	0.272	0.134	0.033	0.005	1.28
Standard Deviation	6.681	2.684	1.252	1.38	1.662	2.05	2.635	0.144	0.158	0.023	0.006	0.99
%RSD	9.932	17.45	52.67	89.69	99.84	74.92	42.52	53.13	117.7	68.95	118.7	77.59

A secondary component of the geochemical work was to test whether the dolostone and basement granite rocks contain metallic mineral potential, such as Pb-Zn mineralization in the dolomite, and/or precious- and base-metal potential, and rare-earth element (REE) in the granite. Histograms of selected metallic elements from the Winnipegosis and basement granite are presented in Figure 30. Spider diagrams, which normalize the Winnipegosis and basement granite with upper continental crustal rocks and post Archean Australian shale (PAAS; Taylor and McLennan, 1985), are presented in Figure 31.

The geochemical results show that the Winnipegosis Formation and Precambrian basement granite has generally poor metallic mineral potential. Three samples from drillhole 14RLD005 yield elevated REE relative to this data set. For example, a section of core from 113-117 m depth has elevated lanthanum (208-371 ppm) and cerium (422-795 ppm). In addition, core from 14RLD005 also yield elevated thorium (167-233 ppm) relative to this dataset at 108-115 m depth. Drillhole 14RLD007 yielded the highest metallic mineral results; for example, an intersection of core from 143-147 m depth contains the highest concentrations of Ni (26-31 ppm), Co (11-22 ppm) and V (127-148 ppm) in this dataset.

An important observation is the homogeneous nature of the geochemical data for the Winnipegosis and granite rock units. The data are remarkable uniform, particularly for the Winnipegosis dolostone (Figure 31), which bodes well for the crush rock aggregate potential and for the geochemical validation of conducting a resource estimate on these rock units. The granite rock REE distribution pattern (Figure 31) shows that some fractionation and/or differentiation has occurred with the core samples analysed (as evidenced by the spread out, but parallel distribution of the REE), but this patter is not atypical of basement granite and may not influence its crush rock aggregate potential. Lastly, it should be noted that the rock units contain low uranium, which is also important for a potential crush rock aggregate source.

Figure 30. Histograms for selected metals and pathfinder elements from Winnipegosis dolostone and Precambrian basement granite from the Richardson Property.

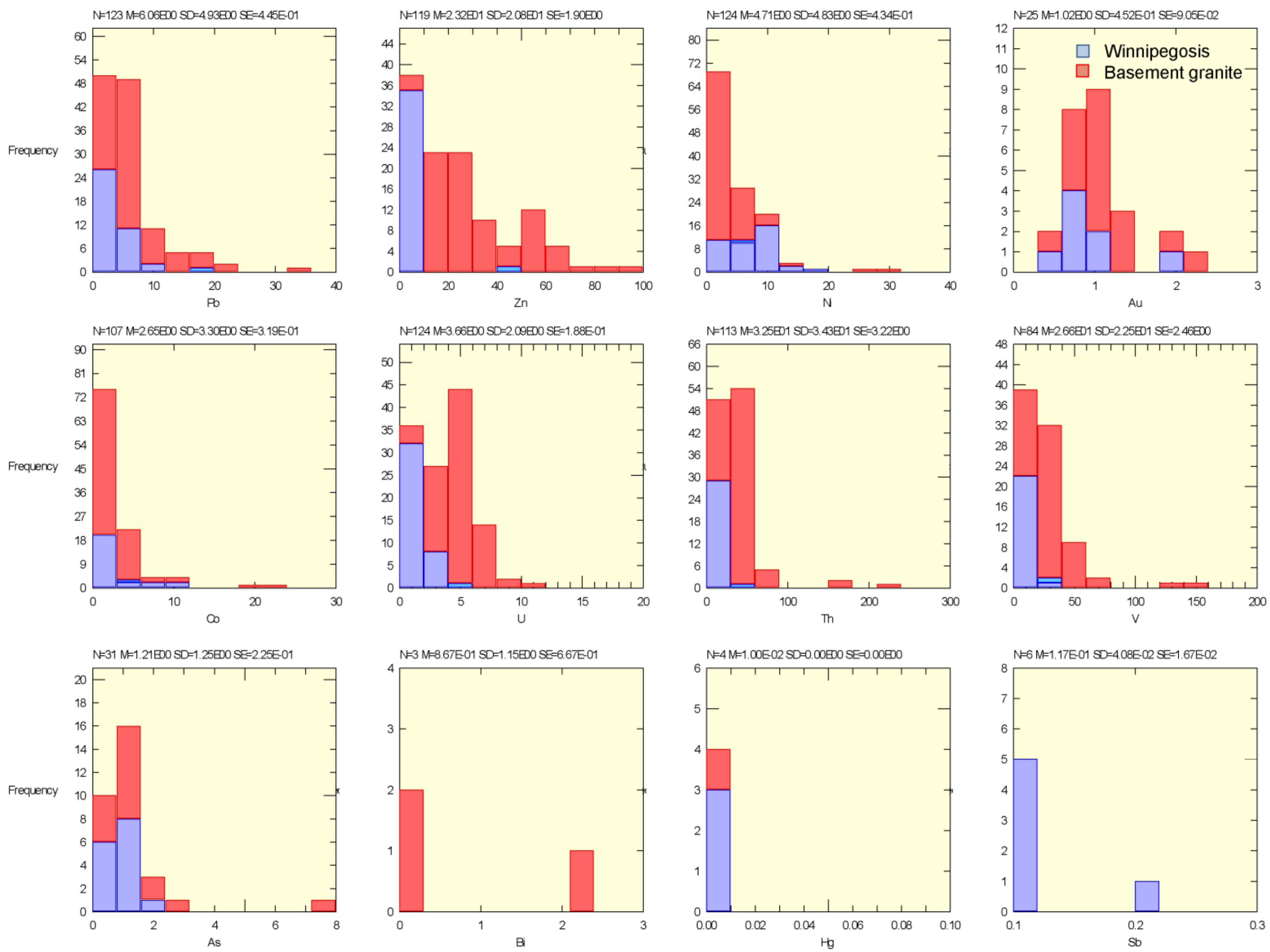
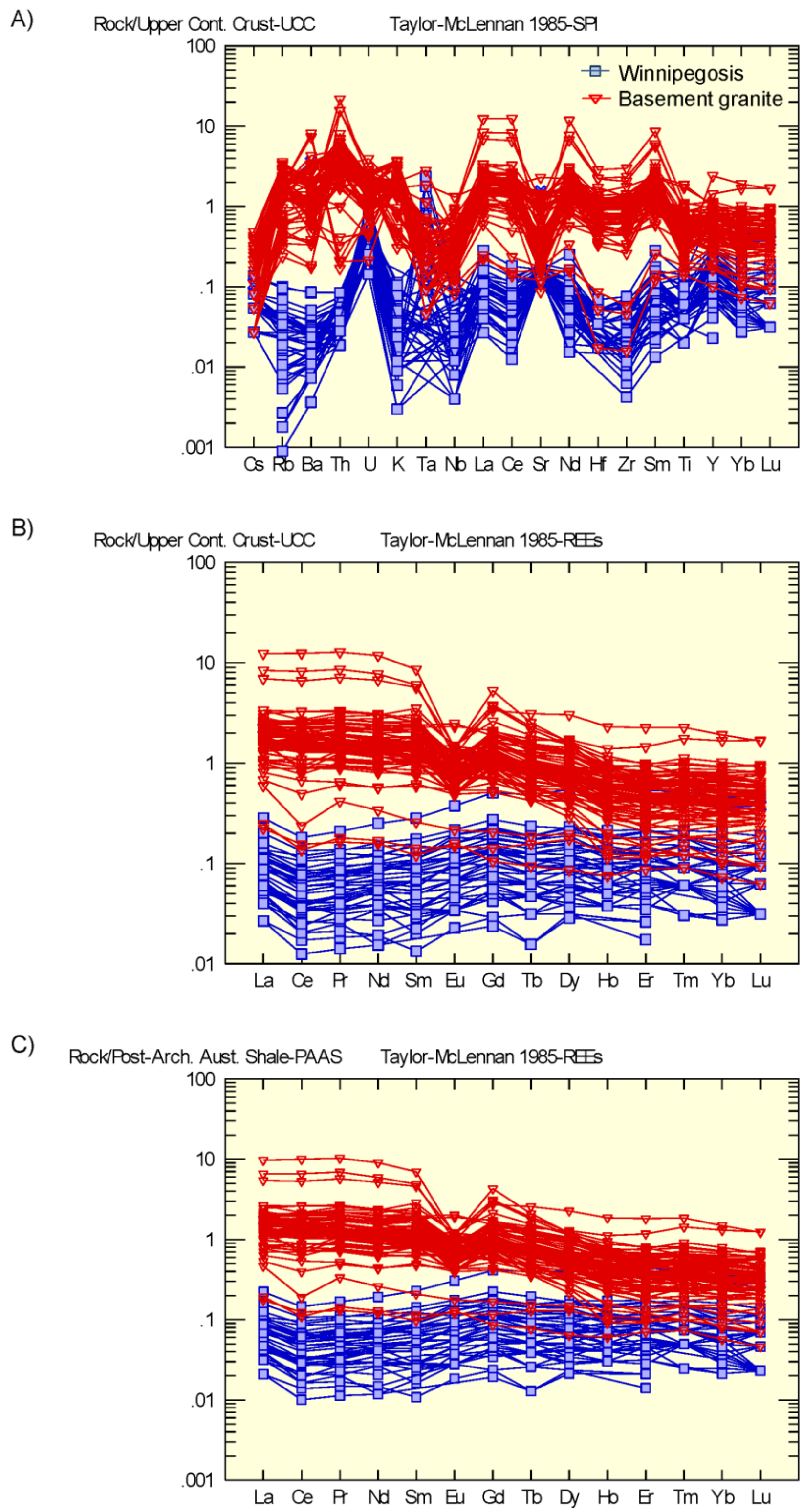


Figure 31. Spider diagrams normalizing Winnipegosis dolostone and Precambrian basement granite geochemical results from the Richardson Property to upper continental crust and post Archean Australian shale (Taylor and McLennan, 1985).



13.3 Summary of Test Work Results

Published specifications and standards for industrial minerals should be used primarily as a screening mechanism to establish the marketability of an industrial mineral. The suitability of an industrial mineral for use in specific applications can only be determined through detailed market investigations and discussions with potential consumers.

While detailed market investigations and discussions with potential consumers are beyond the scope of this Technical Report, we have demonstrated that the Winnipegosis and basement granite rock types have uniform compositions, and that the aggregate test work for the 11 Winnipegosis samples and two Precambrian basement granite samples meets the screening criteria for most of the aggregate designations in Alberta, including asphalt concrete pavement and base course aggregate, as per the guidelines set by Alberta Transportation and the Canadian Standards Association (see Tables 9, 10 and 13).

Accordingly, with respect to reporting a resource estimate and abiding by the General Guidelines of NI 43-101, it should be emphasized that the aggregate test rock results suggest that the Winnipegosis Formation (and secondly, the Precambrian basement granite) from the Richardson crushed rock aggregate deposit has reasonable prospects of economic viability for an industrial mineral deposit.

In contrast, the single Contact Rapids sample does not meet the screening criteria, and therefore, does not meet the *reasonable expectation* and/or *demonstration of economic viability* of an industrial mineral deposit.

