APPENDIX D

Stage 1 Archaeological Assessment

June 2017

STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Wataynikaneyap Power L.P. Pikangikum Distribution Line Project, District of Kenora, Ontario

Submitted to:
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REPORT

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Golder Associates

Executive Summary

The Executive Summary highlights key points from the report only; for complete information and findings, as well as the limitations, the reader should examine the complete report.

Golder Associates Ltd. (Golder) was retained by Wataynikaneyap Power L.P. (Wataynikaneyap), a partnership equally owned by 22 First Nation communities, in partnership with FortisOntario Inc. (FortisOntario) to conduct a Stage 1 archaeological assessment for Wataynikaneyap proposed Pikangikum Distribution Project (the Project), as part of an update to an existing Class Environmental Assessment required under the Ontario *Environmental Assessment Act* (1990) (EAA). Wataynikaneyap is proposing to construct, operate and maintain a 44 kV and 25 kV distribution line, the Pikangikum Distribution Project (the Project). The Project will provide a distribution connection between Pikangikum First Nation and the existing distribution system from Red Lake, Ontario. The Project is located in northwestern Ontario. The assessment local study area (LSA) varies in width from 200 m to 500 m width, which represents the limits of work for the Project. The LSA includes the distribution line right-of-way (ROW) and the substation location. The Project will connect Pikangikum to the provincial power grid. The line will originate from an existing 44 kV feeder on the Nungesser Road, approximately 2 km from its intersection with Highway 125, and travel north to Pikangikum First Nation community. There are a number of small deviations where the proposed route is adjusted to avoid a sensitive feature. Southeast of Prideaux Lake, the LSA deviates in a northeast direction of Nungesser Road and travels northward crossing the Berens River and then east to the Pikangikum First Nation community.

The Stage 1 assessment involved a review of the environmental background of the LSA, previous archaeological research work in the general vicinity of the Project, research into the pre- and post-contact cultural history, and a review of the archaeological sites database at the Ministry of Tourism, Culture and Sport (MTCS) within and in the vicinity of the LSA. Stream order data (MNRF 2016) and Ministry of Natural Resources and Forestry (MNRF) archaeological potential modelling were analysed to provide an accurate determination of archaeological potential within the LSA. The MNRF potential models were provided to Golder by MNRF on 10 April 2017. Additionally, ortho imagery was used to further refine areas of archaeological potential within the LSA.

Numerous areas within the LSA exhibit high potential for archaeological resources and are recommended for Stage 2 archaeological assessment, as indicated on Maps 10 (Tiles 1-7). Any portion of these areas recommended for Stage 2 archaeological assessment that may potentially be impacted by ground disturbance associated with Project construction activities should be assessed by a Stage 2 test pit survey strategy for northern Ontario and the Canadian Shield as described in Section 2.1.5 of the 2011 *Standards and Guidelines (S&Gs) for Consultant Archaeologists* (MTCS 2011). All remaining areas have been determined to have low archaeological potential and no archaeological survey of these areas is required.

The MTCS is requested to review and indicate their satisfaction with the results and recommendations presented herein, with regard to the 2011 *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011) and the terms and conditions for archaeological licences, and to enter this report into the Ontario Public Register of Archaeological Reports.

Project Personnel

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1.0 PROJECT CONTEXT

1.1 Development Context

Golder Associates Ltd. (Golder) was retained by Wataynikaneyap Power L.P. (Wataynikaneyap), a partnership equally owned by 22 First Nation communities, in partnership with FortisOntario Inc. (FortisOntario) to conduct a Stage 1 archaeological assessment for Wataynikaneyap proposed Pikangikum Distribution Project (the Project), as part of an update to an existing Class Environmental Assessment required under the Ontario *Environmental Assessment Act* (1990) (EAA). Wataynikaneyap is proposing to construct, operate and maintain a 44 kV and 25 kV distribution line, the Pikangikum Distribution Project (the Project). The Project will provide a distribution connection between Pikangikum First Nation and the existing distribution system from Red Lake, Ontario. The Project is located in northwestern Ontario.

The assessment local study area (LSA) varies in width from 200 m to 500 width, which represents the limits of work for the Project. The LSA includes the distribution line right-of-way (ROW) and the substation location. The Project will connect Pikangikum to the provincial power grid. The line will originate from an existing 44kV feeder on the Nungesser Road, approximately 2 km from its intersection with Highway 125, and travel north to Pikangikum First Nation community. There are a number of small deviations where the proposed route is adjusted to avoid a sensitive feature. Southeast of Prideaux Lake, the LSA deviates in a northeast direction of Nungesser Road and travels northward crossing the Berens River and then east to the Pikangikum First Nation community.

1.1.1 Potential Ground Disturbance Associated with the Project

Clearing and grading, as required, will be completed along the distribution line right-of-way (ROW) and for the substation. Clearing will consist of cutting tree trunks parallel to, and within 15 centimetre (cm) of the ground or lower, as well as the removal of all shrubs, debris and other such materials. Grubbing will likely only occur at structure foundation locations, and will be required for the substation. Clearing and grading of the distribution line ROW and the substation location will take into consideration the location of known archaeological sites.

1.1.1.1 Power Lines and Associated Structures

The power line includes approximately 96.3 km of 44 kV and 17.8 km of 25 kV of overhead single circuit line and associated components. The northern approximately 91 km of the 44 kV portion of the line will be designed and built to be able to operate at 115 kV in the future should separate approvals be obtained for such higher voltage operation. Line structures will be single-pole, double-pole (H-frame), triple-pole (possible at sharp corners, water crossings, or long spans) or a combination. Poles may be wood, metal, concrete, resin, or a hybrid concrete-steel hybrid.

Subject to surveying, geotechnical analysis, preliminary design, and a land rights assessment, approximately 32 km of the southern-most section of line is expected to be constructed on single poles in and/or adjacent to the existing Nungesser Road ROW. A major portion of the power line structures and associated conductors and anchors will be installed within or adjacent to the road ROW. Any requirements for poles or anchors outside of the power line ROW will be appropriately dealt with as they occur in the field during detailed design.

1.1.1.2 Access Roads

Existing access options are relatively abundant and their utilization will be maximized in the final Project design as a means of minimizing potential Project effects. Primary access will be from Nungesser Road, the Pikangikum All Season Road, and any newly cleared portions of all-season roads that are planned to be constructed under the Whitefeather Forest Management Plan. Approved Whitefeather Forest Management Plan all-season roads or clearings will be utilized (if constructed) to access the existing utility clearing on the north side of the Berens River and the proposed substation area. An ice crossing across the Berens River may also be utilized should ice conditions permit. Approximately 0-3 km of new access apart from the Project ROW clearing are anticipated to be constructed for the Project

Substation

A distribution station (substation) is proposed to be located south of the Berens River. The location is proposed to avoid having to transport materials and equipment across the Berens River and/or along the existing utility clearing running east out of Pikangikum First Nation; and therefore reduce environmental effects to the river, and risks to the Project schedule. The substation will have an approximately 70 m x 80 m footprint.

Helicopter Landing Pad and Staging Area

A helicopter landing pad and a permanent equipment staging area may be required at the substation location. A helicopter landing pad would have a minimum area of approximately 30 m x 30 m, subject to terrain and vegetation conditions as well as aeronautical approval requirements. In total, the staging area and helicopter pad require approximately 100 m x 100 m of cleared area in addition to the substation fenced area above.

Additional Temporary Project Components

Additional temporary Project components will be required during construction, which will include the following:

- **Aggregate Sources** – subject to geotechnical and engineering analysis, substation foundations and pole foundation backfill may consist of either native soil (if deemed suitable), or contain concrete and/or aggregate. Aggregate will be sourced from either local existing facilities, or will be taken from a new hole dug near the pole foundation hole for the purposes of swapping subgrade with the pole foundation hole. Concrete will likely be sourced from supplier(s) in Red Lake, or will be brought to the site in dry format and mixed in small quantity near each foundation hole using water provided from off-site delivery trucks.
- **Construction Worker Housing** – Construction workers may be housed in existing private accommodations such as the Stormer Lake Camp owned by Pikangikum First Nation, and / or in the Municipality of Red Lake, and/or in Pikangikum First Nation.

  If necessary, temporary accommodations may be established and separately permitted by the selected constructor. Should this be the case, the following activities are assumed:

  - Power source is anticipated to be a portable diesel generating station;
  - Water will be sourced from either off-site delivery trucks or separately permitted local source; and
  - All liquid and solid waste will be appropriately stored onsite and transported to facilities licensed to dispose of the waste. There will be no discharge of liquid waste from the temporary accommodation unless separately permitted and approved.

All applicable permits and approvals will be acquired for any temporary accommodation, should it be required.

- **Laydown Areas** – apart from the substation area, temporary laydown areas for the storage of materials and equipment will be located on existing cleared areas within the limits of work, or areas reachable by existing roads originating within the limits of work, with appropriate set back distances from sensitive environmental features.
- **Watercourse Crossing** – It is anticipated that there will not be a requirement for new watercourse crossings for Project construction as the ROW follows existing and planned roads or existing ROW area. If the planned Whitefeather Forest Management Plan roads are not constructed prior to construction timing of the Project, or the Whitefeather Forest Community Resource Management Authority is unable to construct the roads in accordance with their approvals; there may be a requirement for new watercourse crossings. If required, mitigation measures including minimizing removal of bank stabilizing vegetation where possible, will be employed during construction of the watercourse crossings considering Ministry of Natural Resources Environmental Guideline for Access Roads and Water Crossings (MNR 1990).
- **Refueling Areas** – refuelling areas will be located in the Municipality of Red Lake, the Pikangikum First Nation community, or other private facility unless separate permits are obtained for a temporary construction camp.

1.1.2 Development Context Summary

Considering the length and width of the up to 40-m-wide transmission line ROW the potential for ground disturbance associated with the Project is minimal. Because of the relatively flat nature of the landscape covered by the LSA, minimal grading will likely be required in association with the construction of the distribution line ROW and associated access roads. Construction of the distribution structure foundations will result in small, localized ground disturbances (up to approximately 3 x 3 m) every 100-200 metres. Attempts will be made to locate temporary construction camps and laydown areas in areas with low or no archaeological potential based on this Stage 1 archaeological assessment.

1.2 Stage 1 Archaeological Assessment Objectives

This Stage 1 archaeological assessment was completed to identify and evaluate the known and potential archaeological resources that may be located within the area of the planned development. The objectives of a Stage 1 investigation generally flow from principles outlined in the *Ontario Heritage Act* (Consolidated 2007), the *Standards and Guidelines for Consulting Archaeologists* (2011) and the *Archaeological Assessment Technical Guidelines* (1993). More specifically, studies were completed with the following objectives:

- Completion of the appropriate level of background assessment for the areas within the LSA;
- Evaluation of the potential impacts to the archaeological resources that could result from the proposed development;
- Recommendation as to whether additional archaeological investigations (i.e., Stage 2) are required; and
- Strategy for recommended additional work.

This report provides detailed description of the background information collected on the archaeological resources and sites within and in the vicinity of the LSA, as well as identification of the property's archaeological potential. This discussion is followed by a brief summary and recommendations for future protection and or management of archaeological resources at the site, should they be required.

2.0 HISTORICAL CONTEXT

2.1 Pre-Contact Indigenous Culture History

The occupation of northwest Ontario has been sub-divided into a series of phases (Periods). These are based upon the material remains that survive within the archaeological record that allow the re-construction and differentiation of past life-ways. These subdivisions are an archaeological convenience to help better understand the development and change of cultures across the region, and benefit from the broad brush of hindsight and generalisation without the fine detail of local variation (Dalla Bonna et al. 1994a (5)).

The broadest pre-contact archaeological periods corresponding to northwest Ontario will be referred to as Plano-Indian, Archaic, Middle Woodland and Late Woodland, within which further temporal and regional subdivisions exist. The nomenclature utilized in this report corresponds to the chronology defined within Hamilton & Larcombe (1995) due to the locational proximity of their research to the LSA. Two other excellent overviews are provided by Wright (1999) and Bursey et al (2013).

In discussing pre-contact northwest Ontario, there are a number of themes and issues that are relevant across all phases which are also relevant to the determination of areas of archaeological potential within the LSA:

- The general acidity of the soil on the Canadian Shield leads to a lack of organic preservation. As a consequence, there are large gaps in the understanding of various aspects of past cultures, ranging from mortuary practices and skeletal morphology through to diet and subsistence strategies. A huge portion of the non-lithic technologies developed in response to the demands of the environment leave no trace; with perishable organics such as bone tools, bark storage containers, hide clothing and birch canoes, all archaeologically invisible. Aside from rare occasions of survival due to waterlogged or chemically altered soils, such ephemeral yet crucial aspects must be inferred through site locations and the general survival requirements of people within a harsh climate.
- All inhabitants of northern Ontario have used the multitude of interconnected watercourses as a transport network to some degree, hypothetically either by birch bark canoe or as trails when frozen in the winter. The affiliation with water also extends to the constant utilization of fish as a stable and dependable resource, without which habitation of the Shield would be virtually impossible.
- The highly mobile, multi-resource oriented, hunting and gathering lifestyle is a consistent theme throughout the pre-contact history of northern Ontario. The very nature of the landscape and its dispersed resources mean that there are no other options to this flexible strategy in most of the Canadian Shield (Wright 1995:294). This results in a very widespread and relatively homogenous set of subsistence patterns and attendant tool kit across the boreal forests of northern Ontario. This is not to define the area as stagnant or culturally backward, but rather acknowledge the complexity and mobility required to populate such an expanse of ‘micro ecological zones’ (Hamilton and Larcombe 1995).
- A combination of thin soils, bioturbation, frost action and regular forest fires have resulted in the disturbance and mixing of any previously stratified sites, with artifacts congregating at the mineral/organic soil interface (Hinshelwood 1996). This has greatly hindered attempts to separate occupation phases and the research into the temporal and spatial chronologies of such sites. This issue is discussed by Wright (2004), and investigated in finer detail by Hinshelwood (1996).

- Settlement patterns consist of small social groups engaged in seasonal subsistence hunting and gathering, with the more productive late spring and summer seasons able to support greater concentrations of population. Winter hunting camps consisted often of a single family unit or groups of two to three at most. The stability and easily available resources associated with large fishing sites enabled the congregation of people to conduct ceremonies and trade, serving as community focal points within an otherwise dispersed routine;
- Habitation probably consisted of a form of shelter constructed from wood, animal hides and/or birch bark, in keeping with early ethnographic accounts (Wright 1999). These shelters do not survive archaeologically (Wright 2004) at best leaving a hearth, post moulds and weight stones. They are, however, highly mobile and ideally suited to the Boreal adapted way of life. Large permanent settlement does occur further south during the Woodland period (Dawson 1983a), but within the study areas there was likely little need for change until the encroachment of Europeans produced a reliance on trade goods and the pursuit of furs.
- Unlike southern Ontario, agriculture, permanent settlement, and large societies did not become established in the north during the pre-contact phase, except for the areas immediately adjacent to the Minnesota border along the Rainy River. Here, settlement and ceremonial mound building has been linked to a southern Hopewell influence and the access to wild rice and maize. Otter Castle, 30 km south of Ignace is an example of a large scale ceremonial site of the Late Woodland period (Dawson 1983a).

2.1.1 Plano or Paleo-Indian

9,000 before present (BP) to 7,000 BP – Also referred to as Plano and Early Shield, Period II

Initial habitation of southern Ontario follows the retreat of the ice sheets at the end of the Late Pleistocene 11,000 BP; however, the LSA for this Project was fully covered by ice and not open to inhabitation until the Holocene transition approximately 2,000 years later.

Groups of hunter-gatherers moved north following caribou and other arctic species that colonized the tundra-like margins of the glacial lakes. Late Paleo-Indian people of the Plains Plano culture moved north and east into the Thunder Bay area around 9,000 BP (Dawson 1983b) with settlement concentrated along the strandlines of the retreating glacial Lake Agassiz. Population density was very low and large parts of what became the province were still under ice or water; as a consequence, late Paleo-Indian sites are rare within northwest Ontario, mostly congregated within the Rainy River watershed, close to what is now the Manitoba/Minnesota border (Wright 1972:10, Reid 1980) or along the northern edge of Lake Superior (Dawson 1983b). The retreat of the Lake Agassiz shoreline across the project area during this period (Thorleifson 1996) likely provided ideal habitation for the northern movement of Plano people.