14 Mineral Resource Estimate

14.1 Introduction

Modelling, resource estimation and statistics were performed by Mr. Nicholls, MAIG under the direct supervision of Mr. Eccles, who is a Qualified Persons as defined by National Instrument 43-101. Mineral resource modelling was carried out using a three-dimensional model in commercial geologic modelling and mine planning software MICROMINE (v14.0.4).

The project area is based in the Universal Transverse Mercator (UTM) coordinate system, North American Datum (NAD) 1983 and UTM Zone12. No block modelling of the resource area was necessary as no ‘grade’ was being estimated; instead a three-dimensional computer generated ‘solid’ of the area was generated in MICROMINE to calculate the resource ‘volume’. The resource estimation presented in this Technical Report considered data from eight drillholes drilled by Athabasca Minerals in 2014 and four drillholes drilled by Athabasca Minerals in 2013 (twelve total drillholes). Because two of the 2013 drillholes were terminated at <30 m and therefore did not penetrate, or did not penetrate through the entire section of, the Winnipegosis Formation (the uppermost bedrock and primary focus of this resource estimate), only ten drillholes were utilized in the Richardson maiden inferred crush rock aggregate resource modelling that is presented in this Technical Report. Accordingly, this resource section hereafter refers to ten drillholes.

Mr. Eccles P. Geol supervised APEX geologists in the 2014 drill campaign along with logging and sampling of both the 2013 and 2014 drill core. Specific gravity and geologic information are derived from work conducted by APEX personnel, on behalf of Athabasca Minerals, during the 2014 field season. A specific gravity measurement was taken once every 1 metre of drill core. The density data were confirmed by comparing these measurements with a separate set of density analysis on the composite samples that were analyzed at AMEC and Tetra Tech EBA in Calgary and Edmonton, Alberta, respectively.

Richardson maiden inferred crush rock aggregate resource estimate is reported in accordance with the Canadian Securities Administrators National Instrument 43-101 and has been estimated using the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014. Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

The CIM Standards on Mineral Resources and Mineral Reserves, Definitions and Guidelines, dated August 20, 2000 (the "CIM Standards", NI 43-101 and Companion Policy 43-101CP) states that:

> *"When reporting Mineral Resource and Mineral Reserve estimates relating to an industrial mineral site, the Qualified Person(s) must make the reader aware of certain special properties of these commodities".*

The authors have attempted to follow this guideline in this resource section and throughout this Technical Report. Accordingly, an important up-front statement is to acknowledge that the objective of the aggregate analytical test work – in the context of this crush rock aggregate resource estimate – is predominantly focused on the aggregate mechanical qualities for its use in aggregate road building and concrete in support of locale and prolific oil sands operations and development. The reader is invited to view Figure 4 and Section 16, Other Relevant Data and Information, for a synopsis of the significance of the oil sands industry, its developing infrastructure and its limited aggregate resources.

14.2 Drillhole Database Validation

The 2013 and 2014 drillholes were surveyed using a hand-held Garmin GPS unit in UTM coordinates (UTM Zone 12) and NAD 1983 datum. The elevations of the drillholes were initially obtained using the hand-held Garmin GPS, however, the collar elevations have been subsequently modified for all 10 drillholes by using high resolution Light Detection and Ranging (LiDar) technology with 1 m resolution. All drillholes were vertical holes; no down hole surveying was employed. Upon completion of each of the 2014 drillholes, the casing was removed, and the drill sites were reclaimed, and no visible collar marker was left.

All drill logs, summaries, survey data and analytical results from the 2013 and 2014 programs have been imported and stored in a MICROMINE drilling database and in

Microsoft Excel spreadsheets. Drill core logging was completed in Excel format, with hardcopy, PDF and digital back-ups. Drill data, cross sections and 3D plots were interpreted and generated in Edmonton using, Excel and MICROMINE software. The 2013 and 2014 drill core were logged and sampled by APEX personnel under the direct supervision of Mr. Eccles.

At the end of the 2014 program, the excel drillhole database was copied into MICROMINE by APEX personnel. Using MICROMINE's drillhole database validation function, the data was checked for overlapping geological intervals, and survey, collar and drillhole length data. A few minor discrepancies were found and promptly fixed within the database. All 10 drillholes were manually checked and validated for collar, survey, and lithological boundaries data. Collar data was compared back to values on the original drill logs. Lithology codes were compared to original drill logs and assay results were compared to laboratory certificates. The database is considered reliable for mineral resource estimation purposes.

14.3 Micromine Database

The drilling database used is still current. The drillhole database was validated within MICROMINE and no errors were identified. The database incorporates all available diamond drilling and analytical data. All data for the mineral resource estimation was copied from Excel into MICROMINE format.

The five MICROMINE.DAT files that were utilized in the resource estimations, these include:

- Richardson_collars_all – the drillhole collar file;
- XRF – the portable x-ray fluorescence data;
- Density – the density measurements file;
- 2014_lithos_final – the geology and formation information; and
- LiDar 15m– the surface topography.

There was a total of 10 drillholes within the export that guided the geological interpretation of the aggregate resource. Spacing between drillholes varies from 500 m to 1.37 km, with an average of about 0.9 km between drillholes. There were seven drill lines that ranged in spacing from 570 m to 900 m. In this Technical Report, Mr. Nicholls, under the direct supervision of Mr. Eccles, has used reasonable judgment in the context of this crushed rock aggregate deposit type, style and formation to determine that this drill spacing is sufficient for resource volume estimation.

Data supplied and utilized in MICROMINE included collar Easting, Northing and elevation coordinates, lithology information, and bulk density data. The collar co-ordinates were obtained by hand held GPS and the relative elevation were assigned using the detailed one-metre spaced LiDar data. All drillholes are short (up to 147 m) vertical holes and as such there are no down hole surveys. Dip of the hole was set up using a clinometer after the drill was properly levelled.

14.4 Data Type Comparison

As there has only been diamond drilling conducted at the Richardson maiden inferred crush rock aggregate resource area, a data type comparison is not required. Diamond drilling is considered to be representative of a good quality drilling method and is suitable for resource estimation.

14.5 Quality Control

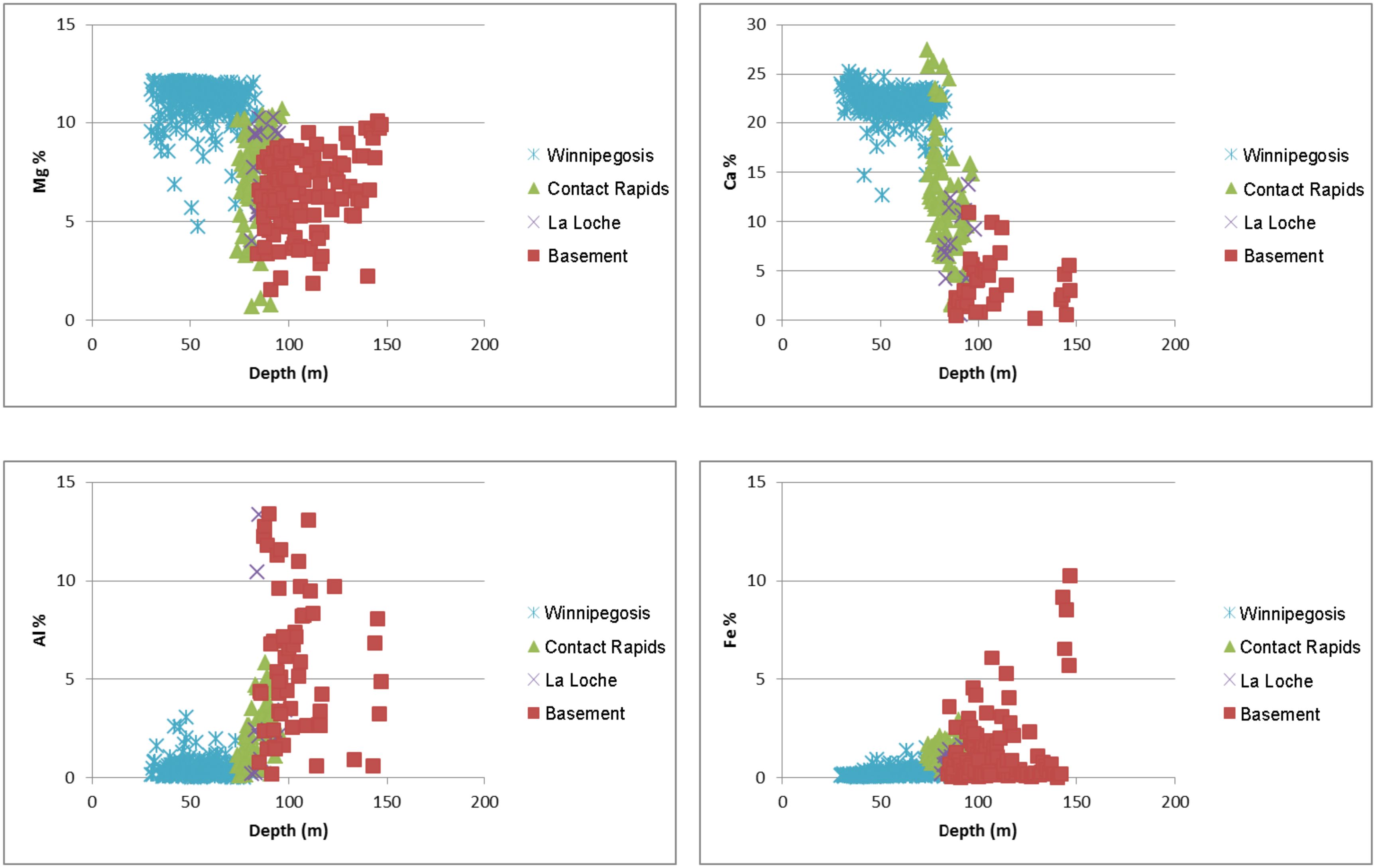
The drillhole campaign data collected during the 2013 and 2014 drilling programs were checked for veracity, then were entered into MICROMINE and validated using the MICROMINE's drillhole validation tools. The upper and lower boundaries of the Winnipegosis Formation, Contact Rapids Formation, La Loche Formation and the Precambrian basement granite have been identified in core and these boundaries were confirmed using trace element geochemical measurements from a portable XRF. For example, Figure 32 shows that even though the Winnipegosis Formation contains several texturally distinct units (via logging), the major element geochemistry of the Winnipegosis is fairly consistent and distinct from the other geological units.

This data shows the homogeneity of the individual units, and with respect to the Winnipegosis Formation, show that dolomitization of the unit was pervasive. In addition, the low Al content of the Winnipegosis Formation (<3.5 wt. %; Figure 32) is indicative of a low mud and clay component, which is a favourable indication in terms of the strength and quality of the dolostone as an aggregate material.

The XRF data shows that geochemical data can be utilized to distinguish between the various lithological formations that are present at the Richardson Property. Based on the bivariate plots of selected elements (Mg, Ca, Al and Fe) versus depth, the representative geochemical groupings for the Winnipegosis, Contact Rapids and the La Loche formations, and the Precambrian basement granite, are respectively homogeneous and clearly differentiate the four respective rock types (Figure 32). For example, the Winnipegosis Formation has consistently higher Mg and Ca than the basement granite; the Contract Rapids and La Loche formations, which typically represent transitional rock types between the dolostone and basement, plot between the Winnipegosis Formation and the basement granite.

These XRF measurements and subsequent geochemical confirmation of the rock units provides an additional level of quality control in the division of samples. This observation is an added benefit of non-destructive semi-quantitative XRF analysis because it was not possible, or necessary, to apply 'conventional' QAQC geochemical test methods, standards and blanks due to the type of applicable test work required for an industrial mineral resource.