The incoming large game hunting populations ambushed migratory caribou herds at the various bottlenecks caused by the lakes and rivers of the region (Wright 1972a), with small family groups following game across the tundra landscape in a varied and highly flexible manner. Site location has also been linked to raw material resource locations found in bedrock outcrops within northwestern Ontario, which were utilized in the production of distinctive unfluted, ribbon flaked, lanceolate spear points, and knives. These lithic resources were often obtained by quarrying and used to produce blades, spear points, large scrapers, and bifaces (Dawson 1983b). There are a number of known sources of fine-grained lithic materials available in northern Ontario. Based on available

information, the primary stone types utilized included Lake of Woods chert, Gunflint Silica, Kakebaca chert, Jasper Taconite, Rossport chert, and Hudson Bay Lowland chert. Other stone material commonly recovered from archaeological sites in the North and Far North include rhyolites, siltstones, argillite, slate, greywacke, quartz, quartzites, pipestone and greenstone (Fox 2009).

2.1.2 Archaic

7,000 BP to 3,000 BP – Also referred to as Early Shield & Middle Shield, Period II & III

The retreat of the Laurentide Ice Sheet northwards, due to the onset of the Holocene, brought with it a change in environmental conditions that consisted of the establishment of coniferous forests to a milder mixed and deciduous forest cover with open grasslands to the south (M. McLeod 2009). This facilitated a corresponding change in material culture and subsistence strategies. The migratory caribou herd dominated lifestyle of the Plano Indians was replaced by a more seasonally shifting hunting and gathering of caribou, deer, elk, moose, fish, and plant resources. This is reflected in the archaeological record by a decrease in the size and change in style of projectile points, and the appearance of hooks and net sinkers. With specific regard to projectile points, this change appears linked with the adoption of the atlatl (spearthower) identified by the transition from stemmed to notched points (M. McLeod 2009). In adapting to a forested environment, new woodworking tools such as axes, adzes and chisels were also developed (Dawson 1983b).

A defining technological change of the Archaic Period was the development of copper tools, produced from near surface copper deposits found on the shores of Lake Superior and traded all across eastern North America. Copper work of this period consisted of heating and hammering the ore to a desired form, rather than smelting and casting. This was achievable because Lake Superior copper ore is unusually pure, allowing it to be malleable at lower temperatures and shaped with simpler tools. The earliest evidence of copper working comes from South Fowl Lake on the Ontario/Minnesota border, providing a radiocarbon date of 6,800 BP for the wooden haft of a copper projectile point (Wright 1995). One of the most complete copper assemblages for Northwestern Ontario comes from the McCollum burial site south of Lake Nipigon (Pollock 2000).

The Holocene induced melting of the glaciers and ice sheets covering northern Ontario resulted in a complex and changing arrangement of glacial lakes and meltwater flow. Artificially high water levels were a result of ice blocking the flow of melt water northwards along the watershed gradient, forming glacial Lake Agassiz over the LSA. Eventual ice mass wastage around 6,000 BP removed this blockage resulting in a dramatic draining episode and a drop in lake levels of around 100 m. This has important implications for Archaic Period archaeological sites within northern Ontario due to their concentration in proximity to the lakeshores and watercourses during this period. Water levels gradually rose to their presently observable level by around 4,000 years BP, therefore submerging the majority of waterside occupation sites dating between 9,000 and 4,000 years BP.

The earliest evidence of people in far Northern Ontario comes from several skeletons at the Wapekeka First Nation Reserve that were accidently discovered during construction of an airstrip. These skeletons were dated between 6,000 and 7,000 years BP (Pollock 2000).

2.1.3 Middle Woodland

3,000 BP to 1,000 BP – Also referred to as Late Western Shield, Initial Woodland, Laurel, Period IV

Northwest Ontario is distinct in that it is divided into the Middle and Late Woodland and is more influenced by Plains cultures emanating from the south and west.

For archaeologists, the adoption of pottery marks the beginning of the Woodland Period. It is important to stress that this provides a marker within the archaeological record that is convenient to use as a subdivision. It is not indicative of a change of people through migration, rather a continuing development of the Plano Indian and Shield Archaic way of life by encompassing new technological advancements.

The introduction of pottery 2,200-2,300 BP (Wright 1999) is postulated to have diffused into northwestern Ontario from the southwest or east and, with it, the development of the Laurel culture within the northern forests of the Canadian Shield, running east from Saskatchewan to northwestern Quebec.

Laurel ceramics were manufactured using the coil method and were stylistically conical with a tapering base. Decoration was restricted to the upper portion of the vessel's exterior surface and consisted of a variety of techniques that left impressions or drag marks, with initial ceramic vessels being relatively crude and thick walled.

In addition to the introduction of pottery, the bow and arrow began to replace the atlatl as the dominant hunting technology, resulting in a change of projectile point morphology. Chipped stone technology was dominated by small side-notched arrowheads and a wide range of scraper varieties (Wright 1999). Tools were based mainly on relatively small nodular chert cores with a heavy reliance upon Hudson Bay lowlands nodular chert (ibid) in contrast to the previously quarried rhyolite and quartzite. This resulted in a marked decrease in the size of all tool types and decline in the occurrence of biface knives, along with an increase in projectile points and scrapers (Wright 1995).

A well-developed bone technology toolkit is suggested for Laurel culture by the unusually well preserved Heron Bay site on the north shore of Lake Superior, with hafted beaver incisors, bone awls, toggle harpoons, needles, beads and snowshoe netting recovered (Dawson 1983b). Copper tools were concentrated around the Lake Superior area and were traded further afield for exotic stone, obsidian and marine shell into Manitoba, southern Ontario and the northern United States (Ross 1979; Harris 1987).

The spread of Laurel culture has been linked to the northward expansion of wild rice due to late Holocene cooling, although no Laurel components have been found associated with microfloral evidence of rice or rice processing features. Recent microfossil analysis on middle and late woodland pottery fragments has revealed the preparation and consumption of maize on sites within the southern edge of the boreal forests. No evidence for agriculture survives at these sites; however, the results suggest trade networks linked to the maize producing cultures upon the plains to the south (Boyd & Surette 2010).

Within northwestern Ontario, the Laurel culture is accepted as ancestral to the following Late Woodland complexes, and subsequent Ojibwa and Western Cree (Wright 1999).

2.1.4 Late Woodland

1,000 BP to 400 BP - Also referred to as Northern Algonquian, Terminal Woodland Algonkian, Period V

The Late Woodland Period in northern Ontario is arbitrarily based on ceramic distinctions. With the climate and landscape prohibiting the adoption of agriculture, with the exception of wild rice, above the Rainy River area, there does not appear to have been the same profound change in lifestyle that occurred amongst the agriculturally dominant populations to the south. The Boreal forests and lichen woodlands of the shield are environmental constraints on the density of population that can be supported (Wright 1999), and also deterministic of the subsistence methods of such populations. Fish and large game were, as before, essential to supporting human existence within northern Ontario during this period.

Settlement patterns reflect this focus on fishing and caribou hunting, with fish sought in the spring, summer and fall, and caribou hunted in the fall and early winter. Occupation sites were predominately located on level, well drained ground with protection from northwest winds, and access to canoe landing beaches. Larger summer encampments were located in proximity to favourable fishing locations such as lake narrows and rapids, while the probable location of dispersed winter camps on frozen creeks has led to a lack of surviving archaeological information (Wright 2004).

It is tempting to view the late woodland in northwest Ontario as comprising discrete ceramic-producing cultures; however, aside from variation in ceramic decoration there is very little observable difference in lithic tools or settlement patterns.

Eschewing the gender trap, it is reasonable to assume that ceramic production and decoration can be seen as a female product and, therefore, changes in ceramics on a site are indicative of female mobility within family groups. The movement of women through marriage served to construct blood ties between various wide ranging bands, with long distance kinship functioning as a safety net against the unreliable resources of the north (Wright 2004). The stability of the lithic assemblages further suggests that men as the hunters were matrimonially immobile, requiring intimate knowledge of the surrounding landscape to succeed (Wright 1965). Late Woodland sites with any significant amount of ceramics generally have more than one tradition represented, again highlighting the mobility of women through inter-complex marriage (Wright 2004).

The Late Woodland Period did not appear uniformly over northern Ontario. In some areas, it can be identified around 1,500 BP while in other (usually remote) areas, Laurel-type pottery continues until 1,000 BP. A variety of pottery types are typically found at Late Woodland sites, ranging from Iroquoian through to vessels originating from Michigan and Wisconsin, and provide evidence of trade networks and contacts with the south (Dawson 1983a, Wright 2004).

Wild rice has a substantial place in Aboriginal culture. Archaeological evidence for its use by the Ojibwa and related Anishinaabe peoples extends to as early as 3000 BP (Reid and Rajnovich 1991). In the Lake of the Woods region, rock art depicting an anthropomorphized rice grain has been found on Painted Rock Island (Kinew 1995). The Ojibwa developed practices to regulate and enhance its production (Moodie 1990) and have historically placed their villages and reserves next to their rice fields (Kinew 1995; Vennum 1988).

The cultivation of wild rice in the area of Lac Seul has been documented as early as 1888 when the procedures used by the Lac Seul Ojibwa to create new fields were recorded in a report made by Ebeneezer McColl, the Inspector for Indian Agencies of the Manitoba Superintendency. McColl (1888) observed the scattering of wild rice in a shallow lake between Lac Seul and Vermillion Lakes where the rice was allowed to grow over multiple seasons to increase the area where rice could be cultivated (McColl 1888). Following the signing of Treaty 3 in 1873 between Canada and the Anishinabe people living in the English and Winnipeg River basins, 18 dams were constructed over the following 70 years to provide power for mines, mills, and the City of Winnipeg. These dams irreversibly altered the flow of water in the basins. In the Lac Seul area, the dams resulted in the flooding of marsh areas that were traditionally used by the Ojibwa in the harvesting of wild rice as well as hunting wild game (Usher 2003). The diversion of upper Albany River to augment water storage in the English-Winnipeg Basin in the mid-20th century provided additional issues for the cultivation of wild rice due to rapid fluctuations in water levels and flow rates. The degradation of natural water systems in the Lac Seul region greatly diminished the Ojibwa ability to continue wild rice cultivation.

Blackduck

The Blackduck complex is a Late Woodland entity dating between 1,200 to 400 BP and widely distributed across the southern Precambrian Shield from Quebec to Saskatchewan, and southwest into the prairie-parkland of southern Manitoba. This cultural complex is primarily defined on the existence of a contrasting pottery tradition to Laurel (Hamilton et al 2007). These large globular vessels were manufactured using the paddle and anvil technique, or formed inside textile containers. Decoration is diverse, consisting of horizontal and/or oblique lines along with circular indentations or puncates, and is present on the neck, rim, lip or inner rim of the container.

Tools associated with the Blackduck culture include small triangular and side-notched arrowheads, a large array of scrapers, both stone and bone, ovate knives, stone drills, smoking pipes, bone awls, needles and harpoons, and variant copper tools.

The development of Blackduck material culture components from the preceding Laurel is generally accepted (Wright 2004:1501) and extends through the southwest part of northern Ontario, Manitoba, northern Minnesota and eastern Saskatchewan.

Selkirk

The Selkirk complex is also characterized by its pottery, similar in form and manufactured with the same techniques as Blackduck, but distinguished only by decoration. When decorated, these vessels usually comprise a single row of puncates or impressed with a cord wrapped stick (Dawson 1983a). The non-ceramic assemblage associated with Selkirk is almost identical to that found on Blackduck sites, with the two often being found together in northern Ontario.

The Selkirk are represented as the ancestors of the present-day Cree (K.D. McLeod 2009:14), although it must be noted that inferring ethnicity based on pottery traditions is problematic. The interchangeable nature of both cultures purported to precede the Cree and Ojibwa in northwest Ontario highlights this issue and provides caution against focusing on a single technological element when interpreting a cultural construct, such as ethnicity. It is possible to identify the Selkirk and Blackduck as ancestral to a Cree-Ojibwa complex but further separation can be misrepresentative (Wright 2004).

Selkirk pottery is found mainly in northwestern Ontario and into northern Manitoba, Saskatchewan and northeastern Alberta. Attempts to produce a ceramic chronology in relation to the Blackduck complex have been hampered by the lack of stratified sites and the validity of carbon-dating attempts. It is now generally accepted that Selkirk is slightly later, and did not develop directly from Blackduck, but rather likely diffused from the northwest as opposed to developing out of existing traditions.

A number of other traditions have been identified based on additional decoration variation, however the uniformity present within the non-ceramic assemblages suggests caution against over-emphasising small differences and the subscription to regional patriarchy (Wright 2004).

Rock Art

The Late Woodland also witnessed the emergence of rock art as an expression of spiritual life and ritual. Rock paintings, known as pictographs, comprised of red ochre mixed with a binding agent such as bear fat or sunflower oil, are typically found within western Ontario on the vertical faces of cliffs where they enter a body of water (Rajnovich 1994). Pictographs constitute a form of written language, signifying sounds, objects and ideas in reference to subsistence, geography, climate, history and also sacred or religious beliefs and visions (Bursey et al 2013), although they could have served a variety of cosmological functions and even political ones including marking territorial boundaries (Wright 2004). The damming of lakes and rivers by the timber and hydroelectric industries may have undoubtedly drowned many sites, while the fragile nature of the paintings themselves, when exposed to the elements, also reduces their chances of survival. Rock etchings, or petroglyphs, are relatively rare within the Canadian Shield, with most examples occurring within the southern and eastern portions of the province. To date, one example of a petroform, or artificial arrangements of stones in pits or cairns, has been identified within the LSA, evidenced by the presence of a Thunderbird nest (further discussed in Section 3.2).

Representative pictographs have been identified in the general vicinity of the LSA including the representation of a hare on a rock wall identified just above the existing water line north of Red Lake (Image 1).

2.2 Early European Exploration in Northern Ontario

European exploration of northern Ontario in the Lake Superior region began in the early 1600s. The first European to reach Lake Superior was most likely Etienne Brulé, an interpreter employed by Samuel de Champlain (Stuart 2003). It would be several decades before Lake Superior and its surrounding region were more thoroughly explored by the Europeans. These early European explorations relied heavily on knowledge of existing territorial routes provided by the local Indigenous inhabitants, which were based on extensive trade among the First Nations. The first known European explorers on the lake were Pierre Esprit Radisson and Médard Court. They set off in 1658 and returned two years later with *"a rich cargo of furs and the knowledge that the best furs could be obtained to the north and west of Superior"* (Stuart 2003).

European exploration of the James Bay region began in 1610 with Henry Hudson, who entered the area while exploring what would come to be called Hudson Bay. James Bay would later be named for the British captain who explored the area more extensively from 1630-1631. During these voyages only one isolated encounter occurred with an Indigenous person, involving Henry Hudson. It has been suggested that although Hudson had to winter his ship along the coast, the lack of encounters with Indigenous people through the winter months indicates the use of coastal areas was likely restricted to summer fishing camps (Julig 1988).

The British formally initiated trading on James Bay in 1668 when Fort Rupert was established on the Rupert River. Moose Fort (Factory) and Fort Albany followed in 1673 and 1675, both located on the south end of James Bay. Trading post journals record the extent that Indigenous peoples were travelling to trade at these posts, with one record from Gloucester House (operated from 1777-1818) indicating that Indigenous people were travelling to the trade post from up to 600 miles away (Newton & Mountain 1980).

The earliest European exploration of north-central Canada occurred along the shores of the bays and the major river systems, with further inland exploration occurring at a later date. In the early decades of European exploration northern North America was explored by both the British and the French. The British focused their efforts of exploration in and around Hudson Bay and James Bay, and further inland along the watershed systems emanating from these bays. The French concentrated their efforts further south and moved inland along the St. Lawrence waterway before exploring the Great Lakes area further inland. The LSA is located in a region that was first explored between 1775 and 1821 in association with the river-based transportation corridor leading from Lake St. Joseph to Lake of the Woods and further west (University of Toronto 2010). Map 2 illustrates the geographical spread of European exploration throughout the eighteenth and nineteenth century in northern Ontario.

2.3 The Fur Trade and Euro-Canadian Settlement in Northern Ontario

The northern portions of Ontario, north of Lake Superior and south and west of Hudson Bay and James Bay have had a number of successive exploration ventures beginning in 1610 with the Hudson's Bay Company (HBC), but more extensively in the mid-eighteenth century. Henry Kelsey was the first of the European explorers to venture into the northern part of Ontario and further east. On Kelsey's second expedition (1690-1692), he explored from York Fort in Hudson Bay and extended the HBC trade west to the Saskatchewan River. Anthony Henday was the second explorer of European descent to venture into the Petit Nord of Ontario, penetrating further west and well into the Prairies. The boundaries of the Petit Nord are approximately described as being James Bay and Hudson Bay to the north, the divide between the Moose and the Albany River drainages to the east, Lake Superior and the boundary waters between Lake Superior and Lake Winnipeg to the south and Lake Winnipeg and the Hayes River system to the west (Hackett 2002).