Figure 32. Bivariate plots of selected elements (Mg, Ca, Al and Fe) versus depth. The geochemical data are portable x-ray fluorescence analyzer measurements that were taken every metre of core to provide an evaluation of the chemical homogeneity of the rock units.



14.6 Stratigraphic Representation and Resource Estimate Objectives by Formation

The drillhole lithology was plotted and displayed next to the drillhole (Figure 33a). From the top of the drillhole to the base, this includes: Quaternary surficial deposits (or overburden); Winnipegosis Formation; Contact Rapids Formation; La Loche Formation; and the Precambrian basement granite. The formations are described in detail in Section 7, Geological Setting and Mineralization.

The Winnipegosis Formation is the primary unit being assessed in this Richardson maiden inferred crushed rock aggregate resource estimate. Athabasca Minerals is also interested in the potential of the granite as a crushed rock aggregate and we have therefore included a volume estimate of the granite albeit to a depth of 10 m below the top of the Precambrian to correlate with drill results. In aggregate operations, different kinds of ‘Flux’ are often required for blending purposes, as a result of this it was decided to model up all formations to provide blending option volumes of the other formations beside the Winnipegosis Formation.

14.7 Demonstration of Stratigraphic Homogeneity

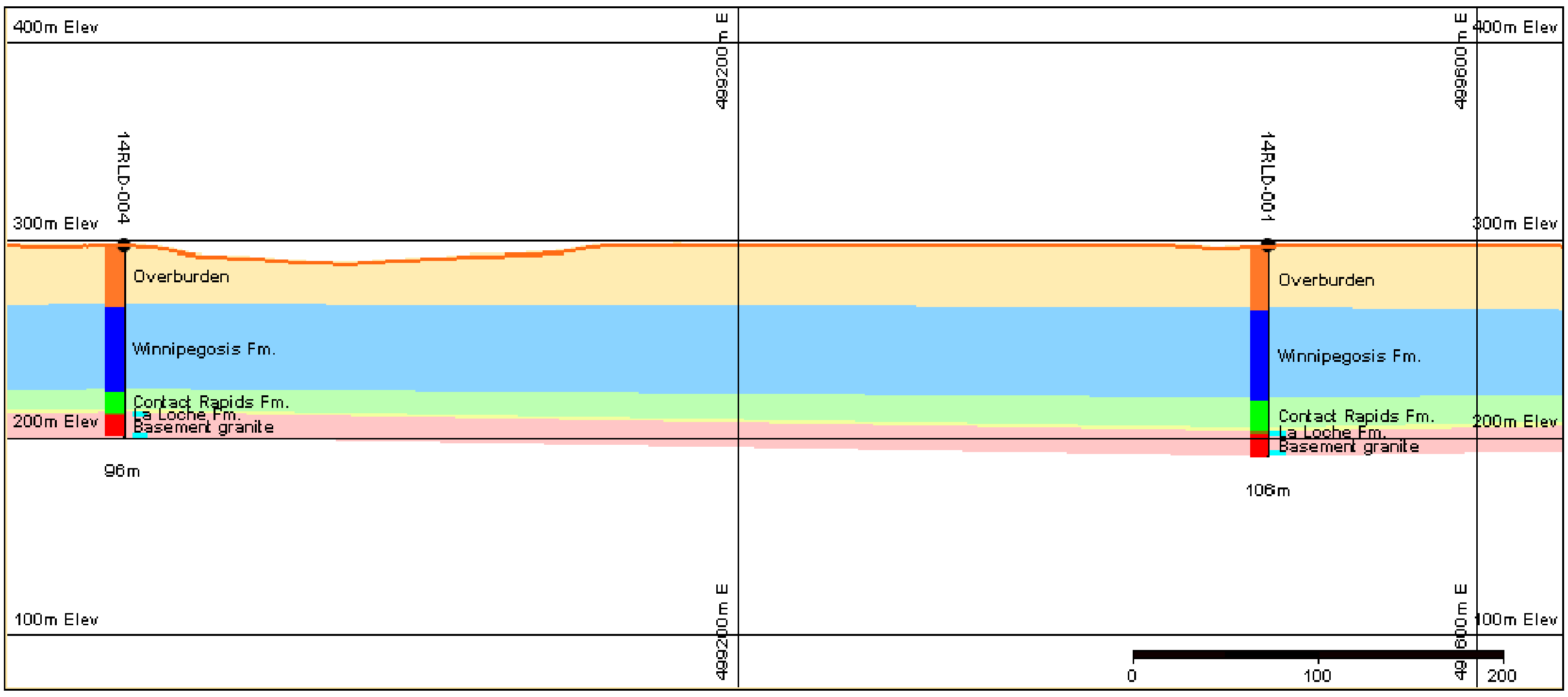
Stratigraphic logging, which was performed by APEX for both the 2013 and 2014 drillholes, showed definitive geological boundaries that are characterized by extensive lateral continuity of the individual geounits. With the exception of the La Loche Formation – Precambrian basement boundary which can be gradational, the boundaries between formations have sharp, visually identifiable contacts.

To demonstrate the homogeneity of the stratigraphic units using geotechnical and geochemical data derived from the cores, Figures 33 and 34 show a comparison between the stratigraphic horizons versus selected geotechnical and geochemical data, respectively. The Rock Quality Description (RDQ) and total fracture data closely mimic the stratigraphic units (Figure 33). This is particularly evident for drillhole 14RLD-007 because this hole cored the deepest into the Precambrian basement granite. Of particular note, the RDQ and total fracture scores are most evident in the Contact Rapids and La Loche formations, which occur between the more competent Winnipegosis Formation dolostone and Precambrian basement granite. In comparison to the majority of the drillholes, the RDQ and total fractures scores are higher in the Precambrian basement granite in drillholes 14RDL-001; this is representative of a transitional zone between the La Loche Formation and the underlying basement granite, the latter of which, is characterized by variable potassic and albite alteration at this local area.

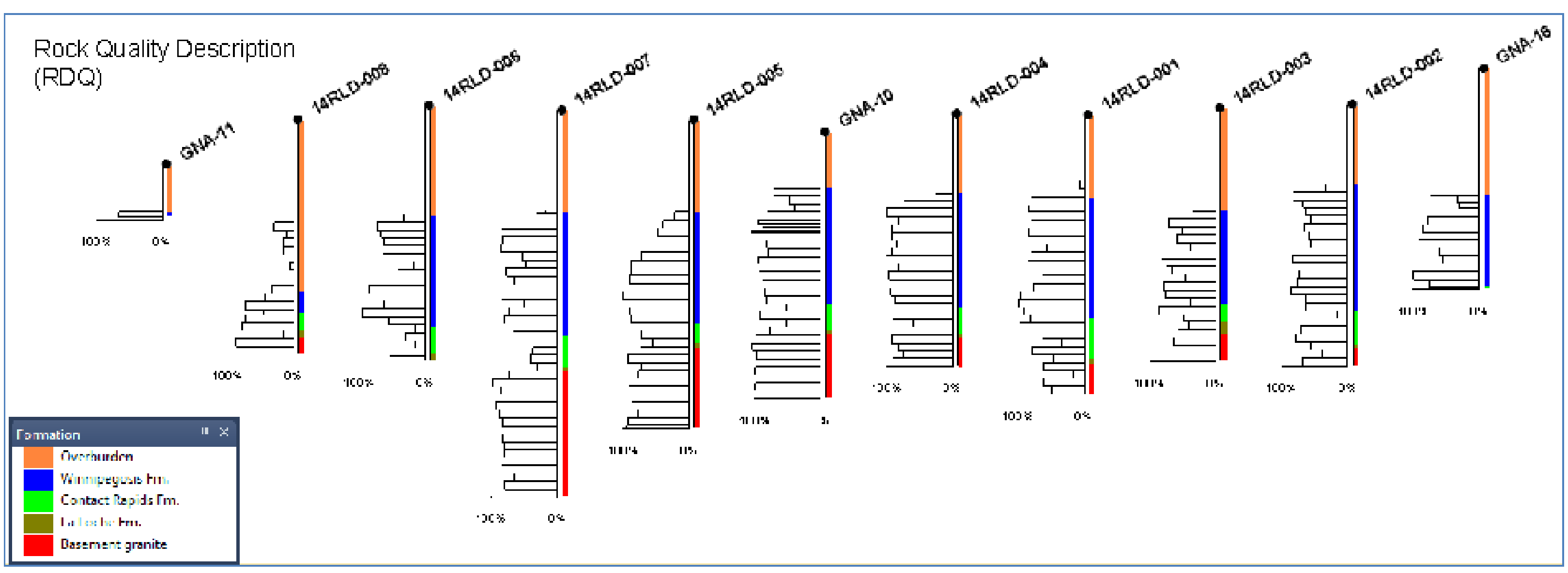
The stratigraphic formation divisions are further supported by chemical homogeneity, which is illustrated by plotting the one-metre interval XRF data next to the stratigraphic units (Figure 34). In conjunction with the stratigraphic cross-section, the ‘zones’ of elevated or depleted Ca+Mg (Figure 34b) or Fe (Figure 34c) closely mimic the geological formations (Figure 34a). In addition, the Ca+Mg plot, in particular, shows the homogeneous nature of the Winnipegosis Formation, which highlights its applicability as a potential source of crush rock aggregate.

Figure 33. Comparison of the stratigraphic and geotechnical rock quality homogeneity of the subsurface geology at the Richardson Property. A) Drillholes 14RLD-004 & 14RLD-001 illustrate the down hole stratigraphic sequence. B,C) Schematic diagram of all drillholes showing the geotechnical homogeneity between rock quality description, and total fractures with respect to the formation boundaries.

A)



B)



C)

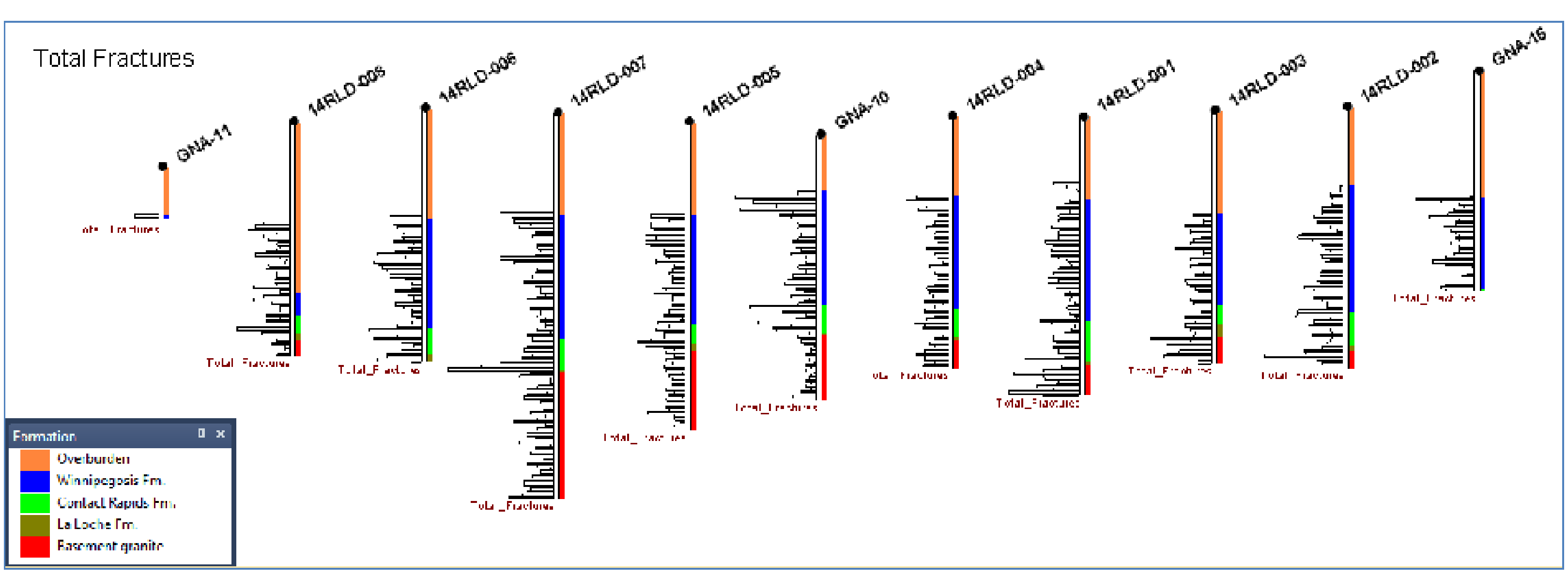
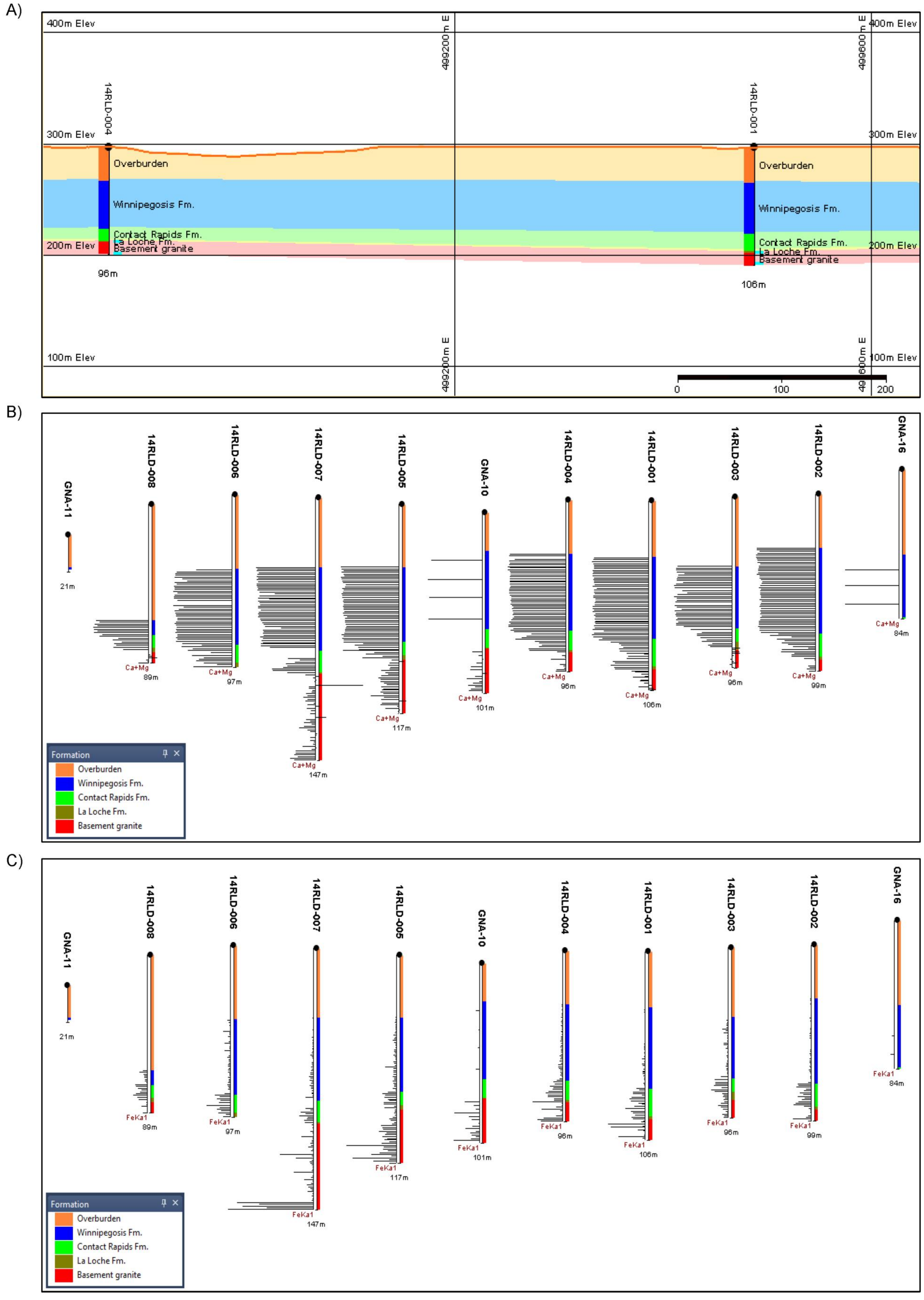


Figure 34. Comparison of the stratigraphic and chemical homogeneity of the subsurface geology at the Richardson Property. A) Drillholes 14RLD-004 & 14RLD-001 illustrate the down hole stratigraphic sequence. B,C) Schematic diagram of all drillholes showing the chemical homogeneity between Calcium + Magnesium, and iron with respect to the formation boundaries.



14.8 Lithological Model Design and Interpretation

As a result of the homogeneous and continuous nature of the stratigraphic formations, the wireframes were constructed and extrapolated from hole to hole for the 10 drillholes that were used in this resource model. A resource outline of 500 m was constructed around the outermost drillholes to define the outer limits of the resource area (Figure 35).

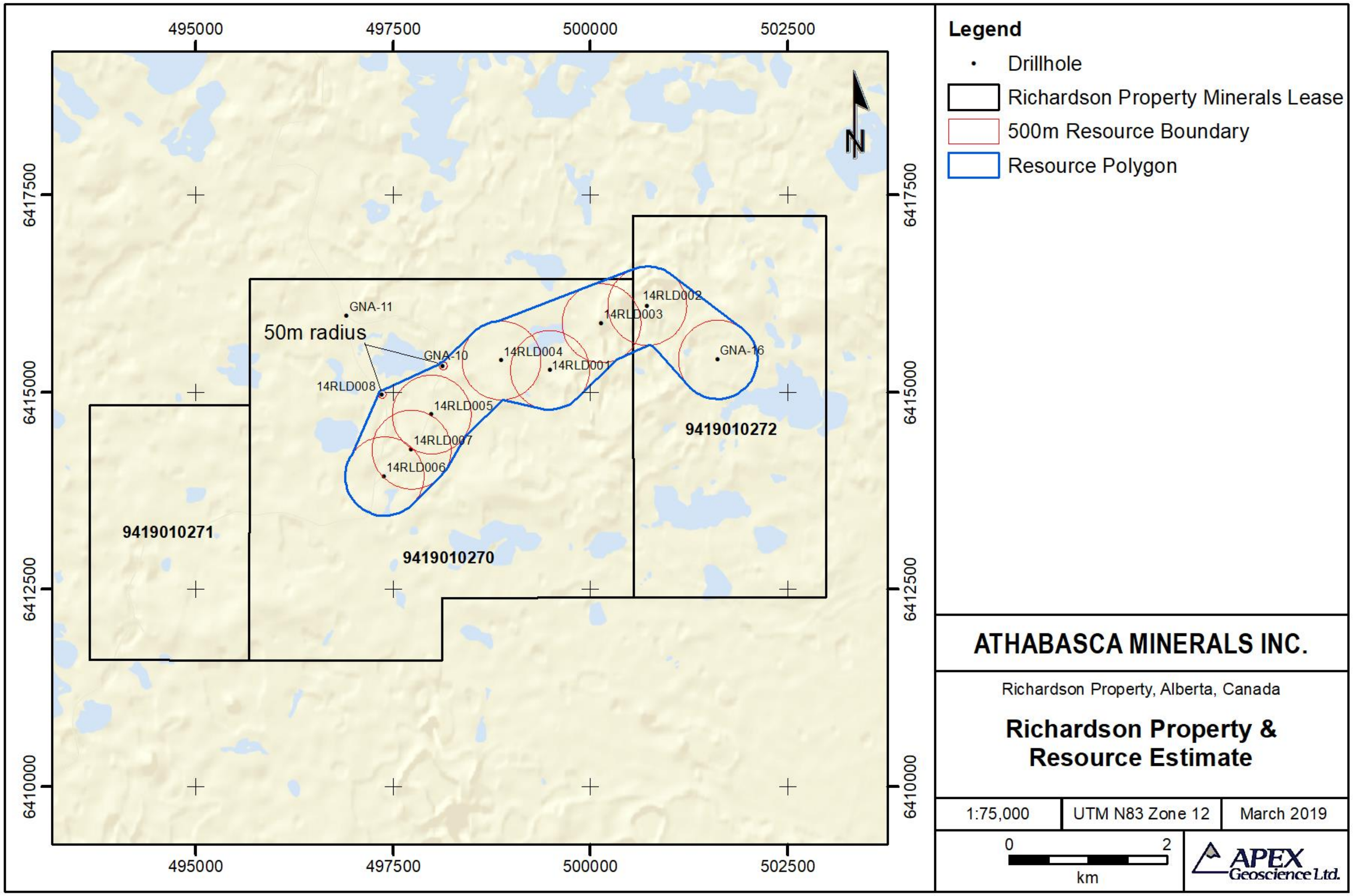
The resource outline of 500 m was deemed appropriate based on the continuous nature of the stratigraphic formation within the resource outline area as defined by 2013 and 2014 Athabasca Minerals drilling, and because the same generally flat-lying stratigraphic formations has been intersected in drillholes and/or oil and gas wells that are located several 10's of kilometres away from the Richardson resource area providing further support of the continuous nature of these geological formations. The boundary outline radius directly north of drillholes GNA-10 and 14RDL-008 was reduced to 50 m (from 500 m) due to the proximity of the lake. I.e., we have not extended the inferred resource estimate under the lake. The surface area of the resource outline is 6.30 km^2.

A separate wireframe was created for each formation from which, separate formation volumes could be derived. The 500 m resource outline was used to clip the individual formation wireframes to restrict the lateral extension of the wireframes and thereby constrict the main resource model to the general 2013 and 2014 Athabasca Minerals drill area. The one-metre LiDar surface topography was reduced to a 15 m survey due to file size constraints within MICROMINE; this surface was then used to clip the overlying overburden wireframe with the best approximation of surface.

This model formed the spatial basis for calculating the volume and tonnage for the Richardson maiden inferred crush rock aggregate resource estimate.

Eight out of the 10 drillholes used in the resource modelling intersected the basement granite. The remaining two drillholes (GNA-16 and 14RLD-006) stopped short of penetrating and coring the basement due to drilling conditions. Given, the stratigraphic continuity of the Winnipegosis dolostone, which was intersected in these drillholes, and the continuity of the basement granite in the resource area, the top of basement wireframe was extrapolated to include these two holes.

Figure 35. The 500 m resource boundary outline that was used to constrain the Richardson maiden inferred crush rock aggregate resource estimate. The figure also shows the Eccles et al. (2015) resource area is entirely within the 2019 revised Richardson Property lease boundary, the leases of which were converted from mineral permits in January 2019.



The overall modeling of the basement granite was restricted to a 10 m thick unit across the entire resource area. The 10 m thickness is considered to provide a conservative estimate because the granite was confirmed to extend to depth in a single drillhole (14RLD-007), which cored up to 48.35 m of basement granite. However, all other drillholes were terminated once they cored approximately 10 m into the basement granite as this drill program (and in this particular part of Athabasca Minerals Richardson Property) placed emphasis on the Winnipegosis Formation.