During the time of initial European exploration, Charles II granted the Hudson Bay Company (HBC) exclusive rights for British trading in the land drained by rivers flowing into Hudson's Bay, referred to as Rupert's Land, in 1670. Rupert's Land was composed of a number of different physiogeographic regions that included the Hudson Bay Lowlands, located along Hudson and James Bays consisting of marshy lowlands with slow-moving rivers and the Canadian Shield located to the south, east and west of the Hudson Bay Lowlands, consisting of rugged terrain, exposed bedrock, glacial features and numerous lakes. Further to the west were the Prairies and to the south, the Great Lakes region (Harris 1987).

Unlike the HBC, French interests within the area were supported by independent traders and voyagers from Montreal and the St. Lawrence venturing into western and northern Ontario through the Great Lakes. Both the British HBC and the French St. Lawrence traders (SLT) vied for control over the rich and highly productive resources of Rupert's Land. In 1686, French forces from the St. Lawrence captured Fort Albany and a few years later, took York Factory and Fort Severn on Hudson Bay. These victories enabled a French monopoly on the lucrative fur trade in the Hudson Bay region until 1713 when the Treaty of Utrecht relegated the French to the southerly St. Lawrence – Great Lakes route into Ontario's hinterland, while the English regained control over their forts and over the northern Hudson Bay routes (Harris 1987).

Intermixed within the network of expanding HBC and SLT posts were groups of highly mobile boreal forest adapted First Nations groups, consisting mainly of Cree and Ojibway, with Assiniboine located further to the west around Lake Winnipeg. In the early period of the fur trade, First Nations groups acted as middlemen, trading furs for European goods such as firearms, ammunition, blankets, tobacco and various other objects between European traders and other First Nations groups further afield. As hostilities arose between the SLT and the HBC, tensions also developed between local First Nations groups. Settlement and warfare patterns changed with local Cree families and communities settling beside or within close proximity to established forts and trading posts. These families supplied the posts with provisions and locally obtained furs. Eventually, the First Nations and Europeans intermixed giving rise to a population that is now referred to as the Métis.

With these increased tensions between the HBC and SLT, First Nations groups allied with the different trading companies. In doing so, traditional lands shifted as First Nations groups expanded and retracted, vying for control over important trapping routes and transportation corridors. By 1720, the majority of the HBC lands were controlled by Cree bands. The Cree in these areas had a number of allies, including the Siouan-speaking Assiniboine to the west and the Algonquian-speaking Ojibway to the south. The Cree's prime rivals were the Athabaskan speaking Chipewyan who were located to the north of the Churchill River. However, by 1740 the Ojibway expanded north and east of Lake Superior and occupied the territory between Lake Winnipeg and Hudson Bay, which was traditionally Cree territory. This displaced the Assiniboine who moved westward and occupied the parkland areas as far north as the Saskatchewan River (Harris 1987).

A major impact upon First Nations populations was the spread of epidemic diseases through the movement of people and the transport of goods. A 1737-1738 smallpox outbreak killed up to two-thirds of some groups within the Petit Nord. A further 1781-1783 outbreak claimed half to two-thirds of the Ojibway in northwest Ontario. Measles, whooping cough, influenza and tuberculosis all took their toll at various times well into the twentieth century, with disease most commonly spread along the trading routes of the fur companies (Hackett 2002).

The state-organized French fur trade within the region ended in 1769 when Montreal surrendered to the English, however French fur traders continued to work independently and forced the HBC to set up more inland posts. It was around this time that the North West Company (NWC) was created to quell the HBC westward advances. From the early part of the 1770s until 1821, strong competition developed between the two groups. With both companies unable to sustain the prolonged and intense competitions, they eventually amalgamated into a single operation under the overall banner of the HBC (Klimko 1994).

William Tomison (1767–1780) explored areas from Fort Severn south and west towards Sandy Lake, Deer Lake and Poplar Hill, then further west to Lake Winnipeg. Tomison joined the HBC in 1760 and worked his way through the ranks to become the first "Chief, Inland". His primary responsibility was to spread the company's activities to the interior from Hudson Bay Forts. Around the same time, groups associated with the SLT and voyagers began exploring the vast hinterland north and west from the shore of Lake Superior.

Two of the most relevant European explorers during this time period were G. Sutherland and David Thompson. Sutherland, who worked for the NWC in the later part of the 1770s explored from Lake Nipigon, north then west through Sturgeon Lake, Lac-Seul, Trout Lake, Red Lake and into Lake Winnipeg. David Thompson was initially employed by the HBC, beginning in the 1770s. During his tenure with HBC, he refined his skills as a surveyor and mathematician and in 1774 was promoted to Chief Surveyor for the Company. In 1797, after much frustration with the politics of the HBC, Thompson quit and walked 80 kilometres to a NWC post where he finished out his days

as a fur trader and surveyor. It was during this time that Thompson surveyed areas from the western shore of Lake Superior west through Rainy River, Lake of the Woods and into Lake Winnipeg, in 1797 and 1804, respectively.

During this time of initial exploration, both the HBC and the French SLT began to create forts and houses along the fur trade routes, which were primarily established along various navigable water thoroughfares (Burpe 1914) (Map 3). The primary corridors that the various groups (Map 4) utilized for trade and transport are mapped by the distribution of forts, company houses and trade posts. Major routes utilized by traders included the waterways connecting York Factory south along the Hayes River to Lake Winnipeg. The eastern side of Lake Winnipeg and the water ways from Fort Albany in James Bay, east down the Albany River, through Osnaburgh House, Lac-Seul and Bas-de-la-Rivière into the south end of Lake Winnipeg were also well travelled. Numerous other small or secondary corridors by the traders connected various other forts, houses and depots within the Petit Nord.

Based on documents reviewed, no forts are located within the LSA as this area was not located on any of the major transport routes. However, two forts are located in the vicinity of the LSA: Red Lake contained two forts, one associated with the HBC and the other for the NWC. Information on either of the names could not be obtained, but both appear to have been used for over 15 years, with the HBC post constructed in 1790 and the SLT post between 1774 and 1789.

During the latter part of the eighteenth century and the beginning of the nineteenth century, neither trading group could dislodge the other and they competed on an even footing. Between 1774 and 1821 there were over 600 posts, most of them only being occupied for only a few years, and at the time of the merger of the NWC and HBC in 1821 only 125 posts remained in operation, 68 of which were controlled by the HBC. This number was further reduced to eliminate the unprofitable posts, lowering the overall number to 45 in 1825 (Wynn 2007:72). A mainstay of the newly united trade companies remained the beaver pelt, representing approximately 40% of their overall trade. Several of these forts and trade posts have been subject to archaeological excavation, most notably Fort Albany on James Bay starting in 1960 (Kenyon 1986), Gloucester House on the Albany River (Newton & Mountain 1980) and Martin's Falls, also located on the Albany River (Vyvyan 1980).

The exploitation of fur bearing and game animals in the northern interior to facilitate the trade for imported items was unsustainable. The depopulation of natural resources led to an increased focus on smaller game such as snowshoe hare and wildfowl, and placed First Nations populations at the mercy of the cyclic nature of the smaller species. The decline of deer, elk, caribou and moose also removed many of the raw materials needed for the boreal subsistence requirements, further increasing the dependence on goods from trade posts (Rogers & Smith 1994). The increased reliance upon fishing and trapping, and the inexorable pull of the trade posts resulted in an increasingly settled lifestyle that was compounded by the Treaty System, the creation of reserves and the introduction of the snowmobile in the 1960s. Many current First Nations community's locations correlate with the fur trade posts and infrastructure that depended on them and in turn provided them with what became the essentials of a more settled existence.

Air travel essentially opened up the north and replaced the previous reliance upon waterways and most northern communities are now accessible by air. Any wrecks encountered, either submerged or on land could potentially be of significance for future generations with regards to the opening up of Canada's North and should be reported.

Outlined below is a brief summary of HBC and STL posts located within vicinity of the Project. None of these posts are located within the LSA nor will any potential archaeological resources related to them be impacted by the Project.

2.3.1 St. Lawrence Traders and Hudson's Bay Company Posts

There was a North West Company post at the north end of Red Lake during the eighteenth century. The post was mentioned by Duncan Cameron in 1786 and is suggested to have been located near the east end of the lake. This post was taken over by the Hudson Bay Company in 1821 (Voorhis, 1930).

The Hudson's Bay Company Red Lake House trading post was established in 1790 in order to compete more effectively with the North West Company that had been trading in the area for several years. Closed, reopened and relocated numerous times, the post was finally located in the town of Red Lake in 1933 (OHT 2017) (Images 2 and 3).

2.4 First Nations Treaties Context

Prior to European exploration and settlement in northern Ontario, the lands were occupied by Indigenous people. The official policy in Ontario, as outlined in the Royal Proclamation of 1763, has been to recognize title to the lands occupied by Indigenous communities.

As part of this recognition of Indigenous title, compensation has been provided for portions of land surrendered by First Nations, and reservations have been set aside. Treaty-making in Ontario generally started in the south, moving north as the European population grew and found more uses for northern lands and resources. Hunting pressures due to increased access to the North through the Canadian Pacific Railway was a driving force to the treaty signing. The Project area is located in land that forms part of Treaty Number 5.

2.4.1 Treaty Number 5

The Ojibwe speaking *Ahneesheenahbeg* of the Berens River signed Treaty Number 5 in 1875. While this was eventually to profoundly influence all of them, for many decades life along the upper Berens River system remained relatively unchanged (Hamilton and Taylor-Hollings 2010).

In 1888, a reserve was surveyed for the people of Pikangikum, though they were still considered to be part of the Little Grand Rapids Band. According to Government records, a Chief was not elected at Pikangikum until 1926. Before that, Chief Berens, and later his son, continued to be the Chief for the Berens River Band and the Pikangikum Band.

Shortly after the Treaty No. 5 signing, the Crown received numerous requests and petitions from other First Nations living outside the original Treaty No. 5 boundaries to also be taken into treaty and receive treaty benefits. These requests were marked with concerns by the First Nations people on the pending development in the area, the decline of fur-bearing animals, and the settler movement that encroached on First Nation traditional lands.

Through the late nineteenth century, government officials considered what would be appropriate provisions for the extension of Treaty No. 5. Pressures due to increased development in the region and the settler expansion led the government to seriously look at the need to take Treaty with the people living north of the original Treaty No. 5 boundaries. As well, the governments of Manitoba, Ontario and Canada were negotiating the extension if Manitoba and Ontario's boundaries northward to the coast of Hudson's Bay.

The government began taking Treaty with the First Nations in Oxford House, God's Lake and Island Lake in 1909. The following year, preparations were made by the government to take treaty with the people living in Fork York, Churchill and Deer Lake (Nishnawbe Aski Nation 2017).

Treaty No. 5 essentially had its roots in two separate treaty processes, one influenced significantly by the Indigenous population and the other implemented by and serving the interests of the federal government. This particular treaty is unique in the western treaty process as it straddles the two separate periods in treaty negotiations in the region and combines very clearly the different influences, attitudes and expectations of the Indigenous population and the government (Coates and Morrison 2010).

2.5 Northern Communities and Existing First Nation Reserves

There are a number communities and First Nation Reserves that are located along or within close proximity to the LSA. Each of these communities has a rich and diverse history. Even though the histories of the these communities may only go back a hundred years or less, they represent some of the first European settlements in the area and as a result the buildings and structures associated with the early pioneers are of heritage value.

Municipality of Red Lake

Indigenous people had been residing within the Red Lake region prior to the establishment of the North West Company trading post in the area in 1786 (Richthammer 2007). The Hudson Bay Company recognized the lucrative trade occurring in the area and established the Red Lake trading post in 1790 in order to compete more effectively with the North West Company that had been trading in the area for several years. Eventually the two posts were merged and relocated numerous times.

The first discovery of gold in the Red Lake area was made in 1897 around Slate Bay although it never really amounted to significant gains (Richthammer 2007). Based on encouraging geological studies prospecting continued in the region and in July 1925 a group of prospectors made a significant gold discovery in Howey Bay, Red Lake. News broke about the major discovery of gold in Red Lake the following year effectively inciting the "Red Lake Gold Rush" (Richthammer 2007), with more than 3,000 people converging on Red Lake at the height of the gold rush in 1926 (RLRHC 2017).

Discovery of gold gave rise in the 1930s to the boom town of Red Lake, on the fringes of which arose a shack town attracted by work in the mines (Macfie and Johnston, 1991:84). Mining companies including the Red Lake Gold Shore Mine (Image 4), the McKenzie Red Lake Mines Ltd. (Image 5), the Gold Eagle Shaft and Mine complex (Image 6) and the Madsen Red Lake Gold Mines (Image 7) were all operating in the area during this period.

Although it was located at Johnson's Point, where it was only accessible by water, the Hudson's Bay post were responsible for outfitting the arriving prospectors. Due to the financial benefits afforded by the arriving prospectors the HBC post was granted "full status" in 1933 and moved into a new two-storey modern frame structure on the main street of the town of Red Lake (Richthammer 2007:34).

Eventually the bush plane came to dominate travel to the goldfields. In 1936, Howey Bay, in the heart of Red Lake, was the busiest airport in the world with aircraft on floats or skis transporting freight and passengers in and out of the area in fifteen minute intervals (RLRHC 2017).

Due to the rapidly growing population in the area, a local law enforcement team and a post office were soon established. Eventually, churches, banks, hotels, restaurants, dance halls and a school were built to accommodate the mining community (Richthammer 2007).

Although the indigenous Anishinaape continued to hunt, fish and trap during this period, it became increasingly difficult to maintain their traditional lifestyle with some working as guides, miners or labourers in the local extraction facilities (Richthammer 2007).

By the late 1930s, many of the gold mining operations were closing due to the devaluation of the commodity and the loss of many young men to the armed forces to participate in World War II (Richthammer 2007). Today, the Red Lake District is composed of five communities, all built around former or currently operating gold mines. As of July 2014, approximately 27 million troy ounces (839 tons) of gold have been mined from the Red Lake area (RLRHC 2017)

Pikangikum First Nation

Archaeological evidence indicates the community inhabitants have occupied the area for at least 2,000 years and were part of the Treaty Number 5 enactment in 1875. Missionaries began arriving Pikangikum in the 1920s with the purpose of introducing the Christian lifestyle, including residential schools. In 1939, the Pikangikum First Nation was placed under the authority of the Sioux Lookout Indian Agency. By 1946, Pikangikum children began attending school and the local trading post opened making European goods readily accessible (Shearer 2008). The local post office was established in 1953 (Scott 2004).

Today, Pikangikum is one of the largest First Nations communities in Northern Ontario with the highest on-reserve population in Northern Ontario, encompassing approximately 2,300. An estimated 75% of the population is under 25 years of age (IFNA 2017).

3.0 ARCHAEOLOGICAL CONTEXT

3.1 Previous Archaeological Research and Assessments

There has been a relative paucity of work within the LSA (Hinshelwood, Hamilton, pers. comm.); however, this should not be taken to mean that there is a lack of archaeological sites. In fact, the opposite is the case with a large number of potential sites remaining within the general region.

An extensive overview of archaeological research in northern Ontario up to 1983 has been provided by Dawson (1984) who indicated that virtually no archaeological work was carried out in northern Ontario prior to the 1940s. Systematic studies were initiated in the 1970s, following the direct involvement of the Provincial government in archaeological fieldwork. Work conducted post-1983 is split between academic research and Cultural Resource Management (CRM) based assessments.

A significant amount of archaeological investigations have been completed within northwest Ontario, primarily concentrated within the Lake Superior and Lake Nipigon regions, along with the southwest portion of the province containing the Rainy River, Quetico Park and the Lake of the Woods area. Pollack conducted the initial surveys of the Northwest interior and published the first cultural sequence for the mid-northeast region (Dawson 1984), in addition to the more northern Winsk River drainage system, along with Pugh (1971).

Historical archaeology has primarily been concentrated on fur-trade posts, with work relevant to the LSA undertaken upon the Severn River (Pilon 1981, 1982), Osnaburgh House (Bundy 2010), an overview study by Harris (1987) and a more detailed investigation by Lytwyn (1986).

General overviews of northern Ontario pre-history are provided by Dawson (1983) and Wright (1972a, 1972b, 1995, 1999, 2004). The predictive modelling study undertaken by Lakehead University also provides an excellent and detailed synopsis of the area (Larcombe 1994, Hamilton *et al* 1994).

Archaeological research has been conducted within the general vicinity of the LSA by Dawson (1976), Reid (1974), Smyk (1989-1994), Julig (1982), Wall (1978), Smith (1979), Dunlop (1985), Pollock (in Smith 1980), Pelleck (1980, 1981, 1983), McLeod (1992), Hinshelwood (1996), and Taylor-Hollings (2004).

Cultural Resource Management Projects have been carried out by Lennox (1987, 1994), Pollock (1992), Stewart (1993), Settlement Surveys Inc. (1986), Hamilton (2004), and M. McLeod (2009).

At least four CRM archaeological assessments are known to have been completed within 50 m of the LSA.

In 2011, Golder (Golder 2011) completed a Stage 1 Archaeological Assessment for a number of different fiber optic corridors within northern Ontario, one of which follows a very similar route to the proposed LSA Corridor Alternatives detailed in this report. This report included lands within 50 m of the LSA and provided the following recommendations:

1) *That a Stage 2 assessment be undertaken by a licensed archaeologist in areas that will be disturbed and have been identified within the study area as possessing archaeological potential;*

2) *That the Stage 2 testing consists of hand excavated test pits placed at intervals of five and ten metres following the standards identified in the Ontario Ministry of Culture's Standards and Guidelines for Consulting Archaeologists (2010);*

3) *That should the route change to corridors outside the present study area following submission of the Stage 1 report, additional Stage 1 assessments of those areas will be required. Should deeply buried archaeological deposits be found within the study area for the proposed project during any construction activities, the Ministry of Tourism and Culture must be notified immediately; and*

4) *In the event that human remains are encountered during the construction activities, both the Ministry of Tourism and Culture and the Registrar or Deputy Registrar of the Cemeteries Regulations Unit of the Ministry of Small Business and Consumer Relations must be notified immediately.*

The second archaeological assessment known to have been completed within 50 m of the LSA is the Stage 1 archaeological assessment for a proposed Ministry of Transportation (MTO) aggregate expansion application east of Kirkness Lake along Nungesser Road (BHC 2014). The Stage 1 assessment indicated low potential for archaeological resources within the assessed area and provided the following recommendation:

1) *The proposed area for expansion for MTO aggregate source Site 11, Kirkness Lake #1, K29-001, does not exhibit archaeological potential therefore it is recommended that it does not require further archaeological assessment.*

The third archaeological assessment completed within 50 m of the LSA was a Stage 1 archaeological assessment for the proposed Berens River bridge crossing and associated road extensions in the Berens Lake area (Hamilton and Taylor-Hollings 2010). This assessment identified areas of high archaeological potential for Indigenous cultural resources and made the following recommendations:

1) *We recommend that Pikangikum First Nation and Jimmy Keeper be contacted to discuss archaeological survey and excavation work in their traditional territory. Community members would also be very helpful in learning about the landscape.*

2) *Zone 1, specifically the stream and headwater lake margins that drain west into Pikangikum Lake, should be examined during a walking survey. As a winter road bed has already been established in much of this area, some degree of damage may have occurred already to the ground surface. This might provide sufficient visibility to determine whether archaeological deposits are located here.*

3) *Zone 2 defines an area where the existing winter road route (Route B) crosses an extensive bog and small stream. While the wetland area is unlikely to contain heritage resources, it is also unlikely that a permanent road will be built along the length of this muskeg. Instead, it will likely be built upon well-drained ground adjacent to the wetland, and these areas should be subjected to a walking survey with periodic test pit excavation once the most likely route is determined.*

4) *Zone 3 is an area of high archaeological potential with one site (EkKk-4) already recorded at Dog Rib Falls. The west banks of Berens Lake and also the peninsula forming Dog Rib Falls should first be subjected to ground inspection to identify the most attractive areas for past settlement, and those areas should then be evaluated with five metre interval test pit excavations. This sampling should also extend along the northeast shore of Berens Lake (east of Dog Rib Falls) for about 500 m where the proposed road corridor (Route C) runs close (within 100 m) to the shore, and across the current portage. Given the extent of earth moving required to prepare suitable approaches for the bridge, this testing should be expansive (well beyond the final road bed) in order to identify all vulnerable archaeological deposits. This subsurface testing will be quite*

time-intensive and if archaeological deposits are encountered, significant lead time will be required to undertake Stage 3 and 4 excavations.

5) *Zones 4 and 5 are two places where the proposed road corridor intercepts small streams. We suggest that walking survey inspection supplemented with test pit excavations should be undertaken depending upon local sedimentary and drainage conditions. Zone 5 appears to be the most attractive locale given the high well-drained banks and near proximity to a small lake.*

6) *A walking transect of accessible portions of Route B and C should be undertaken with special attention paid to documenting upland Pleistocene epoch landscape features, and inspection of areas with disturbed vegetation and sediment. If the ground surfaces along the existing winter road and hydro transmission corridors have been disturbed, visual inspection should offer sufficient visibility to identify archaeological deposits. Areas of archaeological potential (i.e., Pleistocene features) identified during the walking survey that are not already disturbed should be inspected with periodic test pit excavations.*

A fourth archaeological assessment completed within the LSA is the 1997 report by Allyne Gliddon titled "Archaeological Assessment of Two (2) Water Crossing Locations Along the Proposed Pikangikum Transmission Line Corridor, North of Red Lake, Ontario, District of Kenora, Ontario" completed under PIF AHG2-097. Attempts were made to contact the licensed archaeologist to review the report but it was not provided. Furthermore, all attempts to acquire the report through the MTCS were also declined.

3.2 Known and Registered Archaeological Sites

The primary source of information regarding known archaeological sites within the province is the MTCS's archaeological site database (ASDB). This database contains archaeological sites registered according to the Borden system. Under the Borden system, Canada is divided into grid blocks based on latitude and longitude. A Borden Block is approximately 13 kilometres east to west and approximately 18.5 kilometres north to south. Each Borden Block is referenced by a four-letter designator and sites within a block are numbered sequentially as they are found.

A search of the ASDB indicated that ten sites are located within four kilometres of the LSA; one of which located directly within the LSA.

- **EgKk-3** – Middle Woodland Laurel tradition campsite containing 4 Hudson Bay Lowland chert artifacts and one broken scraper situated 3.1 km west of LSA on the east side of an island between McKenzie and Bruce Channels on Red Lake.
- **EgKk-4: MacKenzie Channel** – Post-confederation site located 2.38 km west of LSA on the east side of MacKenzie channel on Red Lake, containing 14 artifacts
- **EgKk-5: Bruce Channel** – Post-confederation structure located on the east side of Bruce Channel on Red Lake, approximately 3.6 km west of LSA.
- **EgKk-6** – Pre-contact Selkirk Tradition fishing/campsite located at the north end of the western shore of McFinley Bay on Red Lake, approximately 2.25 km west of the LSA. The site contained 38 artifacts.

- **EgKk-7: Hell's Acres** – Pre-contact site located approximately 2.6 km south of LSA on cleared land associated with a homestead on McNeely Peninsula on Red Lake. The site contained a single quartzite biface.
- **EhKj-1: Coli Lake Cabin** – Site of unknown period located on the east side of a long northwest facing peninsula on Coli Lake across from two small islands, approximately 1 km east of the LSA.
- **EjKl-1: Kirkness Area 1** – Pre-contact site located approximately 3 km west of LSA on the north shore of an island at the northeast corner of Kirkness Lake. The site contained one endscraper and one flake.
- **EjKl-4: Kirkness Area 6** – A large multi-component pre-contact and historic site located on a raised terrace near the junction of Stormer and Kirkness Lakes, approximately 1.75 km west of LSA. This site was investigated on the basis of information provided by the Pikangikum Elders and included Blackduck and Laurel components, as well as Euro-Canadian material (Hamilton et al 2007:114)
- **EiKk-1: Barnes** – Site of unknown period located approximately 2.8 km east of LSA on the north bank of the Nungesser River.
- **EkKk-4: Berens Lake Portage** – This site is located within the LSA corridor at the west end of Berens Lake, south of the rapids and was originally recorded during the West Patricia Land Use Study archaeology project. All cultural material was recovered from the surface, with a portion of the site identified as having been previously disturbed by extensive use of the portage on which it lies. The site has been classified as a chipping station of unknown cultural affiliation since only six lithic flakes were recovered, consisting of three unused quartz, two unused Hudson Bay Lowland chert and one used rhyolite. No subsurface testing was completed at this site and much more material is suggested to exist within the general vicinity of the rapids and nearby portage (Hamilton and Taylor-Hollings 2010).

Although not officially registered as archaeological sites, additional archaeological resources have been identified by local community members in the vicinity of the LSA, including the discovery of a stone projectile point beside the Berens River (Macfie and Johnston 1991).

The landscape around Kirkness Lake is also identified as the historical location of a summer village for Pikangikum people, and the historical occupation of this area is supported by the two registered archaeological sites in this landscape (EjKl-1 and EjKl-4). Culturally significant Thunderbird nests are also known to be located within the Kirkness Lake landscape (PFN 2006). A Thunderbird nest was also identified along Nungesser Road, north of Coli Lake, during a site visit by a representative of Wataynikaneyap (Image 8).

3.3 Paleo-environment

At the peak of the Last Glacial Maximum (LGM) 11,000 BP all of the project sites would have been located under the Laurentide Ice Sheet (Harris 1987). During deglaciation and warming between 11,000 BP and 10,500 BP, the ice sheet retreated and advanced numerous times over the project areas before finally retreating north with the establishment of the Holocene (Maps 5 and 6).

Large glacial lakes were formed by melt water, with Lake Agassiz covering over a third of northern Ontario (Baldwin et al 2000) and the Tyrell Sea covering the Hudson Bay Lowlands to the north. Lake Agassiz gradually drained, exposing the LSA around 9,300 BP (Thorleifson 1996) and making it available for colonization by flora and fauna (Map 5).

As Lake Agassiz receded, the newly exposed land would have become vegetated, pollen cores suggest first with a spruce-dominated landscape that also included birch, poplar, larch and elm, before giving way to jack and red pine along with birch.

During the period between 9,500 and 6,400 BP, the climate became warmer and drier than currently being experienced, with this episode identified as the Atlantic Climatic. This period is characterized by the opening up of previously forested land to the south, giving way to grassland with stands of pine and poplar, and the advancement north of spruce forests into the tundra. Water levels were also at their lowest during this period due to the draining of glacial lakes following the eventual melt of the ice sheets blocking outflow north into Hudson Bay (Maps 5 and 6).

The current Boreal forest vegetation has been established since 3,600 BP with temperatures and seasonality also stabilizing at current levels around at this time (Map 6). Minor cooling episodes around 2,500 BP and 500 BP resulted in the southerly retreat of the forests and corresponding development of peat and muskeg, while minor warming around 1,500 BP resulted in a temporary advance north of the tree line (Dawson 1984, Wright 1999).

While agreement as to the exact timing, extent and even nomenclature of Northern Ontario's climatic episodes and patterns varies, general consensus based on the archaeological record points to the contemporary nature of major climatic changes and major cultural changes within the Boreal Forest populations (Dawson in Steegman 1983).

3.4 Current Environmental Setting

The LSA is located within the Boreal Forest Ecozone and more specifically within the Lac Seul Uplands Ecoregion.

The dominant vegetation within the LSA is mixed forest, characterized by stands of white and black spruce (*Picea glauca* and *P. mariana*, respectively), balsam fir (*Abies balsamea*), jack pine (*Pinus banksiana*), trembling aspen (*Populus tremuloides*), and white birch (*Betula papyrifera*) (Environment Canada 2005). Dry sites are dominated by jack pine with secondary quantities of black spruce. In warmer locations, red and white pine (*Pinus resinosa* and *P. strobus*, respectively) occur. Wet sites contain tamarack (*Larix laricina*) and black spruce with a ground cover of moss and lichen. Wetlands are prevalent along the west and north shores of Lake Nipigon (Environment Canada 2005). Coniferous forest dominates the Lac Seul Uplands Ecoregion, characterized by a closed canopy of black spruce, along with some white spruce, balsam fir, and trembling aspen (Environment Canada 2005). Drier sites are typified by open stands of jack pine, trembling aspen, and white birch with some black and white spruce. Labrador tea (Ledum groenlandicum), blueberry (*Vaccinium angustifolium* and *V. myrtilloides*), bog rosemary (*Andromeda polifolia*), and sphagnum mosses (*Sphagnum* sp.) dominate poorly drained, peat-filled depressions. More than 50% of this Ecoregion is covered by wetlands (Environment Canada 2005).

The Northern Coniferous sub-region is an area affected by considerable glacial action. The topography is irregular, consisting of parallel rocky ridges that separate the numerous poorly drained depressions and narrow lakes of the region. Black spruce is the dominant tree cover in the large areas of thin or poorly drained soils. Jack pine and tamarack are associated with the deeper soils and better drainage, along with a scattering of white birch. In optimal areas, such as river valleys, lakeshores and south-facing slopes, intermixed stands of white spruce, balsam fir, trembling aspen and balsam poplar occur, given sufficient soil depth.

Forest cover throughout the region has been directly influenced by logging and an increase in forest fires due to settlement and railway traffic. Forest fires have the effect of further degrading any thin soils, while also allowing the establishment of more vigorous pioneer species such as trembling aspen and balsam fir. This sequence of tree cover replacement is also encountered after the disturbance of logging operations. Without disturbance, natural or man-made, black spruce forest dominates the upland areas of the region (Winterhalder 1983).

Jack pine and white spruce prefer well-drained sandy sites and are therefore indicative of areas with higher potential for pre-contact habitation sites. Black spruce forests are the primary habitat for caribou and as such provided an important hunting resource for pre-contact populations. White spruce roots are pliable yet strong and were used to sew together birch bark canoes (Hosie 1979). Tannin, used for the tanning of leather goods, can be obtained from the bark of the tamarack tree, while its roots may be used in lieu of the white spruce for construction purposes. The tough yet pliable white birch bark provides the raw material needed for canoe and shelter construction, along with containers and vessels. White birch is a very successful colonizer and is much more common and widespread now than 200 years ago, with logging and burning having created many suitable sites (Kershaw 2001).

The Berens River system, located in the northern portion of the LSA, is a primary environmental feature and is a prominent transportation corridor and an important food/water source for the Pikangikum and other nearby Aboriginal communities (Hamilton and Taylor-Hollings 2010).

3.5 Geological Setting

Nature Resource Values Information System (NRVIS) data received from the MNRF in 2010 was used to delineate the geology of the LSA.

The Project LSA is underlain by the Precambrian rock of the Canadian Shield, and is located within its oldest area, known as the Superior Province. The topography has a low total relief and drainage patterns that have been heavily altered by glacial action, resulting in poor overall drainage. The glacial deposits on the southern Shield are predominantly sandy to silty till, in contrast to the northern Shield, which is dominated by lake deposits of clayey till and silty till. These poorly-draining deposits have allowed the formation of large areas of peat and other organic muskeg.

Glacial erosion and post-glacial deposition have formed the present landscape. The Canadian Shield was originally an area of high relief, with extensive mountains rising up to 12,000 m; however, millennia of erosion has resulted in its current low topographic relief (Clark 1999).

A consequence of the exposure of the underlying volcanic activity is the near surface location of the extensive mineral deposits that occurred as a result of high temperature and pressure upwelling during mountain formation.

The Canadian Shield is one of the world's richest areas of minerals and mining deposits, which have also been augmented by at least two meteor impacts.

This mineral abundance has produced a history of mining activity within the area, from the pre-contact mining of near surface copper and siliceous rock, through to the gold rush of the late nineteenth century to today's intensive mineral exploration.

Deposition by glacial streams and lakes account for the majority of soil development and the subsequent composition of supported flora and fauna. Till material deposited by rivers entering lakes formed deltaic plains, while glacial action left high relief features such as moraines, drumlins and eskers. These raised areas provide better drainage compared to the surrounding low lying land and often form a locally distinct environmental landscape capable of supporting drier ecosystems.

The Project LSA overlie large areas of exposed or thinly covered bedrock to the north, along with glacial till to the south. Large portions of the route also follow gravel and sand ridges associated with glaciofluvial ice-contact deposits (Map 7). These features represent the remains of the retreating ice sheet and subsequent glacial lake formation and attendant river systems.