14.9 Density Results

A total of 675 bulk density measurements were collected from drill core within the Richardson maiden inferred crush rock aggregate resource area. The measurements were conducted directly on drill core sample using the "hydrostatic" method, which involves weighing the item in air and then again while it is fully submerged in water. Density measurements were collected once every metre of drill core and were separated by formation to calculate an average bulk density for the resource area. The density values used in the Richardson maiden inferred crush rock aggregate resource estimate are shown in Table 16.

The density samples were collected during core geotechnical, logging and sampling work on eight drillholes drilled in 2014 and two drillholes completed in 2013. All of these holes are situated within the Richardson maiden inferred crush rock aggregate resources area. Samples were collected every metre where possible down the drill hole. The specific gravity calculation was performed using the weight in air/weight in water emulsion methodology.

Table 16. Average bulk density values that were used in the Richardson maiden inferred crush rock aggregate resource estimate.

Formation	Number of samples	Average bulk density	Variance
Overburden/overlying till	19	2.25	0.044
Winnipegosis	395	2.68	0.010
Contact Rapids	90	2.50	0.006
La Loche	19	2.54	0.004
Basement granite	152	2.63	0.005

The density measurements were examined in relation to the formation in which the sample measurement was situated within. As such all density samples were tagged with the formation name, in order to examine and assign a nominal density for each stratigraphic unit. Statistical analysis was performed on each of the stratigraphic unit density datasets in order to asses any potential outliers and to examine the variance of the samples. No outliers were identified, and the variance of the density samples was very small. The small variance in the density samples is to be expected from the uniform and stratigraphically continuous nature of the geological formations.

It should be noted that the assigned density for the overburden/overlying till of 2.25 t/m^3 was calculated using only 19 samples. This was due to the fact that limited overburden drill core was available for sampling due to the fact that the majority of the overburden was in drill casing. Given this the calculated density of 2.25 t/m^3 is considered appropriate and reasonable for the use in the Richardson maiden inferred crush rock aggregate resource estimate.

Density measurements (n=14) were also performed as part of aggregate test work at AMEC (n=13) with one duplicate sample being analyzed at Tetra Tech EBA. The average bulk relative density, saturated surface dry (SSD) relative density and apparent relative density of 11 Winnipegosis Formation samples yielded 2.65, 2.70 and 2.80, respectively. The bulk relative density, SSD relative density and apparent relative density of one Contact Rapids sample yielded 2.49, 2.59 and 2.76, respectively. The average bulk relative density, SSD relative density and apparent relative density of two basement granite samples yielded 2.68, 2.69 and 2.70, respectively. The comparison between the hydrostatic density measurements, which were taken during core logging and the aggregate test work results are similar. Hence, the hydrostatic method-based density values of 2.68, 2.50 and 2.63 for the Winnipegosis, Contact Rapids and basement granite, which were used in this Technical Report, are considered realistic and a conservative density value for resource estimation.

14.10 Resource Calculation

The volume of the Winnipegosis Formation was calculated from 3-dimmenional modelling that utilised the commercial mine planning software MICROMINE. In addition to the Winnipegosis Formation volume, the separate wireframes and density values for each of the sub-surface formations facilitated the calculation of volumes for the overburden, Contract Rapids, La Loche and Precambrian basement granite.

The specifics of the three-dimensional modelling is described in section 14.8. There was no need to create a block model as no specific chemical elements were being estimated. As such the volume of each formation was used to multiply against a nominal specific gravity value, which was determined on a formation by formation basis. This resulted in the reported tonnages. As this is the maiden inferred resource, no mining studies have yet been employed to constrain the resource within an optimal pit shell. This work is recommended for future resource studies.

The Winnipegosis Formation is considered the most favourable unit for crush rock aggregate as it is the shallowest (directly underlying the quaternary cover) at depths ranging from 18 m to 64.92 m – in this particular part of the Richardson Property. This unit has undergone pervasive dolomitization; the higher magnesium content makes the unit harder and thus more resistive in consideration of crush rock aggregate.

Underlying the Winnipegosis Formation, the Contact Rapids is mudstone-enriched (higher aluminum content), is more lime in nature and comprises weakly consolidated muddy limestone and sandy limestone in comparison to the Winnipegosis dolostone. The Contact Rapids is therefore not nearly as desirable as a crush rock aggregate source in comparison to the Winnipegosis. There is the possibility, however, that the Contract Rapids may provide some alternative flux material if the Winnipegosis were to be mined as a crush rock aggregate source. There is a distinct unconformity between the carbonate units, which is therefore easy to separate if the deposit undergoes mining.

If the economics of mining the Winnipegosis Formation are feasible, then the Precambrian basement granite represents a secondary crush rock aggregate target within the Richardson resource area due to the hardness and the uniform nature of the granite.

14.11 Mineral Resource Marketability

Industrial minerals are influenced by a number of factors that are less applicable to metallic mineral deposits such as: particular physical and chemical characteristics; mineral quality issues; market size; the level of the producer’s technical applications knowledge; market concentration; and transportation costs. Market considerations must, therefore, incorporate not only the requirement for detailed market analyses and/or contracts of sale, but also recognition that markets for many industrial minerals are relatively small, may have a high degree of producer concentration, or may have very high technical barriers to entry, thus imposing limits or constraints on achievable market volumes. Accordingly, the reader must be made aware of any special properties related to the industry specifications.

In the case of the Richardson project, the crush rock aggregate deposit is located in proximity to several major oil sands operations and operations in development (see Figure 4; the reader is also invited to review Section 16.1, Other Relevant Data and Information, for a synopsis of the significance of the oil sands industry, its developing infrastructure and its limited aggregate resources.). In light of the continued investment in the oil sands industry, it is possible that there is an ongoing requirement for aggregate throughout the region. In addition, the close proximity of the Winnipegosis Formation to surface, its overall uniformity, and positive aggregate test results in comparison to Alberta aggregate standards indicate that the Winnipegosis crushed rock aggregate has reasonable prospects of economic viability.

It should be noted that no mining or detailed economic studies have been performed and that the Richardson crush rock aggregate deposits represents an early stage project. No aggregate price data were integrated into the resource estimate presented in this Technical Report. In a brief scan, crush aggregate product varies anywhere from CDN$9.00 per ton to CDN$27.00 per ton (e.g., Dufferin Aggregate, 2014; Hammerstone Corporation, 2014; Jordan River Gravel and Excavating, 2014; Polaris Minerals Corporation, 2014). With respect to potential for economic extraction, Hammerstone is mining limestone at its Hammerstone Project, which is located adjacent to the southeastern Richardson Property (see Section 23, Adjacent Properties). Hence, it appears that the Richardson crush rock aggregate would support the cost of mining and the removal of the overburden.

14.12 Reasonable Prospects

The authors have demonstrated that the Winnipegosis and basement granite rock types have uniform compositions, and that the aggregate test work for the 11 Winnipegosis samples and two Precambrian basement granite samples meets the screening criteria for most of the aggregate designations in Alberta, including asphalt concrete pavement and base course aggregate, as per the guidelines set by Alberta Transportation and the Canadian Standards Association.

While detailed market investigations and discussions with potential consumers are beyond the scope of this inferred resource Technical Report, the Richardson Property crush rock aggregate deposit is located in proximity to several major oil sands operations that are both active and in development. Given the scale of the oil sands operations and international interest in extracting bitumen from the deposits, it is very possible that there is an ongoing requirement for aggregate throughout the region. Especially because aggregate surficial deposits are difficult to find throughout much of northern Alberta.

In addition, the Winnipegosis Formation is near surface (18-65 m below surface; average 36 m), is stratigraphically uniform (thickness of 35-48 m; average 40 m) and yields positive aggregate test results in comparison to Alberta aggregate standards.

Accordingly, with respect to reporting a resource estimate and abiding by the General Guidelines of NI 43-101, it should be emphasized that the aggregate test rock results, proximity to the oil sands operations and general characteristics and low strip ratio of the target unit suggest that the Winnipegosis Formation (and secondly, the Precambrian basement granite) from the Richardson crushed rock aggregate deposit has reasonable prospects of economic viability for an industrial mineral deposit.

14.13 Resource Classification

The Richardson maiden inferred crush rock aggregate resource estimate has been classified in accordance with guidelines established by the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014.

The Richardson maiden inferred crush rock aggregate resource estimate has been classified as 'inferred' according to the CIM definition standards. The classification of the Richardson maiden inferred crush rock aggregate resource was based on geological confidence, data quality and stratigraphic continuity. That is, the criteria and rational for the classification of inferred resources was based upon the wide spaced nature of the drilling to date and the fact that this is classed as an early stage project.

14.14 Mineral Resource Reporting

The Richardson maiden inferred crush rock aggregate resource estimate is reported in accordance with the Canadian Securities Administrators National Instrument 43-101 and has been estimated using the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014.

The Richardson maiden inferred crush rock aggregate resource estimate has been classified as inferred only. At this stage of resource classification, no cut-off value has been assigned as it is anticipated that the entire in-situ dolostone unit would be bulk-mined. The aerial extent of the Richardson maiden inferred crush rock aggregate resource area is 6.30 km^2. The Richardson maiden inferred crush rock aggregate resource consists of 683.14 million tonnes of aggregate material situated within the favourable Winnipegosis Formation (Table 17). The thickness of the Winnipegosis aggregate resource varies from 8.3 m to 47.9 m. The Winnipegosis aggregate resource is overlain by 497.29 million tonnes of overburden-waste material. Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

Table 17. Richardson maiden inferred crush rock aggregate resource. Volumes and tonnages for the overburden and all lithostratigraphic units are included, but the main resource reported in this Technical Report belongs to the Winnipegosis Formation.

Formation	Volume (m^3)	Density (t/m^3) *	Tonnes (million tonnes) **
Overburden	220,625,000	2.25	497.29
Winnipegosis	**254,523,000**	**2.68**	**683.14**
Contact Rapids	63,322,000	2.50	158.11
La Loche	13,339,000	2.54	33.93
Basement granite	62,941,000	2.63	165.41

* Density has been rounded to two decimal places.

** Tonnes have been rounded to the nearest 10,000 tonnes.

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

Note 2: The quantity of tonnes reported in these inferred resource estimations are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource, and it is uncertain if further exploration will result in upgrading them to an indicated or measured resource category.

The estimate of mineral resources presented in this Technical Report may be materially affected by geology, environment, permitting, legal, title, taxation, socio-political, marketing or other relevant issues. Because the Richardson Property is in its preliminary exploration stages, specific detail on project’s risks and uncertainties has yet to be fully investigated at this time. As the Richardson Property advances toward an early stage conceptual assessment of potential economic viability of the mineral resources, future discussion on the significant risks, uncertainties and foreseeable impacts are required, including those risks to the project’s potential economic viability.

The quality and grade of reported Inferred resource in this estimation is uncertain in nature as there has been insufficient exploration to define these Inferred resources as an Indicated or Measured mineral resource, and it is uncertain if further exploration will result in upgrading them to an indicated or measured resource category. The portion of the Richardson property resource that has been classified as ‘Inferred’ demonstrates that the nature, quantity and distribution of data is such as to allow confident interpretation of the geological framework and to reasonably assume continuity of geological formations. The collective work to date from the Richardson Property indicate that while the project is in early stages of exploration/resource work that indications of the metallurgical and mineral processing qualities give suggestions that they are of high enough quality that the Winnipegosis is a reasonable prospect for potential future economic extraction.