Although the granitic and minor constituents of gnessic rocks in this area tend to be unsuitable for stone tool production, some intrusive pegmatite dykes of quartz and feldspar may have been available, especially when exposed near the shorelines. Quartz is a commonly used lithic material found in archaeological sites in areas of the Whitefeather Forest and nearby Woodland Caribou Signature site, with the Red and Favourable lakes likely representing the closest sources for convenient extraction of chert, rhyolite and chlorite schists that may have been used by Indigenous flintnappers. Additional stone tool raw resources likely included cryptocrystalline pebbles and cobbles found in the overlying glacial sediments (Hamilton and Taylor-Hollings 2010).

4.0 FIELD METHODS

4.1 Optional Property Inspection

Due to the large area and inaccessible nature of portions the LSA, a ground property inspection was not completed. However, a portion of the LSA was visited by a representative of Wataynikaneyap in late August, 2016 and photographs were taken within the LSA. The photographs were used to provide a general sense of the landscape within the LSA.

In addition to the above mentioned site visit, Golder staff completed a flyover between April 23 and 27, 2016 on along a proposed transmission corridor approximately 190 km to the east, which provided details on the general terrain and vegetation for this portion of northwestern Ontario. In general, the environment of the northern portion of the LSA, contains a large amount of peatland that is dominated by a forest regime of black spruce (*Picea mariana*) mixed with larch (tamarack) (*Larix laricinia*) with the occasional trembling aspen (*Populus tremuloides*).

The central and southern portion of the LSA has a similar forest regime, dominated by black spruce (*Picea mariana*) with secondary populations of larch (tamarack) (*Larix laricinia*) and trembling aspen (*Populus tremuloides*). Also present are small numbers of eastern white pine (*Pinus strobus*), white birch (paper birch) (*Betula papyrifera*), black ash (*Fraxinus nigra)* and eastern white cedar (*Thuja occidentalis*).

In general, all small streams (stream order 1 and 2) and most small ‘lakes’ or basins within the LSA are surrounded by several metres, and sometimes tens of metres, of active peatland which is difficult, and potentially hazardous, to traverse and contains low archaeological potential.

In addition to the client site visit, detailed ortho imagery was acquired in November 2016 for nearly the entirety of the LSA; one area around the Nungesser River did not have ortho imagery and Golder is still in the process of acquiring this imagery. The availability of the ortho imagery provided exceptional detail of the terrain and allowed for a refinement of the areas of archaeological potential and areas recommended for Stage 2. The following provides a general review of specific areas of the proposed alignment where, based on MNRF data and MTCS criteria, areas were identified as having archaeological potential but were removed as a result of the ortho imagery review.

There are six small ponds that, based on MTCS criteria, trigger archaeological potential. However, in reviewing the available ortho imagery, it is clear that these six areas are small isolated ponds with no access in or out and would likely not have been an area of focus or travel during the Pre-Contact or Historic period, as such archaeological potential has been removed. Images 9 to 14 identify each of these six locations in detail and can be referenced on Maps 10-1 through to 10-7, as Locations A through F. The green circle around each of the six identified areas represents a 50 m set back where archaeological potential was originally identified. The pink area represents the LSA and the black dotted line is the proposed construction 50-metre-wide right of way.

5.0 ANALYSIS AND CONCLUSIONS

The potential for archaeological resources with cultural heritage value or interest to be located within the LSA is analysed in this section considering general MTCS archaeological potential criteria, as defined in the S&Gs (MTCS 2011), and information presented in Sections 1 through 4 of this report. Further analysis, to refine the areas of archaeological potential associated with the general MTCS criteria, was performed using stream order data (Map 8), MNRF archaeological potential modelling (Map 9), and ortho imagery, to arrive at a rigorous model of archaeological potential within the LSA. Finally, regionally specific MTCS special condition criteria for the assessment of property on the Canadian Shield and in 'Remote Areas' are applied to develop a map of the LSA indicating where further archaeological assessment is recommended prior to ground disturbance related to the Project (Map 10).

5.1 Potential for Euro-Canadian Archaeological Resources

The criteria used by the MTCS to determine potential for historical archaeological sites of relevance to this analysis are evidence for:

- Early Euro-Canadian industry (e.g., fur trade, logging, prospecting, mining);
- Early Euro-Canadian settlement including pioneer homesteads, isolated cabins, pioneer churches and early cemeteries; and
- Early historical transportation routes (e.g., trails, passes, roads, railways, portage routes) (MTCS 2011).

Property listed on a municipal register or designated under the *Ontario Heritage Act* or that is a federal, provincial or municipal historic landmark or site is also indicative of archaeological potential. A search of the *Ontario Heritage Act Register*, maintained by the Ontario Heritage Trust, indicates that no property within the LSA is listed or designated under the *Ontario Heritage Act* and no historic landmarks are known to exist within the LSA.

Given the location of the Project LSA to known fur trade transportation routes and mapped Hudson's Bay and St. Lawrence Traders posts, the potential for historical post-contact Indigenous and Euro-Canadian archaeological resources is generally moderate to high along navigable streams and lakes. In addition to the fur trade related areas, there is also evidence of early twentieth-century mining at the southern terminus of the LSA and a number of waterway trails and portage routes cross the LSA.

5.2 Potential for Pre-Contact Indigenous Archaeological Resources

A number of factors are employed when determining archaeological potential within a particular area. In addition to the proximity to known archaeological sites, factors for determining Indigenous archaeological potential includes watershed area (primary and secondary watercourses), distance from water, drainage patterns, identification of past water sources (beach ridges, river beds, relic creeks, ancient shorelines, etc.), elevated topography, identification of significant physiological and geological features (knolls, drumlins, eskers, plateaus, etc.), soil geomorphology, distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.), known burials sites and cemeteries, historic transportation routes (navigable waterways, historic trails, portages, etc.) and associated biological features (distribution of food and animal resources before colonization).

While known archaeological sites documented in Section 3.2 provide evidence of historically significant Indigenous occupation within the general LSA vicinity, all property within 150 m of a registered archaeological site in the Canadian Shield is considered to possess archaeological potential. This includes the 150 metre radius around the Berens Lake Portage (EkKk-4) site currently situated within the LSA.

A 150 metre radius around known or potential cultural heritage resources is also determined to possess archaeological potential. This includes the Thunderbird nest along Nungesser Road, north of Coli Lake, identified during a general site visit for the EA project.

Cultural Heritage Landscapes are also considered to represent features of archaeological potential. The Kirkness Lake, Nungesser Lake, and Berens Lake Cultural Heritage Landscapes have been designated (PFN 2006:87) within the LSA and trigger archaeological potential, in addition to a 150 metre buffer around these designated landscape boundaries.

Waterways also trigger archaeological potential as defined by the MTCS Standards and Guidelines (2011). These waterways have historically been a focal point in the Indigenous culture (PFN 2006:21) with lands surrounding the waterways utilized as a reliable source of water for nearby traditional camps and habitation sites. These waterways have also utilized for subsistence extraction strategies such as hunting and fishing, with potential evidence representing these activities such as fish weirs or netsinkers and projectile points located within the waterway zones. Navigable waterways within the LSA vicinity have also been historically employed as reliable transportation routes both in the summer by boat and in the winter as ice pathways. Stream orders designated as greater than 3 would be considered to possess high archaeological, while streams designated as 1 or 2 within the ordering system would be considered to possess low archaeological potential.

5.2.1 Stream Ordering

Stream ordering is a method used to assign a numerical order to branches in a stream network. Ordering allows for the identification and classification of stream types to infer their characteristics. First-order streams are the smallest streams and have no tributaries. When two first-order streams meet, the upstream portion of the watercourse is classified as a second-order stream. For this analysis, stream order was calculated from the Provincial Enhanced Flow Direction (EFDir) grids, provided to Golder by the MNRF, which are composed of the Archydro Stream and Flow Direction grids. The EFDir grids were analysed in ArcGIS Spatial Analyst software using the Strahler method to create the stream orders presented in Map 8, respectively.

Stream order may be used as a rough proxy for channel flow and navigability. Navigability is a key component of archaeological potential modelling within the boreal forest because travel of any significant distance in the region would have been exceedingly difficult without the use of the waterway system as a travel corridor. In the spring, summer and fall, small crafts were used on navigable waterways while in winter the waterway acted as a cleared, frozen footpath.

Streams with very low stream orders 1 or 2 are small, with limited channel flow, and have limited navigability. In the vicinity of these small streams in the past; the low relief, poor drainage conditions and shallow post-glacial organic soil formation in the LSA has led to their formation in huge quantities. Plant gathering, in particular, is known from ethnographic sources to have taken place primarily in swamps, bogs, small streams and lake margins (Larcombe 1994). From an archaeological potential modelling perspective; however, there is little to recommend one small stream over another in the landscape. From an archaeological perspective, the large number of small,

low stream order watercourses in the boreal forest generally, and in the LSA in particular, and their frequent association with very wet, poorly drained peatland greatly reduces their value as features with archaeological potential (Hamilton and Larcombe 1995). This is particularly true considering the ethnographic evidence that suggests that base camps were almost always located on lake margins (both in summer and winter) or along larger rivers (in the winter). In addition, the large number of these small streams and the saturated nature of their surrounding soils present serious practical obstacles to archaeological assessment. Small streams with stream orders of 1 or 2 are very unlikely to show archaeological evidence of occupation (Hyslop pers. comm. 2013). Therefore, streams with a stream order of 1 or 2 are considered to have low archaeological potential and are not recommended for further assessment.

The highly mobile nature of past inhabitants of the landscape, on the other hand, indicates that streams with higher stream orders, 3 or greater, reflecting greater channel flow and higher navigability would have been important to the population for movement across the landscape. All streams within the LSA with a stream order of 3 or greater are considered to have archaeological potential and are recommended for further archaeological assessment.

5.2.2 Ministry of Natural Resources Archaeological Potential Modeling

The MNRF prepares archaeological potential area modelling, during forestry management planning work using the MNRF Heritage Assessment Tool (HAT) (MNRF 2007). The HAT combines numerous datasets and allows for the calibration of individual data layers, based on landscape features, by assigning an analytical ‘weight’ to each layer according to the statistical likelihood that an individual landscape feature may contain an archaeological site. For example, archaeological sites are typically located on fairly level ground so areas with low slope angles have a higher weighted value than areas with steep slopes.

Archaeological potential is determined by plotting known archaeological site locations on the weighted potential model developed for the forestry region in question. The location of known archaeological sites may also provide extra “weight” to certain landscape features as part of an iterative modelling process. The distribution of archaeological sites within the model is examined to determine whether the initial archaeological potential model is suitable. Weights may be adjusted until a maximum number of archaeological sites are captured within a minimum area of land designated as containing archaeological potential.

Preliminary archaeological potential mapping is analysed by an MNRF provincial cultural heritage specialist who may perform several more runs of the model with adjusted data weights or the addition of local heritage and landscape knowledge. This process leads to the development of a final archaeological potential map. The final archaeological potential map is modified in the event that mapped landscape features are subsequently determined not to accurately reflect the conditions on the ground. All areas of archaeological potential designated on the final archaeological potential map must have their top 30 cm of mineral soil protected during forestry operations to avoid destruction of potential subsurface cultural features (MNRF 2007). A small amount of disturbance to mineral soil (up to 5%) is allowed, averaged across an individual forestry block.

The archaeological potential models developed by the MNRF for forestry management purposes are not sufficient, on their own, to determine areas of archaeological potential to meet current MTCS S&Gs unless the project in question is a forestry project situated on Crown land covered under a specific forest management plan. Nevertheless, they represent the most sophisticated archaeological potential modelling occurring in the boreal forest of Ontario and are based on decades of archaeological potential modelling research (for example: Dalla Bonna 1994a, 1994b; Ebert and Kohler 1988; Hamilton 2000; Hamilton and Larcombe 1995;

Larcombe 1994); and therefore provide a key data source for use in large-scale archaeological assessments in the region.

The MNRF archaeological potential within the LSA passing through the LSA is presented in Map 9, and are incorporated into the determination of areas recommended for further archaeological assessment as indicated in Map 10.

5.2.3 Alternatives for Archaeological Potential Evaluation in Special Conditions: Remote Areas

Section 1.3.4 of the MTCS S&Gs contains two Standards that apply when evaluations of archaeological potential are made for areas of the province that are remote and difficult to access.

Standard 1: The degree of remoteness must be documented in sufficient detail to demonstrate that there are practical obstacles to achieving success. This will be primarily a matter of distance and a lack of available transportation infrastructure (i.e., roads, trails) along with factors of visibility (e.g., forest cover).

Standard 2: Aerial photos, detailed engineering plans or other detailed mapped information may be used to determine that areas are of low potential.

For this Project, it is assumed that any portion of the LSA a minimum of 10 km from a road is sufficiently remote to "present practical obstacles to achieving access," considering the difficulty in traversing large areas of the boreal forest on foot. Portions of the LSA, particularly those in the northern area, that extend around Berens Lake are greater than 10 km from all transportation routes.

5.3 Compliance with MTCS 2011 Standards and Guidelines for Consultant Archaeologists: Determining Archaeological Potential in the Boreal Forest

Section 2.1.5 provides alternative strategies for Stage 2 test pit survey in northern Ontario and on Canadian Shield terrain:

Standard 1: Where the identified feature of archaeological potential is a modern water source, test pitting is required between 0 and 50 m from the feature. Space test pits at maximum intervals of 5 m. Survey is not required beyond 50 m.

Standard 2: For features of archaeological potential other than modern water sources (e.g., historic water sources such as glacial shorelines), test pitting is required as follows:

a) space test pits at maximum intervals of 5 m between 0 and 50 m from the feature of archaeological potential

b) space test pits at maximum intervals of 10 m between 50 and 150 m from the feature of archaeological potential

c) survey is not required beyond 150 m

Standard 3: While maintaining standard survey grids as closely as possible, the consultant archaeologist may vary from standard survey grids as necessary, based on professional judgement. Document and explain the rationale for all variation in the Stage 2 report.

Because of the large number of modern water sources in northern Ontario, not all of them are considered features of significant archaeological potential. Archaeological potential is limited within this assessment to modern water sources defined as 'primary water sources' (e.g., lakes, rivers, streams, creeks) (Section 1.3.1, S&Gs). A further restriction of navigability is identified as a pre-requisite for a watercourse to possess significant archaeological potential. Navigability is determined through a combination of stream order data, a review of ortho imagery and mapping of known river and lake canoe trails. No watercourse with a stream order value of less than 3 is considered to possess high archaeological potential. In association with navigability, the water course must be a viable transportation route, leading from somewhere to somewhere in a sensible fashion, including portages if necessary, for it to be deemed to possess high archaeological potential. There are hundreds of potentially navigable water courses within the LSA that are dead-ends, cul-de-sacs, or minor, isolated creeks whose banks have virtually no potential for the recovery of archaeological remains (Ross pers. comm. 2013) and are not considered to have high archaeological potential, not least because they occur in areas of wet, acidic peatlands, as are common in the boreal forest region. This is not to say that these small areas of wetland and associated streams were not the site of plant gathering or other important but ephemeral activities in the past, but that ethnographically, occupation sites were rarely located in these areas and archaeologically, sites are rarely recovered from these areas. The archaeological potential of these areas is predicted to be very low.

Areas of elevated topography have been attractive to people in the past as areas to settle or collect resources otherwise unavailable in the surrounding landscape. Ethnographic data indicate that winter camps in the boreal forest were occasionally located at inland, upland locations because these were good locations to find moose during that season. Nevertheless, we also know from the ethnographic and archaeological record that settlement in the boreal forest was primarily influenced by water resources rather than elevation.

In discussing archaeological predictive modelling, Dalla Bonna suggests that mapping with elevation contour intervals of less than 15 m provides sufficient detail to indicate the nature of the terrain (Dalla Bonna 1994a, b). The LSA is mapped at elevation contours of 10 m. There are no mapped drumlins or eskers that overlap with the LSA. There is one "linear trend of end moraine crest" that extends north along the Nungesser Road by Coli Lake. However, this feature is low in relief (less than 10 m in elevation compared to the surrounding terrain) and as such does not represent an area of true potential as this feature is similar in relief to the surrounding terrain (Map 10; Tiles 2-3).