If the economics of mining the Winnipegosis Formation are feasible, then the Precambrian basement granite represents a potential secondary crush rock aggregate target within the Richardson resource area due to its uniform nature and overall hardness as shown by the few (n=2) samples that were processed using standard aggregate test work. In the resource area, the basement granite has a volume of 165.41 million tonnes; the overall volume of the granite was calculated to a maximum depth of ten metres from the top of the Precambrian rock unit. This hypothesis is conceptual in nature; there has been insufficient exploration to define the extended mineral deposit and it is uncertain if further exploration will result in the target being delineated as a mineral deposit and/or resource.

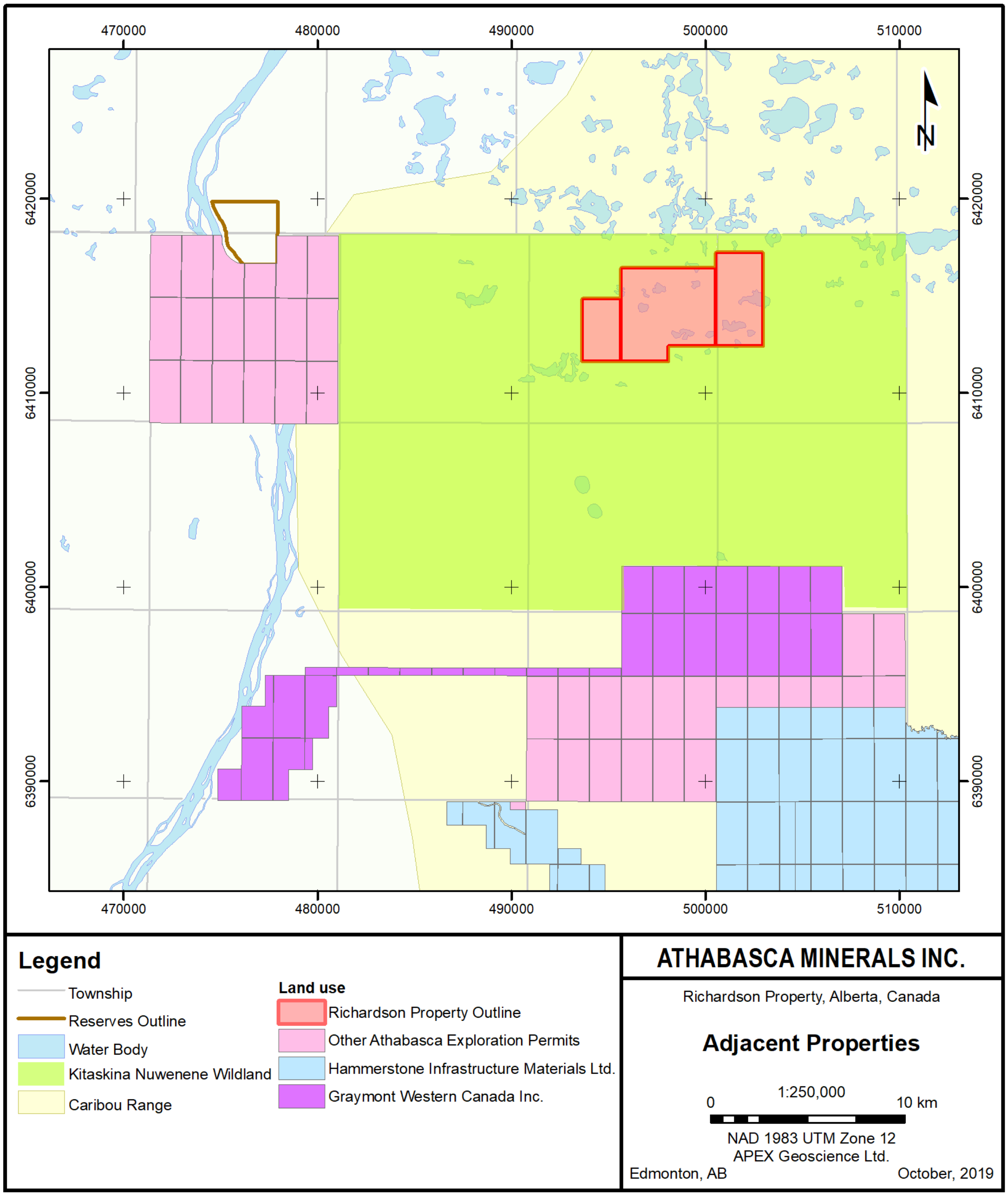
Athabasca Minerals Richardson Project is an Early Stage Exploration Project and therefore Items 15 to 22 of NI 43-101 Form are not required.

23 Adjacent Properties

Hammerstone Corporation owns Alberta Metallic and Industrial Mineral Permits and Leases that are located southeast of the Richardson Property (Figure 36). No exploration details are currently provided to make commodity predictions on these particular permits and leases. Hammerstone also owns the Hammerstone Project, which is located approximately 30 km to the southwest of the Richardson Property. The Hammerstone Project involves the expansion of the pre-existing Muskeg Valley Quarry (formerly owned by Birch Mountain Resources Ltd.), from 235 acres to 1,200 acres.

Graymont Western Canada Inc. (“Graymont”) owns the Alberta Metallic and Industrial Mineral Permits that are located in the middle of the Richardson Property (Figure 36). Graymont is a private corporation and the second largest lime producer in North America. The company focuses on producing high calcium and dolomitic lime, value-added lime-based products, pulverized limestone and construction stone. Graymont also provides construction materials such as sand, gravel, asphalt products, construction stone and ready-mix concrete. No exploration or operational details are publicly available regarding these Graymont’s permits.

Figure 36. Locations of other properties in relation to Athabasca Minerals Richardson Property.



24 Other Relevant Data and Information

24.1 Significance of the Oil Sands Industry and its Developing Infrastructure

It is important to point out the significance of the oil sands industry and its ramifications on any supporting sources of construction product such as a crush rock aggregate material. The Conference Board of Canada estimates that, after adjusting for inflation, a cumulative $364 billion in 2010 dollars will be invested in the oil sands between 2012 and 2035 (Conference Board of Canada, 2012). This estimate includes new projects, expenditures on sustaining capital, and pipeline development. This statement should be taken at face value, however, because any kind of ongoing production level data associated with the oil sands are subject to an infinite number of variables such as geology, environment, permitting, legal, title, taxation, socio-political, marketing or other relevant issues. Nevertheless, there are estimations that by 2035, oil sands bitumen production is projected to reach (5.1 million barrels/day), three times the production for 2010 (Energy Resources Conservation Board, 2011; National Energy Board, 2014). The majority of the growth is in the in-situ category, which tends to be smaller and less expensive to operate. About 80% of the oil sands reserves are considered well suited to in situ extraction.

24.2 Limited Sources of Sand and Gravel Aggregate in the Fort McMurray Region

With respect to aggregate sources, Government mapping and reporting has shown that sand and gravel deposits in the Fort McMurray area, and the Waterways (NTS 74D) and Bitumount (NTS 74E) map sheets are distributed unevenly, of variable quality and quantity, and have largely been exploited (Scafe et al., 1988; Scafe and Edwards, 2000a,b). These authors mapped small pockets of aggregate but noted that no major deposits are present and that any additional aggregate exploration in the region should focus on buried deposits, which show no surface expression and have not been detected by their or previous research programs.

In a document prepared for the Alberta Association of Municipal Districts and Counties, the Got Gravel? Summary Report states that “the Lower Athabasca Region (i.e., the general Fort McMurray area) has the highest population of rural municipalities, escalating growth associated with oil sands development and the least amount of gravel availability in the province (Poscente and Kurjata, 2013).” These authors suggest that the Lower Athabasca Region is subject to a “looming aggregate shortfall” due to demands associated with: an expanding community infrastructure; ongoing oil sands and associated industrial development (e.g., upstream, midstream and downstream hydrocarbon sectors); and regional mega-projects such as the twinning of Highway 63, which connects Fort McMurray to the city of Edmonton.

In summary, sand and gravel in the region is scarce and inadequate to meet most industrial windfalls let alone the prolific oil sands industry. Industrial Mineral companies are supplying gravel by importing gravel and other products or exploring opportunities to mine local underground rock crush aggregate for use as aggregate in the Fort McMurray region. Examples of the latter industrial mineral include open pit limestone deposit production by Hammerstone Corporation and Suncor Energy Inc., and the dolomite and Precambrian basement granite that are being assessed in this Technical Report.

25 Interpretation and Conclusions

A maiden inferred resource Technical Report was originally prepared by APEX Geoscience Ltd. (APEX) for Athabasca Minerals with an effective date of June 8, 2015 (Eccles et al., 2015). Since then, Athabasca Minerals has not conducted any exploration activities and/or other work that is material to the issuer; however, Athabasca Minerals has been in consultations with the Government of Alberta with respect to the implementation of a new Provincial Park (the Kitaskino Nuwenëné Wildland Provincial Park) in the vicinity of the original Richardson Property permits.

Accordingly, the purpose of this updated Technical Report is to: 1) state Athabasca Minerals revised Richardson Property land position; 2) state Athabasca Minerals conversion of mineral exploration 'permits' to mineral development 'leases'; and 3) show that the original inferred resource estimate prepared in June 2015 is still current with the resource area situated entirely within the boundaries of the new Property outline and leases. Hence, the change in land position and conversion of permits to leases represent the only material change to the issuer as documented in this updated and current Technical Report, which supersedes and replaces Eccles et al. (2015).

25.1 Summary of the Richardson Maiden Inferred Crush Rock Aggregate Resource Estimate

Industrial minerals are influenced by a number of factors that are less applicable to metallic mineral deposits such as: particular physical and chemical characteristics; mineral quality issues; market size; the level of the producer's technical applications knowledge; market concentration; and transportation costs. While the inclusion of a detailed market analyses is beyond the scope of this Technical Report, the reader should be made aware of several special factors that are related to this 'early stage project'.

Athabasca Minerals Richardson Property comprises 3 contiguous Alberta Metallic and Industrial Minerals Leases totalling 3,904 hectares (9,647 acres). The Property is active, in good standing and 100% owned by Athabasca Minerals, who have—prior to the Richardson Property work outlined in this Technical Report—identified, explored and operated industrial mineral deposits in other parts of northeastern Alberta. With respect to aggregate marketing, technical applications knowledge and production experience, Athabasca Minerals is therefore assumed to have familiarity of the industrial mineral economics specific to the area.

Proximity to market and market demand are also important industrial mineral factors. The Richardson Property is directly adjacent to the Athabasca oil Sands region of northeastern Alberta. The oil sands operations represent an area of enormous growth opportunity, and subsequently, require substantial sources of local aggregate. While continued oil sands development is subject to an infinite number of variables (e.g., geology, hydrocarbon prices, environment, taxation, socio-political, marketing or other relevant issues), the current development suggests a continued and positive aggregate market demand. Of equal note, sand and gravel aggregate in the oil sands region is scarce and inadequate to meet industrial demand. Consequently, alternative local sources such as crush rock aggregate are required to minimize common industrial mineral impediments such as transportation costs. Crush rock aggregate in the form of limestone is being mined adjacent to the Richardson Property region by Hammerstone Corporation exhibiting the potential demand for aggregate in the region.

To assess the Richardson Property for its crush rock aggregate potential, APEX Geoscience Ltd. has reviewed, logged, measured, sampled and analyzed drill cores from a 2013 (4 holes totalling 235 m) and a 2014 (8 holes totalling 843 m) drilling programs, both of which were conducted by Athabasca Minerals. Two distinct geological units - the Winnipegosis Formation, which is the primary focus of this Technical Report, and the Precambrian basement granite – are identified in this Technical Report as having reasonable prospects of economic viability for an industrial mineral deposit. The thickness of the Winnipegosis varies from 8.3 m to 47.9 m (averages 39.5 m) and is comprised largely of competent, light brown dolostone. Precambrian basement granite was drill-tested to a depth of 10 m prior to terminating the drillholes, although a single drillhole (14RLD007) tested the granite to a coring depth of 44.5 m to test its uniformity and crush rock aggregate potential at depth. The granite is comprised light-blue grey coarse-grained weakly foliated granite. Based on the 2013 and 2014 drill results, Athabasca Minerals Inc. further commissioned APEX Geoscience Ltd. to prepare a National Instrument 43-101 (NI 43-101) Technical Report and maiden inferred crush rock aggregate resource estimate of the Middle Devonian Winnipegosis Formation and make recommendations on future exploration to advance the Athabasca Minerals Richardson Property.

A review of oil and gas well, historical mineral exploration and Athabasca Minerals 2013 and 2014 drill program information, indicates that stratigraphic continuity of the Winnipegosis appears to extend over large distances in the Property area representing an apparently continuous target unit. Geotechnical measurements and geochemical analysis show that within the resource area, the Winnipegosis Formation is homogeneous, uniform and has undergone pervasive dolomitization attributing to its hardness, competency and resistive nature.

The single ‘impurity’ to report involves supplementary bitumen, which is more or less confined to the uppermost portions of the Winnipegosis Formation (and the La Loche Formation directly overlying the Winnipegosis dolostone). The bitumen ranges in intensity from non-existent (in most of the core) to pervasive, the latter of which is evident in 25 cm to 90 cm wide ‘bituminous horizons’ that occur in the eastern drillholes 14RLD006 and 14RLD008. The bitumen appears to be confined to porosity enabling textures in the carbonate such as vugs, sandy horizons and fracture planes. However, the overall consistency and volume of non-bitumen-bearing dolostone, and the positive aggregate test work results, provide justification that the bitumen does not influence the viability of the Winnipegosis as an industrial mineral deposit, at least in the evaluation of this early stage project.

The Winnipegosis Formation and Precambrian basement granite were analyzed using relevant aggregate analytical techniques, the results of which were compared to Alberta Transportation and Canadian Standards Association aggregate specifications and standards. The results show that the Winnipegosis Formation and Precambrian basement granite met the maximum allowable screening criteria for major aggregate test methods, including: plasticity index; Los Angeles abrasion; magnesium sulphate soundness; and unconfined freeze-thaw. Based on the results of this test work and evidence of the homogeneity and uniformity of the rock units, it is concluded that the Winnipegosis Formation and Precambrian basement granite represent material of merit for several Alberta Transportation aggregate designations, including: Designation 1 (asphalt concrete pavement); and Designation 2 (base course aggregate).

The Richardson maiden inferred crush rock aggregate resource estimate is reported in accordance with the Canadian Securities Administrators National Instrument 43-101 and has been estimated using the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines" dated November 23rd, 2003 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" adopted May 10, 2014. The mineral resource modelling was carried out using a three-dimensional model in commercial geological modelling and mine planning software MICROMINE (v.14.0.4).

The resource estimation utilized data from two 2013 drillholes and eight 2014 drillholes drilled by Athabasca Minerals (to drillholes in total). All drillholes were vertical holes and spacing between the drillholes varies from 500 m to 1.37 km, with an average of about 900 m between drillholes. A separate wireframe was created for each formation (Precambrian basement granite; La Loche Formation; Contact Rapids Formation; Winnipegosis Formation; and overburden), from which, separate formation volumes could be derived for each lithostratigraphic unit.

Block modelling of the resource area was not necessary as no 'grade' was being estimated; instead a three-dimensional computer-generated 'solid' of the area was generated in MICROMINE to calculate the resource 'volume'. Within the model, the volume of each formation was used to multiply against a nominal density value, which was determined as averages on a formation by formation basis from the 675 bulk density measurements collected. This resulted in the reported tonnages.

The surface area of the resource outline reported in this Technical Report is 6.30 km^2, representing a small north-central portion of Athabasca Minerals Richardson Property. The Richardson maiden inferred crush rock aggregate resource estimate has been classified as 'inferred' according to the CIM definition standards. The classification of the Richardson maiden inferred crush rock aggregate resource was based on geological confidence, data quality and stratigraphic continuity. That is, the criteria and rational for the classification of inferred resource is based upon the wide spaced nature of the drilling to date and the fact that the Richardson crush rock aggregate project is classified as an early stage project with little mineral processing test work completed to date. As this is the maiden inferred resource, no mining studies have been employed to constrain the resource within an optimal pit shell.

The Richardson maiden inferred crush rock aggregate resource estimate has been classified as inferred only and consists of 683 million tonnes of aggregate material situated within the favourable Winnipegosis Formation (Table 18). Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve. The Winnipegosis aggregate resource is directly overlain by 497 million tonnes of overburden-waste material.

Table 18. Richardson maiden inferred crush rock aggregate resource. Volumes and tonnages for the overburden and all lithostratigraphic units within the resource area are included, but the resource reported in this Technical Report relates to the Winnipegosis Formation.

Formation	Volume (m^3)	Density (t/m^3) *	Tonnes (million tonnes) **
Overburden	220,625,000	2.25	497.29
Winnipegosis	**254,523,000**	**2.68**	**683.14**
Contact Rapids	63,322,000	2.50	158.11
La Loche	13,339,000	2.54	33.93
Basement granite	62,941,000	2.63	165.41

* Density has been rounded to two decimal places.

** Tonnes have been rounded to the nearest 10,000 tonnes.

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

Note 2: The quantity of tonnes reported in these inferred resource estimations are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource, and it is uncertain if further exploration will result in upgrading them to an indicated or measured resource category.

25.2 Discussion of Risks and Uncertainties

The exploration methodologies employed during the 2013 and 2014 drill programs meet industry standards for accuracy and reliability. Mr. Eccles, P. Geol, supervised the 2014 drill campaign along with logging and sampling of both the 2013 and 2014 drill core. The sample collection and test work package has been designed and reviewed independently by R. Eccles, P. Geol. In addition, R. Eccles reviewed the results of analytical test work and verified that they are sufficiently accurate and precise. In the opinion of the R. Eccles, the methodologies of the exploration program and resulting data are sufficiently accurate and precise for use in the Richardson maiden inferred crush rock aggregate resource estimate.

The Richardson maiden inferred crush rock aggregate resource estimate has been classified as 'inferred' according to the CIM definition standards. The classification of the Richardson maiden inferred crush rock aggregate resource was based on geological confidence, data quality and stratigraphic continuity. That is, the criteria and rational for the classification of inferred resources was based upon the wide spaced nature of the drilling to date and the fact that this is classed as an early stage project with little mineral processing test work completed to date.

The quality and grade of reported Inferred resource in this estimation is uncertain in nature as there has been insufficient exploration to define these Inferred resources as an Indicated or Measured mineral resource, and it is uncertain if further exploration will result in upgrading them to an indicated or measured resource category. The portion of the Richardson property resource that has been classified as ‘Inferred’ demonstrates that the nature, quantity and distribution of data is such as to allow confident interpretation of the geological framework and to reasonably assume continuity of geological formations. The collective work to date from the Richardson Property indicate that while the project is in early stages of exploration/resource work that indications of the metallurgical and mineral processing qualities give suggestions that they are of high enough quality that the Winnipegosis is of economic interest.

The estimate of mineral resources presented in this Technical Report may be materially affected by geology, environment, permitting, legal, title, taxation, socio-political, marketing or other relevant issues. Because the Richardson Property is in its preliminary exploration stages, specific detail on project’s risks and uncertainties has yet to be fully investigated at this time. As the Richardson Property advances toward an early stage conceptual assessment of potential economic viability of the mineral resources, future discussion on the significant risks, cut-offs, uncertainties and foreseeable impacts are required, including those risks to the project’s potential economic viability.

25.3 Potential Targets for Future Exploration at the Richardson Property

The Winnipegosis Formation is considered the most favourable unit for crush rock aggregate in the resource area given that it is the shallowest lithostratigraphic unit (directly underlying the quaternary cover and occurs at depths ranging from 18.0 m to 64.9 m). A stratigraphic compilation of publicly available oil and gas well information, historical metallic and industrial mineral assessment work, and data from Athabasca Minerals Inc. 2013 and 2014 drill programs shows that there is good stratigraphic continuity of the lithostratigraphic units in the Richardson Property area. This includes the Winnipegosis Formation and the Precambrian basement granite, which are discussed further in the text that follows. By way of preliminary reasoning to extrapolate these formations based on the stratigraphic continuity and observations made at the Property, the Richardson Property has several potential targets for further exploration.

The following statements referring to any potential extension of the Richardson crush aggregate deposit are conceptual in nature; there has been insufficient exploration to define the extended mineral deposit and it is uncertain if further exploration will result in the target being delineated as a mineral deposit and/or resource. Potential targets for further exploration are summarized as follows:

1. Based on stratigraphic continuity of the Winnipegosis Formation, an extension of the current Winnipegosis crush rock aggregate deposit outwards from the resource area to other parts of the Property could create additional and/or more

accessible Winnipegosis tonnage. To provide an example of the potential range increase in volume, a southerly extension of the Winnipegosis Formation deposit equivalent to an additional aerial extent of 7.49 km^2 could add between 0.6707 and 1.0060 billion tonnes of aggregate crush rock (e.g., Table 19). The approximate tonnages have been interpreted by extrapolating the formation wireframes from the resource area southwards and using the same averaged densities that were used for the Richardson maiden inferred crush rock aggregate resource. The volume range is within 20 percent of the modelled volume for each formation in the Richardson maiden inferred crush rock aggregate resource (compare versus Table 18).

2. There is also justification in targeting future Winnipegosis exploration to the east-northeast, where the thickness of overburden is assumed to be thinner. If successful, this would lower the strip ratios to access the Winnipegosis in comparison to the resource area.

3. If the economics of mining the Winnipegosis Formation are feasible, then the Precambrian basement granite represents a potential secondary crush rock aggregate target within the resource area due to its uniform nature and overall hardness as shown by aggregate test work conducted in this Technical Report. In the resource area, the Precambrian basement granite could account for an additional 165 million tonnes of aggregate. This estimate is conservative as the volume assumes a depth of 10 m (corresponding to when most of the drillholes ended). Based on drillhole 14RLD007, which confirmed uniform granite to a depth of 48.35 m, the granite could easily be extended, such that the granite could account for 319 million tonnes if, for example, the depth was extended to 20 m instead of 10 m.

4. In in the resource area, any potential granite crush rock aggregate source is contingent on the Winnipegosis being economic. However, the Precambrian basement granite is known crop out directly east-southeast of the resource area. Based on the uniformity and positive granite aggregate test results from the resource area, the adjacent exposed and near-surface granite represents a potential target for further exploration.