To comply with all Sections of the S&Gs, it will be recommended within this report that the relevant Standards within Section 1.4.1 are followed when determining areas requiring Stage 2 test pit survey. Despite this recommendation, because the Project LSA is located in northern Ontario on Canadian Shield terrain, and because portions of the LSA are remote and difficult to access, Sections 1.3.3, 1.3.4 and 2.1.5 are directly applicable to the LSA and it will also be recommended within this report that the relevant Standards within these Sections are applied to modify the Stage 2 test pit survey strategy of the LSA. The relevant Standards in Sections 1.3.3., 1.3.4 and 2.1.5 of the S&Gs will supersede the Standards within Section 1.4.1 and it will be the Standards within Sections 1.3.3, 1.3.4 and 2.1.5 that will determine the recommended modified Stage 2 test pit survey strategy. This application of the S&Gs has been reviewed and approved on a number of transmission projects for the same

overall undertaking. These Standards, combined with the analysis of level of archaeological potential described above, have been used to determine areas within the LSA that are recommended for Stage 2 archaeological assessment as depicted on Map 10: Tiles 1-7, respectively.

6.0 RECOMMENDATIONS

Based on the results of the Stage 1 archaeological assessment, it has been determined that archaeological potential is low for the majority of the Project LSA. Nevertheless, potential for both pre-contact and post-contact era archaeological resources exists for specific areas within the LSA.

The following recommendations are made:

1. As per Section 1.4.1 of the S&Gs:

    a) *No areas within 300 m of the following features of archaeological potential, located either on or adjacent to the property (defined here as the LSA), are recommended for exemption from further assessment: previously identified archaeological sites; water sources; areas of early Euro-Canadian settlement; locations identified through local knowledge or informants.*

    b) *No areas within 100 m of early historic transportation routes are recommended for exemption from further assessment.*

    c) *No areas within the property containing the following features of archaeological potential are recommended for exemption from further assessment: elevated topography; pockets of well-drained sandy soil; distinctive land formations; resource areas.*

    All of the areas of the LSA described here in 1.a and 1.b are recommended for further archaeological assessment subject to modification by the relevant Standards set out in Sections 1.3.3, 1.3.4, and 2.1.5 of the S&Gs, and as described in Section 3.3 of this report, and recommendations 2 through 5 below.

2. The LSA is defined as being located on the Canadian Shield (Map 1), and as such the entire LSA is eligible for both a reduction in Stage 2 survey area and for the application of alternative Stage 2 survey strategies, with the exception of small landscape features that may possess differing characteristics from the surrounding environment, as per Section 1.3.3 of the S&Gs. Where such landscape features are identified a complete assessment and systematic survey of the feature should be undertaken. These landscape features include, but are not limited to, sand plains, clay plains and glacial beach ridges. A complete assessment and systematic survey is here defined as the Stage 2 survey strategy identified for use in northern Ontario and Canadian Shield terrain as described in Section 2.1.5 of the S&Gs.

3. All areas of the LSA determined to be remote and difficult to access, as defined in Sections 3.2.3 and 3.3 of this report, have been assessed through detailed mapping and review of ortho imagery as being of low potential, other than where specifically indicated on Map 10: Tiles 1-7 and do not require Stage 2 archaeological assessment, as per Section 1.3.4 of the S&Gs.

4. All areas of the LSA identified as having sufficiently high archaeological potential to require further archaeological assessment, as described in Section 5.2 of this report, are shown on Map 10: Tiles 1-7, respectively. Any portion of these areas recommended for Stage 2 archaeological assessment that may potentially be impacted by ground disturbance associated with Project construction activities should be assessed by the Stage 2 test pit survey strategy for northern Ontario and the Canadian Shield as described in Section 2.1.5 of the S&Gs.

5. All areas of the LSA not indicated on Map 10: Tiles 1-7, respectively as requiring further archaeological assessment have been determined to have low archaeological potential and no archaeological survey of these areas is required.

6. Should the route of the Project LSA corridor change following submission of this Stage 1 report, such that it no longer falls within the LSA assessed within this report as indicated on Map 10: Tiles 1-7, respectively, Stage 1 archaeological assessment of all new areas will be required. Should ground disturbance activity related to the Project prove necessary outside of the LSA assessed within this report, Stage 1 archaeological assessment and any further stages of assessment as necessary will be required prior to construction.

7. The registered archaeological site within the LSA (EkKk-4) and the Thunderbird nest identified along Nungesser Road should be avoided and protected.

8. If registered archaeological site EkKk-4, or and land within 150 metres of this site is to be impacted, the recommendations detailed in the Stage 1 Archaeological Assessment report for the proposed Berens River Bridge Crossing at Dog Rib Falls should be addressed. As these recommendations were prepared prior to 2011, additional intensive testing may be required to comply with the updated MTCS S&G's (2011).

9. A marine archaeological assessment should be completed if in-water impacts are to occur for the two navigable streams located within the designated Cultural Heritage Landscapes encompassing Kirkness Lake and Berens Lake due to the high archaeological potential recognized for these two river crossings.

10. Consultation with local First Nations communities where Stage 2 Archaeological Assessment field testing will occur within their traditional territory should occur prior to any archaeological fieldwork. Local and traditional knowledge may be gleaned from traditional community members which may identify areas for potential archaeological resources not sufficiently addressed in published accounts or officially registered with the MTCS.

7.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and, therefore, subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Funeral, Burial and Cremation Services Act*, 2002, R.S.O. 2002, c.33 require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

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9.0 IMAGES

Image 1: Snowshoe hare pictograph identified at Deer Lake, north of Red Lake, June 1956 (Adopted from Ontario Archives).

Image 2: Hudson's Bay Trading Post, Red Lake, 1925 (Adopted from Library and Archives Canada).

Image 3: Hudson Bay Post, Red Lake (Adopted from Library and Archives Canada).

Image 4: Red Lake Gold Shore Mine, Red Lake, Ontario, September 1937 (Adopted from Library and Archives Canada).

Image 5: McKenzie Red Lake Mines Ltd., Red Lake, Ontario, 1935 (Adopted from Library and Archives Canada).

Image 6: Gold Eagle Shaft and Mine Buildings, Red Lake, Ontario, August 1936 (Adopted from Library and Archives Canada).

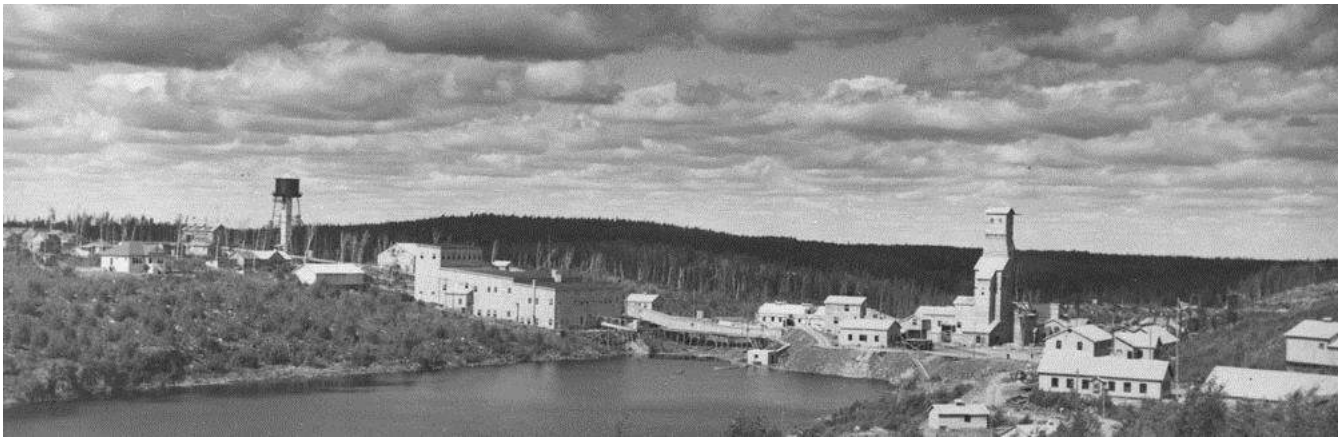

Image 7: Panoramic View of Madsen Red Lake Gold Mines, Ontario, 1944 (Adopted from Library and Archives Canada).

Image 8: Thunderbird Nest Observed along Nungesser Road, North of Coli Lake.

Image 9: Ortho Imagery of Unnamed Pond Overlapping the Local Study Area. Location A, Map 10-1.

Image 10: Ortho Imagery of Unnamed Pond Overlapping the Local Study Area. Location B, Map 10-2.

Image 11: Ortho Imagery of Unnamed Pond Overlapping the Local Study Area. Location C, Map 10-4.

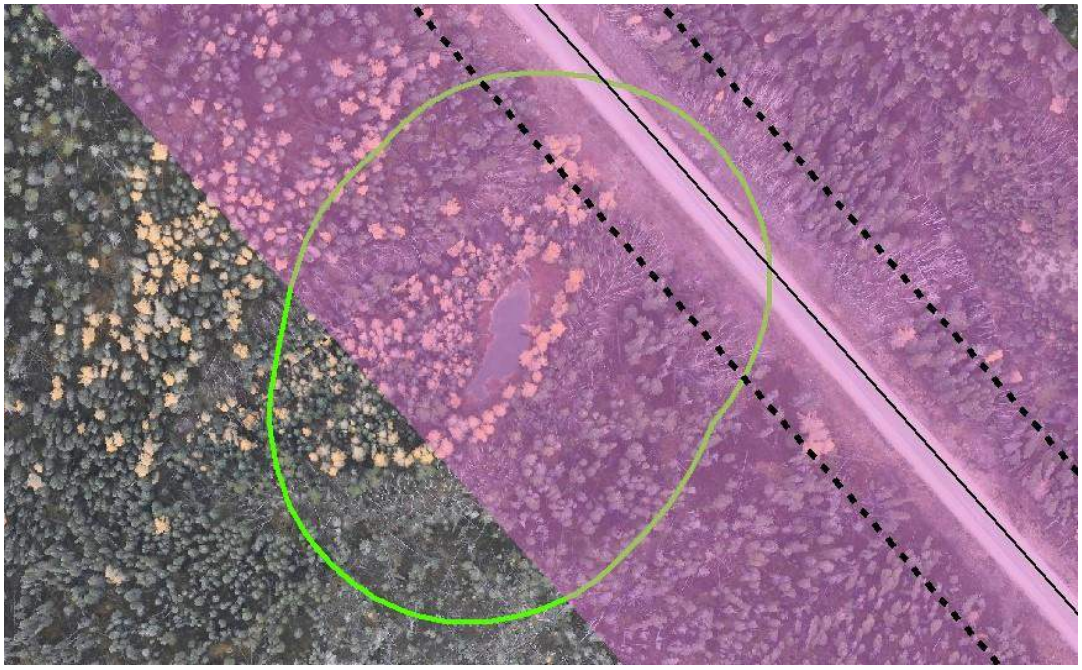

Image 12: Ortho imagery of Unnamed Pond Overlapping the Local Study Area. Location D, Map 10-4.

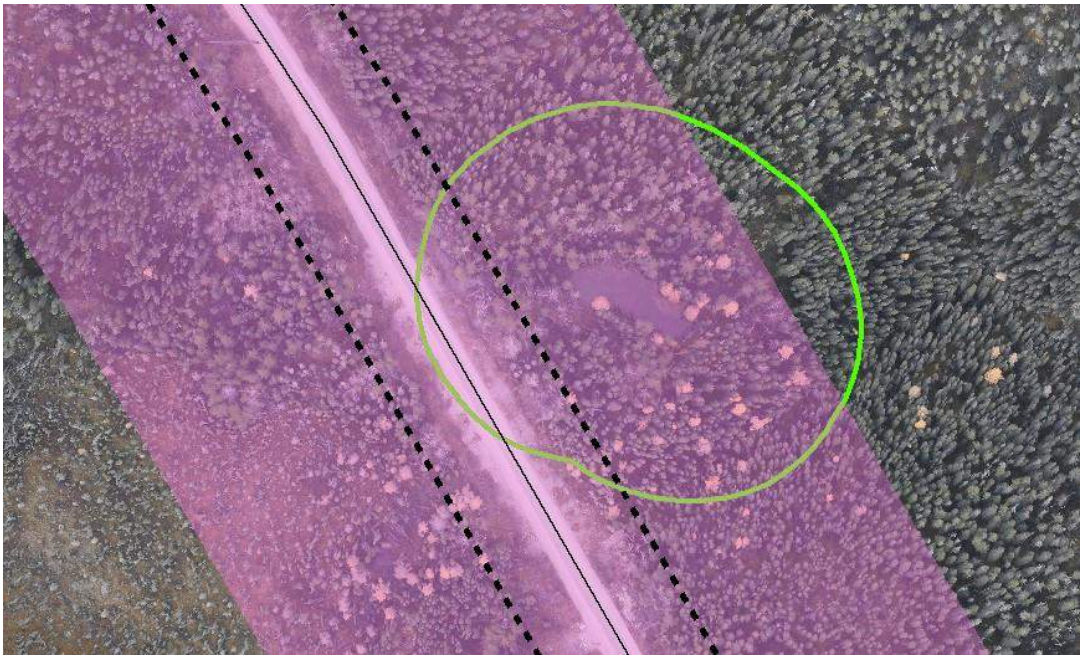

Image 13: Ortho Imagery of Unnamed Pond Overlapping the Local Study Area. Location E, Map 10-4.

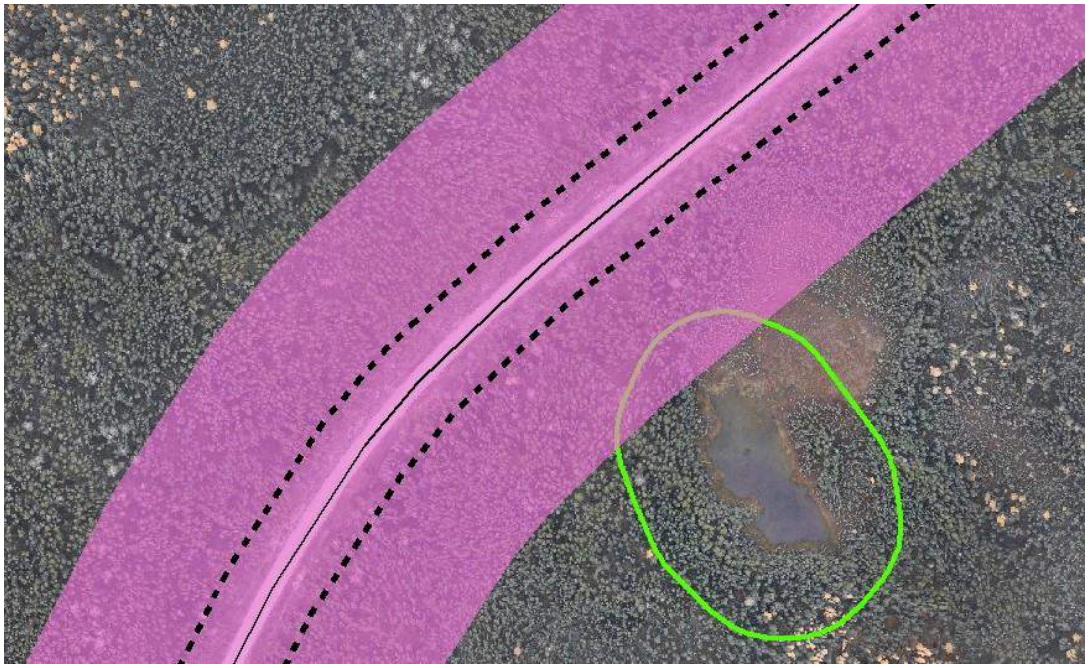

Image 14: Ortho Imagery of Unnamed Pond Overlapping the Local Study Area. Location F, Map 10-5.

10.0 MAPS

All maps follow on the succeeding pages.