5. A multi-technique geophysical conducted over the general granite outcrop area helps to define the near-surface boundaries of the granite body. Ground Penetrating Radar (GPR) profiles, which display interpretable data in the area of up to depths of 60 m, shows that the granite outcrop is fairly constrained to the immediate observed exposure; however, the GPR profiles suggest that the area directly north of the outcrop has the least amount of overburden and/or Winnipegosis dolostone material to overlie the Precambrian basement granite. Based on the GPR results, the estimated areas of combined surficial overburden and Winnipegosis Formation dolostone material that is situated on top of the Precambrian granite and is within 5 m, 10 m, 15 m, 20 m and 25 m of surface is approximately: 4,600 m^2; 15,200 m^2; 45,100 m^2; 91,300 m^2; and 147,233 m^2, respectively. The ground magnetic data, which illustrates lateral changes in the subsurface that were not observed in the GPR response, shows

that the overburden, in particular, is thicker to the northeast of the granite outcrop correlating to kame-type deposits delineated using LiDAR data. The geophysical interpretations remain inherently ambiguous, and require other geological information such as drilling to properly confirm and classify the identified litho-magnetic zones.

6. Lastly, the Contact Rapids Formation, which underlies the Winnipegosis, comprises weakly consolidated muddy and sandy limestone, and is therefore not as desirable in comparison to the Winnipegosis (this is evident in poor aggregate test work results presented in this Technical Report). There is the possibility, however, that the Contract Rapids could provide a source of alternative flux material if the Winnipegosis were to be mined as crush rock aggregate.

Table 19. A projected range of volumes associated with an example of extending a potential Winnipegosis deposit southward of the resource area at the Richardson Property.

	Volume (m^3)		Tonnes (million tonnes) *	
Formation	**Range from**	**Range to**	**Range from**	**Range to**
Overburden	247,560,000	371,341,000	558.00	837.00
Winnipegosis	**248,928,000**	**373,392,000**	**668.12**	**1002.18**
Contact Rapids	59,478,000	89,216,000	148.52	222.77
La Loche	12,856,000	19,284,000	32.71	49.06
Basement granite	59,858,000	89,787,000	157.31	235.96

* Tonnes have been rounded to the nearest 10,000 tonnes.

Note 1: The potential deposit quantity is conceptual in nature; there has been insufficient exploration to define the extended mineral deposit and it is uncertain if further exploration will result in the target being delineated as a mineral deposit and/or resource.

26 Recommendations

The Richardson Property is considered to be a property of merit and warrants further exploration. This contention is supported by results presented in this Technical Report, which include: uniform and continuous Winnipegosis Formation target unit (and a secondary target unit in the Precambrian basement granite); positive aggregate test work results that were evaluated against Alberta Transportation and Canadian Standards Association aggregate standards; a Richardson maiden inferred crush rock aggregate resource estimate that has an aerial extent of 6.30 km^2 and consists of 683 million tonnes of aggregate material situated within the Winnipegosis Formation; and a continuing and positive market demand for aggregate products in the oil sands area of northeastern Alberta.

In addition to the inferred aggregate resource area (6.30 km^2), this Technical Report has shown the potential: 1) to extend the Winnipegosis deposit beyond the current resource area; and 2) for the Precambrian basement granite to provide another source of crush rock aggregate at the Property based on sample results presented in this Technical Report and knowledge that the granite crops out in the eastern part of the Richardson Property. Note: the potential deposit quantity and suggestion of a granite crush rock aggregate source is conceptual in nature as there has been insufficient exploration to define the extended mineral deposit and it is uncertain if further exploration will result in the target being delineated as a mineral deposit and/or resource.

A two-Phase approach is therefore recommended for 2019-2020 exploration at the Richardson Property consisting of Phase One geophysical surveying, and Phase Two extension and infill drilling in conjunction with a Preliminary Economic Assessment (PEA) scoping study. The total cost of both phases of recommended exploration work is estimated at CDN$916,000 (Table 20; not including contingency). With a 10% contingency the total budget is CDN$1,007,600.

The recommended Phase One exploration work includes a 35 line-kilometre Ground Penetrating Radar (GPR) survey to:

- create a preliminary three-dimensional geological model of the resource area and beyond;
- depict those areas that have shallow overburden overlying Devonian Winnipegosis dolomite and/or the Precambrian basement granite; and
- define the drillhole locations for the Phase Two drill program.

The proposed GPR survey will include eight northwesterly grid-lines designed to connect the 2014 GPR test area (i.e., the test area around the granite outcrop) to the 2013 and 2014 drillhole collars. The GPR survey will also include four north-easterly tie-lines that are designed to verify the grid-line data and add confidence to the measured depths of the overburden, Winnipegosis dolomite and basement granite. The approximate cost of the Phase One work is CDN$40,000 (Table 20).

Subject to the results of the Phase One survey, a Phase Two extension/infill drillhole program and ensuing composite aggregate test work analyses on the drill cores will:

- verify the three-dimensional geological model; and
- provide additional confidence to uniformity, extent, depth and quality of the Winnipegosis dolomite and the basement granite, which is necessary to produce an updated mineral resource estimate.

It is recommended that the Phase Two extension and infill drilling consists of ten to eleven systematically placed diamond drillholes (totalling approximately 1,000 m). Areas of focus should include two separate justifications for drill testing as follows.

1. Winnipegosis Extension. The Winnipegosis Formation deposit could be extended to the south, east and northeast of the resource area. It is anticipated that the topography (i.e., overburden) thins out to the east-northeast such that the depth to the Winnipegosis Formation may be thinner than in the resource area (overburden averages 36 m thickness; n = 11 drillholes drilled in 2013 and 2014 by Athabasca minerals). The Winnipegosis extension drilling would advance the project by increasing the confidence in the continuity and uniformity of the Winnipegosis Formation and the depth of overburden overlying the Winnipegosis.

2. Precambrian Basement Granite Extension. This drilling should place emphasis on the granite as a potential crush rock aggregate source. Drill targets should be collared east-southeast of the resource area in an area directly adjacent to an exposure of Precambrian granite. The granite outcrop identified during 2013 field program and the 2014 ground geophysical program has the advantage of shallow to non-existent overburden and/or Winnipegosis Formation cover rock.

The Phase Two extension/infill drilling, aggregate test work analysis and an updated NI 43-101 inferred and possibly indicated resource estimate Technical Report is estimated to cost approximately CDN$576,000 (Table 20).

In conjunction with the Phase Two work, it is recommended that a PEA scoping study of the Richardson Project be conducted and includes: the creation of an initial pit shell; estimations of strip ratios to remove the overburden; and examines certain economic and environmental factors related to the market for crushed rock aggregate in the immediate vicinity of the Project. The completion of a PEA would add confidence to the viability of the Project. For example, this maiden inferred resource is reported in tonnages, and mining studies are required to constrain the resource within an optimal pit shell. The estimated cost to complete the PEA is CDN$300,000 (Table 20).

Table 20. Summary of recommendations for the Richardson Property.

Phase One: Ground Geophysical Survey and Preliminary 3D Model

Activity	Description	Cost (CDN$)
Ground Penetrating Radar (GPR) geophysical survey	A 35-line km GPR survey to develop a preliminary 3D model, determine o/b thickness and site drillhole locations.	$40,000
	Sub-total	**$40,000**

Phase Two: Drill Program, Indicated/Inferred Technical Report and Preliminary Economic Assessment

Activity	Description	Cost (CDN$)
Drilling	A 10-11 drillhole heli-supported program (approximately 1,000 m of coring)	$511,000
Analysis	Aggregate test work	$30,000
Reporting	NI 43-101 Mineral Resource Estimation and Technical Report	$35,000
Reporting	Preliminary Economic Assessment Scoping Study	$300,000
	Sub-total	**$876,000**
	Total	**$916,000**
	10% Contingency	**$91,600**
	Total with Contingency	**$1,007,600**

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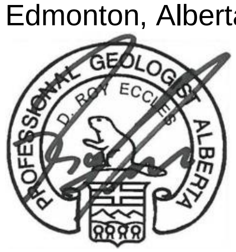
28 Certificate of Authors

I, D. Roy Eccles, P. Geol., do here by certify that:

1. I am currently Senior Consulting Geologist and Operations Manager with APEX Geoscience Ltd., 8429 – 24th Street, Edmonton, Alberta T6P 1L3.
2. I graduated with a B.Sc. in Geology from the University of Manitoba in Winnipeg, Manitoba in 1986 and with a M.Sc. in Geology from the University of Alberta in Edmonton, Alberta in 2004.
3. I am and have been registered as a Professional Geologist with the Association of Professional Engineers, Geologists and Geophysicists of Alberta since 2003.
4. I have worked as a geologist for more than 30 years since my graduation from university and have been involved in all aspects of mineral exploration and mineral resource estimations for metallic and industrial mineral projects and deposits in North America. I have explored for and prepared mineral resource estimates for industrial mineral projects in western Canada and northeastern United States.
5. I have read the definition of “Qualified Person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of NI 43-101.
6. I supervised and am responsible for *“National Instrument 43-101 Technical Report, Inferred Crush Rock Aggregate Resource Estimate with Updated Lease Boundaries for the Richardson Property, Northeastern Alberta, Canada”* (the “Technical Report). The Technical Report is effectively dated October 24, 2019. I stepped on the Richardson Property on October 25, 2017 and can verify the Property infrastructure; the site inspection is sufficient for this Technical Report as there has been no material change at the Property since 2014.
7. To the best of my knowledge, information and belief, the Technical Report contains all relevant scientific and technical information that is required to be disclosed, to make the Technical Report not misleading.
8. I am independent of the issuer, the vendor and the Property and successfully pass the independency requirements of the Guidance of Independence test in NI 43-101 CP Item 1.5.
9. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files or their websites.

Dated October 24, 2019
Edmonton, Alberta, Canada



D. Roy Eccles, M.Sc., P. Geol.

I, Steven J. Nicholls, MAIG., do here by certify that:

1. I am currently employed as a Resource Geologist with:
   APEX Geoscience Australia Pty Ltd.
   39B Kensington St
   East Perth WA Australia 6004
2. I graduated with a Bachelor of Applied Science (BASc.) in Geology, received from the University of Ballarat, Victoria, Australia in 1997.
3. My professional affiliation is member of the Australian Institute of Geoscientists, Australia (AIG).
4. I have worked as a geologist for more than 13 years since my graduation from university.
5. I have read the definition of “Qualified Person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “Qualified Person” for the purposes of NI 43-101.
6. I was involved in the preparation of this report. More specifically, under the direct supervision of Roy Eccles, P. Geol., I prepared Section 14 of *“National Instrument 43-101 Technical Report, Inferred Crush Rock Aggregate Resource Estimate with Updated Lease Boundaries for the Richardson Property, Northeastern Alberta, Canada”*, effectively dated October 24, 2019 (the “Technical Report”). I have not had prior involvement with the Property nor have I visited the Property.
7. To the best of my knowledge, information and belief, the Technical Report contains all relevant scientific and technical information that is required to be disclosed, to make the Technical Report not misleading.
8. I am independent of the issuer, the vendor and the Property and successfully pass the independency requirements of the Guidance of Independence test in NI 43-101 CP Item 1.5.
9. I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
10. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files or their websites.

Dated October 24, 2019
Edmonton, Alberta, Canada

Steven J. Nicholls, BASc., MAIG.

Appendix 1. Geotechnical and Geochemical Data Results from Athabasca Minerals 2013 and 2014 Drill Programs

The following information and data is available through APEX Geoscience Ltd. and/or Athabasca Minerals Inc.

- 2013 and 2014 geotechnical measurements (RQD, rock mass defects)
- 2013 and 2014 drill core logs
- 2013 and 2014 drill core sample inventory
- 2013 and 2014 geochemical laboratory certificates from Acme Analytical Laboratories Ltd. located in Vancouver, British Columbia
- 2013 and 2014 aggregate test work laboratory certificates from AMEC and Tetra Tech EBA located in Calgary and Edmonton, Alberta, respectively.