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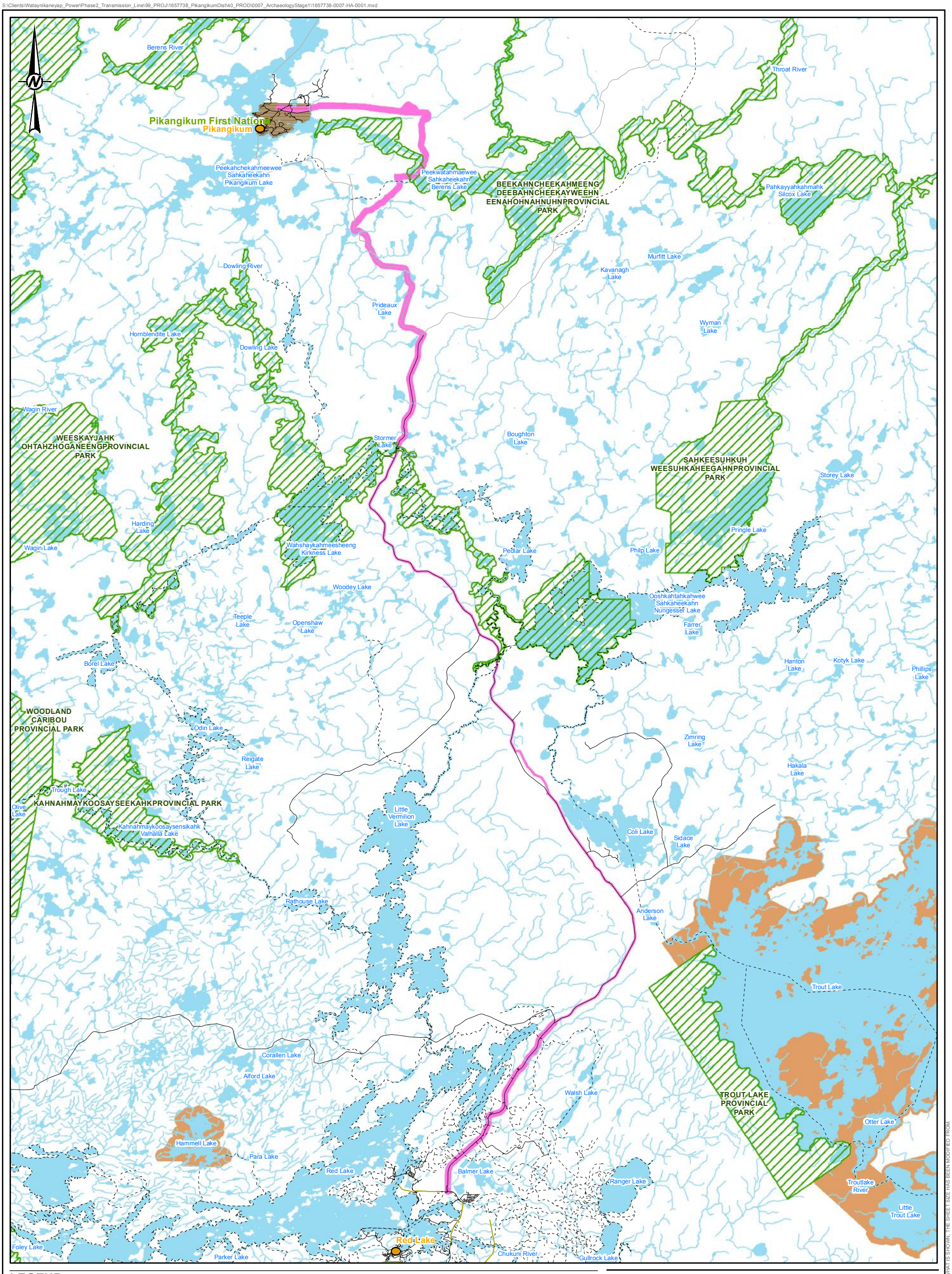

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Watercourse
- Waterbody
- First Nation Reserve Land
- Conservation Reserve
- Provincial Parks
- Project Limits of Work

NOTE(S)
1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.
2. ALL LOCATIONS ARE APPROXIMATE.
3. NOT FOR ENGINEERING PURPOSES.

REFERENCE(S)
1. BASE DATA - MNR LIO, OBTAINED 2016, NTDB
2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. FIRST NATION COMMUNITIES FROM INDIGENOUS AND NORTHERN AFFAIRS CANADA (WWW.AINC-INAC.GC.CA)
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1:280,000 KILOMETERS

CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
PROJECT LOCATION – LOCAL STUDY AREA

CONSULTANT
Wataynikaneyap Power
Golder Associates

YYYY-MM-DD	2017-04-06
DESIGNED	JMC
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
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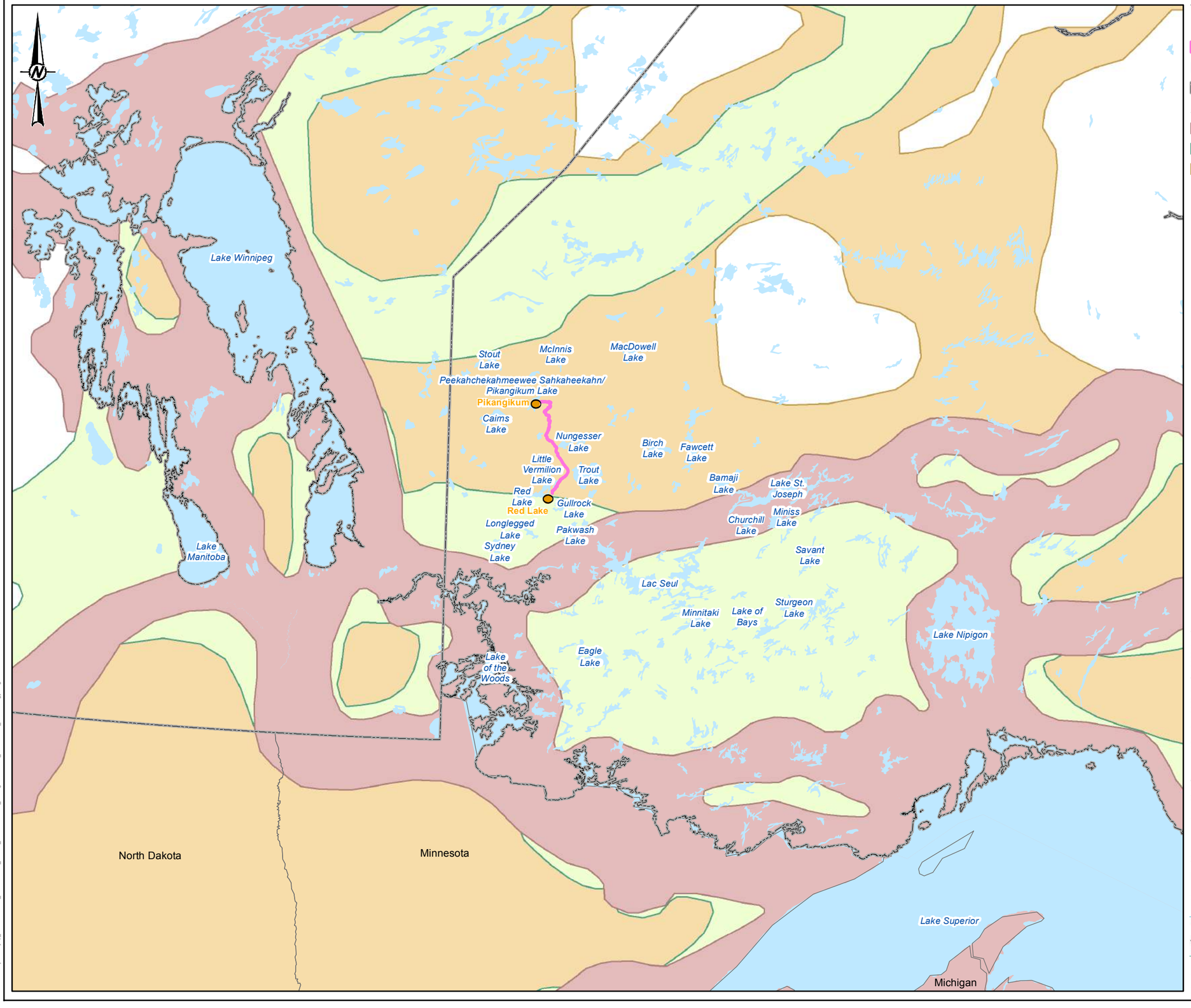

LEGEND

- Town
- Project Limits of Work
- Waterbody
- Province Boundary

Areas Explored and Mapped by Europeans

- Before 1751
- 1752 - 1774
- 1775 - 1821

0 20 40 80 120 160 200

1:3,500,000 KILOMETERS

NOTE(S)

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REFERENCE(S)

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2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. EUROPEAN EXPLORATION - EUROPEAN EXPLORATION AND TRADING POST OBTAINED FROM THE HISTORICAL ATLAS OF CANADA (HTTP://WWW.HISTORICALATLAS.CA)
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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
EUROPEAN EXPLORATION BY DATE

CONSULTANT

YYYY-MM-DD	2016-04-06
DESIGNED	JR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
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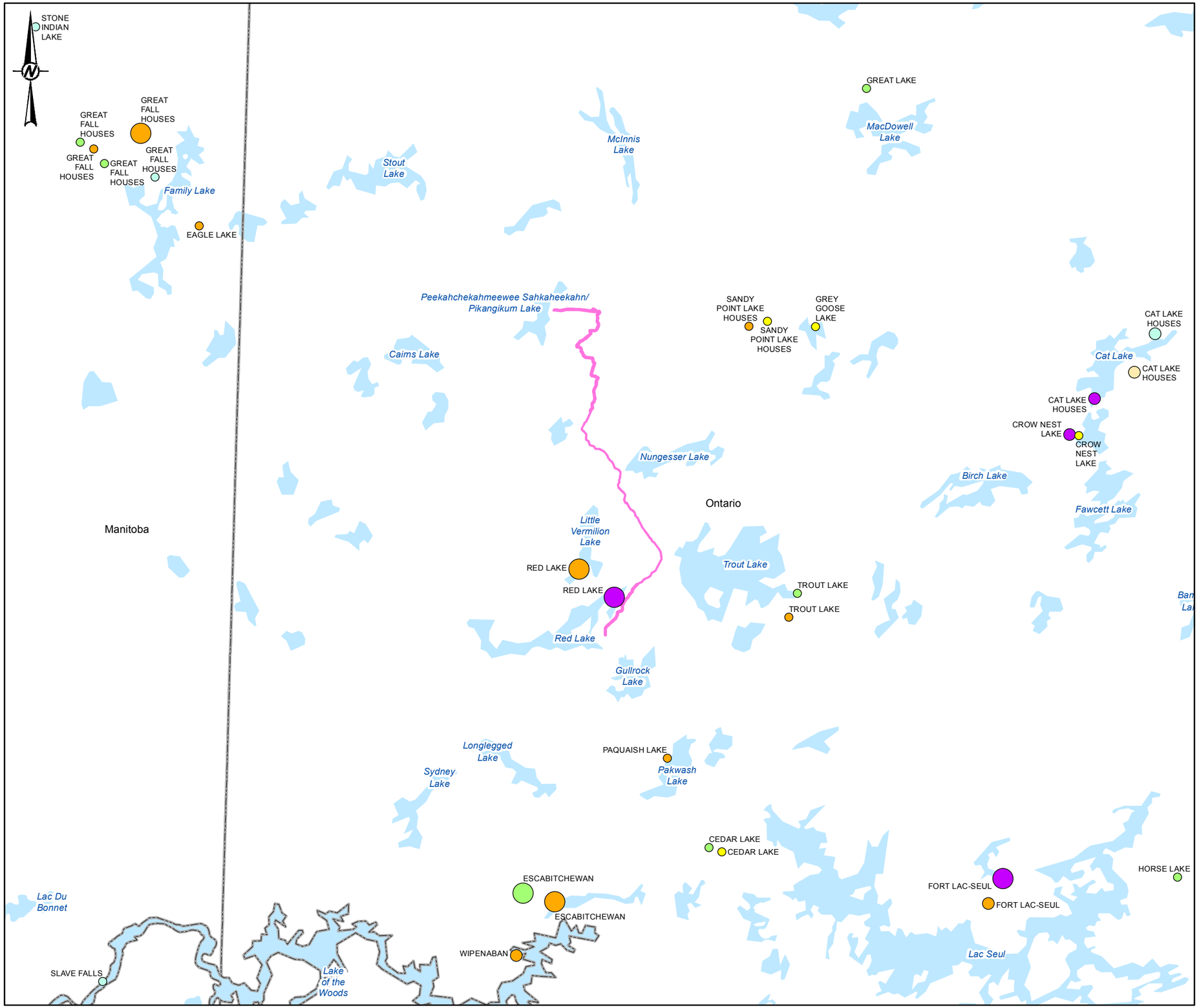

LEGEND

- Project Limits of Work
- Waterbody
- Province Boundary

INITIAL OCCUPATION OF TRADING POST

HUDSON'S BAY COMPANY	ST. LAWRENCE TRADERS	DURATION OF POST
PRE-1774	PRE-1774	MORE THAN 15 YEARS
1774-1789	1774-1789	5-15 YEARS
1790-1805	1790-1805	LESS THAN 5 YEARS
1806-1821	1806-1821	

0 5 10 20 30 40 50

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NOTE(S)

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2. ALL LOCATIONS ARE APPROXIMATE.
3. NOT FOR ENGINEERING PURPOSES.

REFERENCE(S)

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2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. TRADING POST DATA - HISTORICAL ATLAS OF CANADA, VOL. 1 ED. R. COLE HARRIS 1987. UNIVERSITY OF TORONTO PRESS, TORONTO, ON.
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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
FUR TRADE POSTS

CONSULTANT

YYYY-MM-DD	2017-04-06
DESIGNED	JR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

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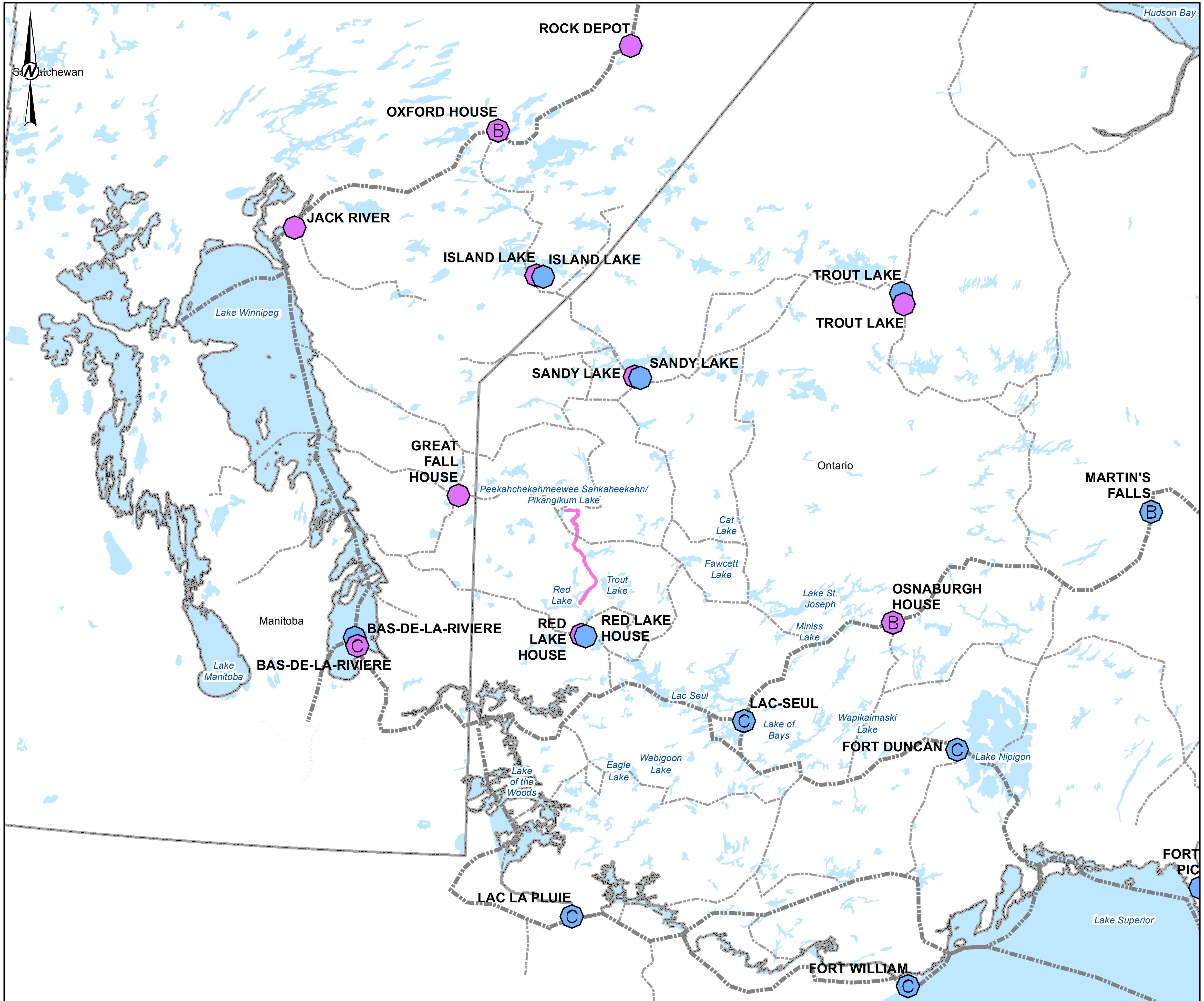

LEGEND

- Project Limits of Work
- Province Boundary
- Waterbody

Type of Transportation Route

- Major Route
- Minor Route

Depots and/or Break-of-Bulk-Points

- Hudson's Bay Company
- St. Lawrence Traders
- B Major Boat-Building Centre
- C Major Canoe-Building Centre

0 20 40 80 120 160 200

1:3,500,000 KILOMETERS

NOTE(S)

1. THIS FIGURE IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.
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3. NOT FOR ENGINEERING PURPOSES.

REFERENCE(S)

1. BASE DATA - MNR LIO, OBTAINED 2016, NTDB
2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. TRANSPORTATION ROUTES, DEPOTS AND BREAK-OF-BULK-POINTS DATA - HISTORICAL ATLAS OF CANADA, VOL. 1 ED. R. COLE HARRIS 1987. UNIVERSITY OF TORONTO PRESS, TORONTO, ON.
4. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2008
5. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 15

CLIENT
WATAYNIKANEYAP POWER L.P.

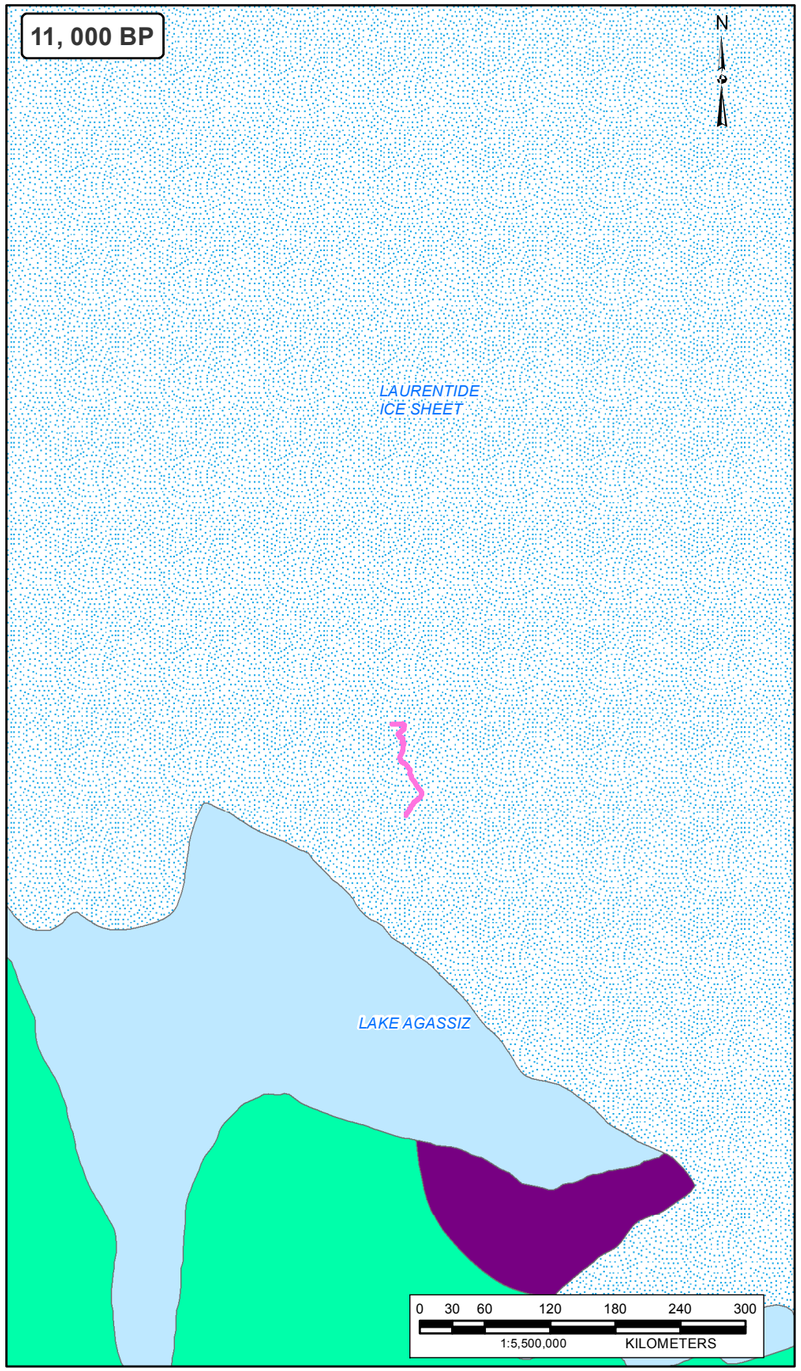
PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

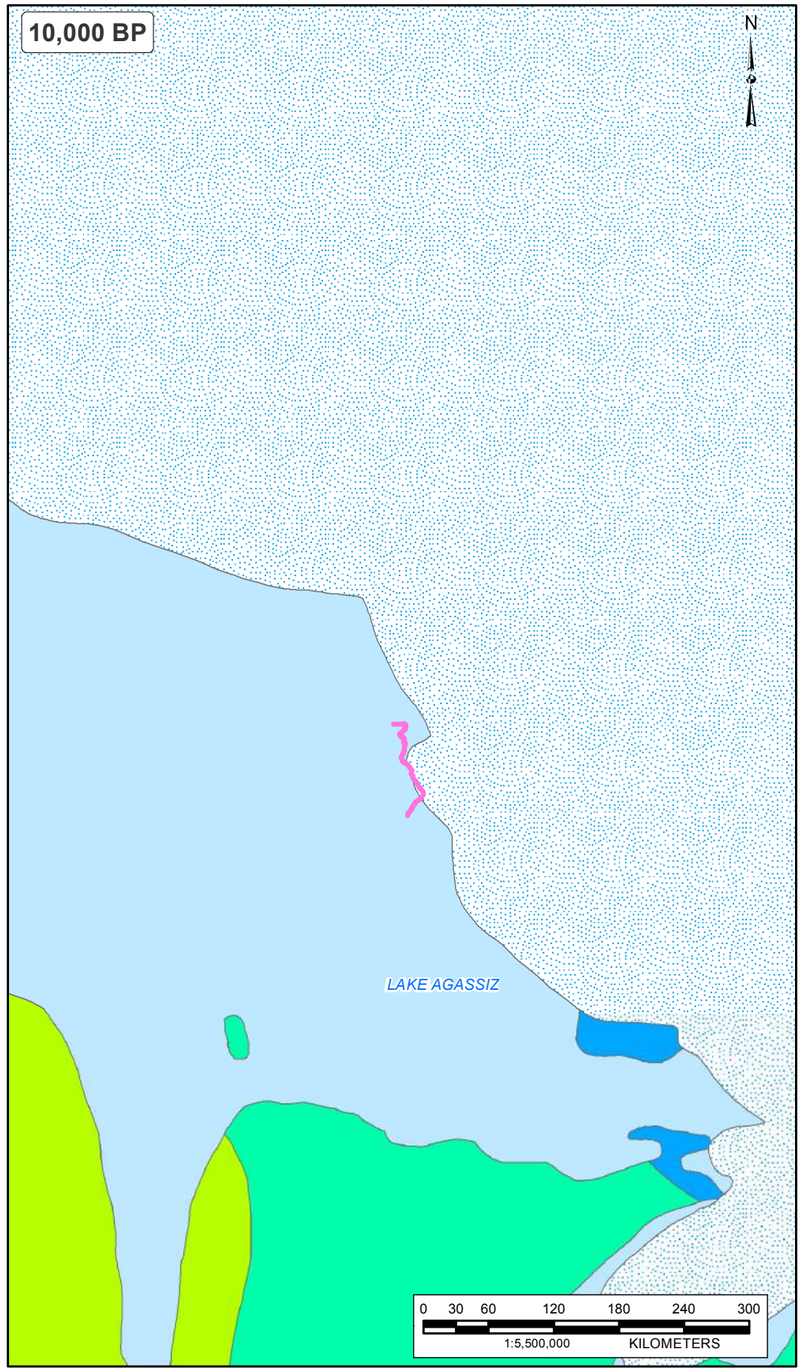
TITLE
HISTORIC TRANSPORTATION ROUTES AND MAJOR ROUTES

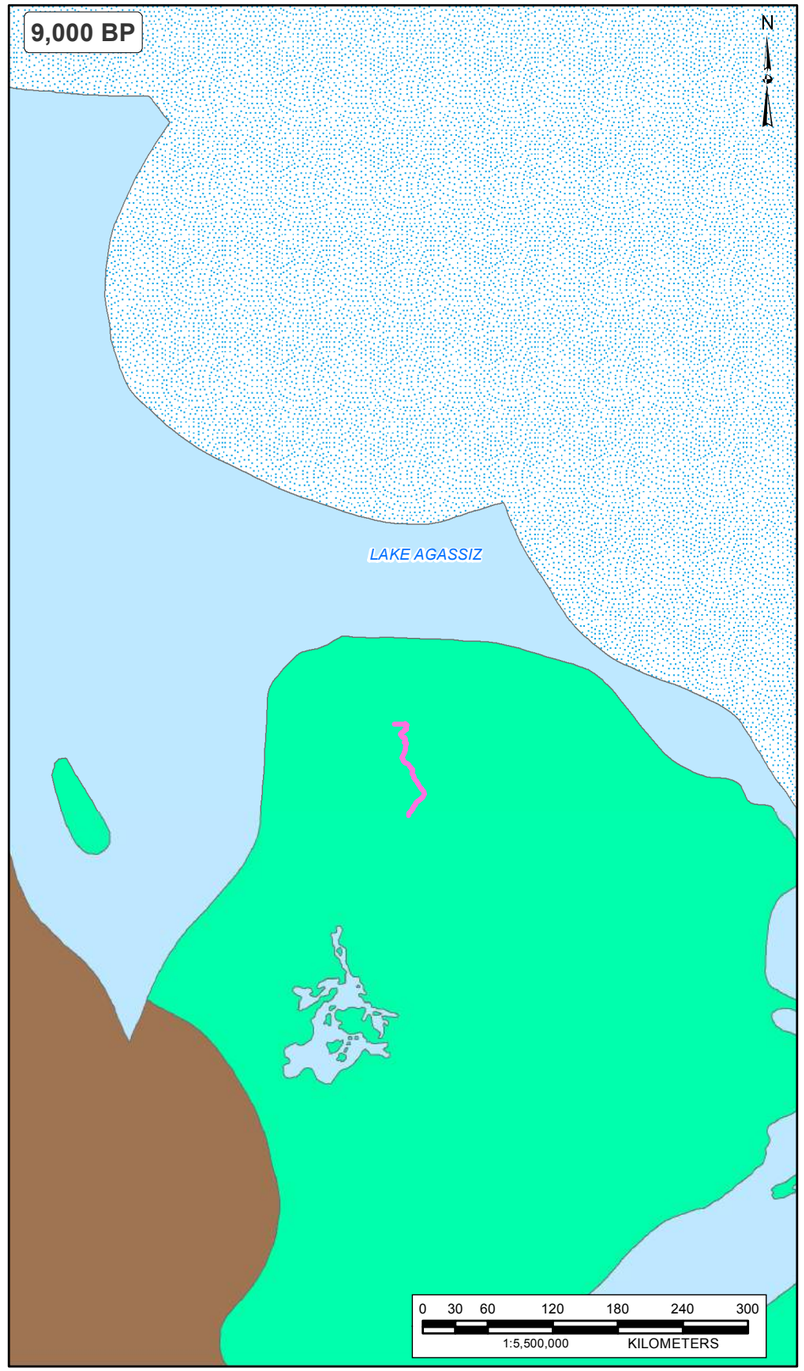
CONSULTANT

YYYY-MM-DD	2017-04-06
DESIGNED	JR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	4







LEGEND

- Shrub Tundra
- Forest Tundra
- Boreal Forest
- Boreal Parkland
- Grassland
- Ice
- Water
- Project Limits of Work

REFERENCES

1. BASE DATA - MNR LIO, OBTAINED 2016, NTDB
2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. PALEO-ENVIRONMENTAL RECORDS OF CLIMATE CHANGE ACROSS CANADA VEGETATION HISTORY, GLACIATED NORTH AMERICA. NATURAL RESOURCES CANADA, EARTH SCIENCES SECTOR, CENTRAL AND NORTHERN CANADA BRANCH - GEOLOGICAL SURVEY OF CANADA. 2010-01-28
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NOTES

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CLIENT
WATAYNIKANEYAP POWER L.P.

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-04-06
PREPARED	JR
DESIGN	PR/JMC
REVIEW	AM/BD
APPROVED	BT

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
POST-GLACIAL ENVIRONMENTAL SEQUENCE, NORTHWESTERN ONTARIO 11,000 TO 9,000 B.P.

PROJECT NO.	PHASE	REV.	MAP
1657738	-	-	**5**

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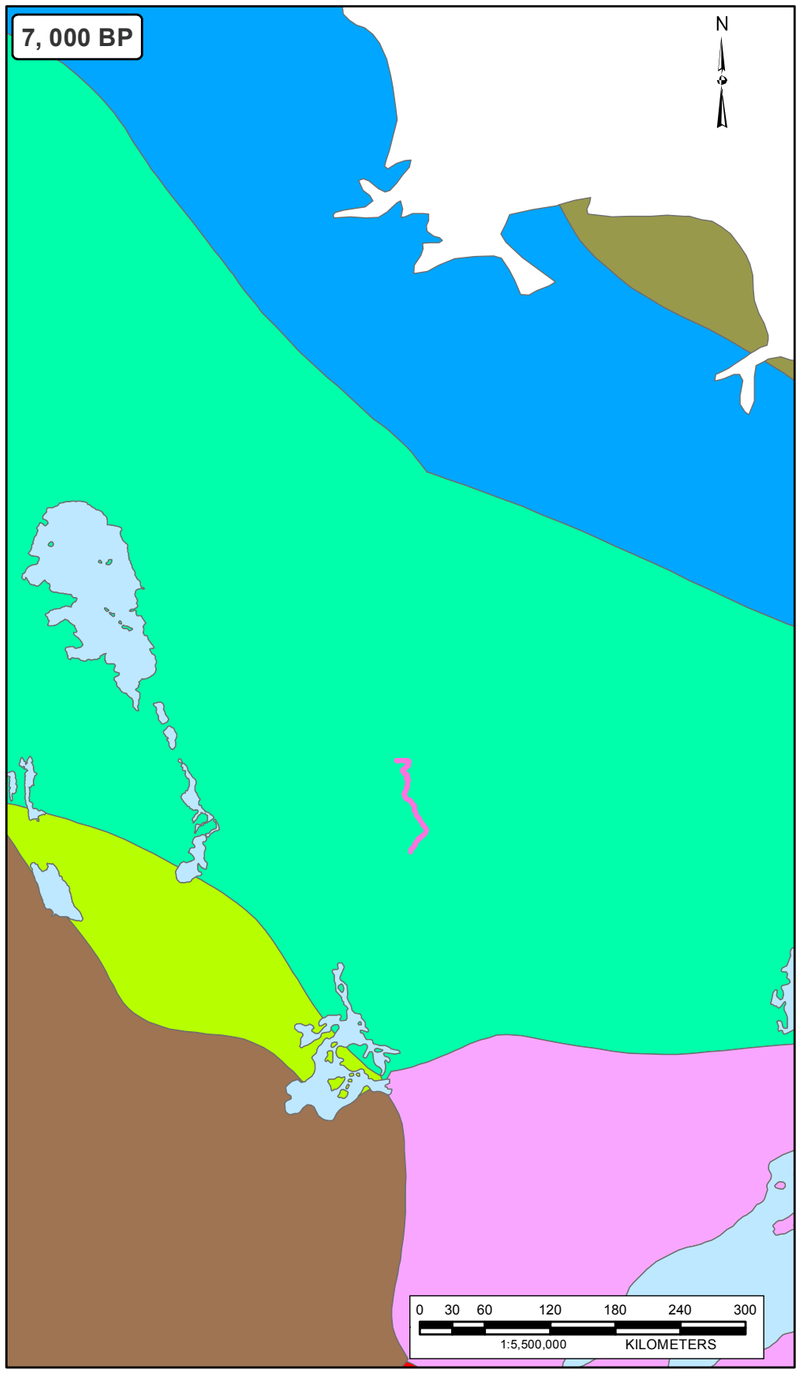

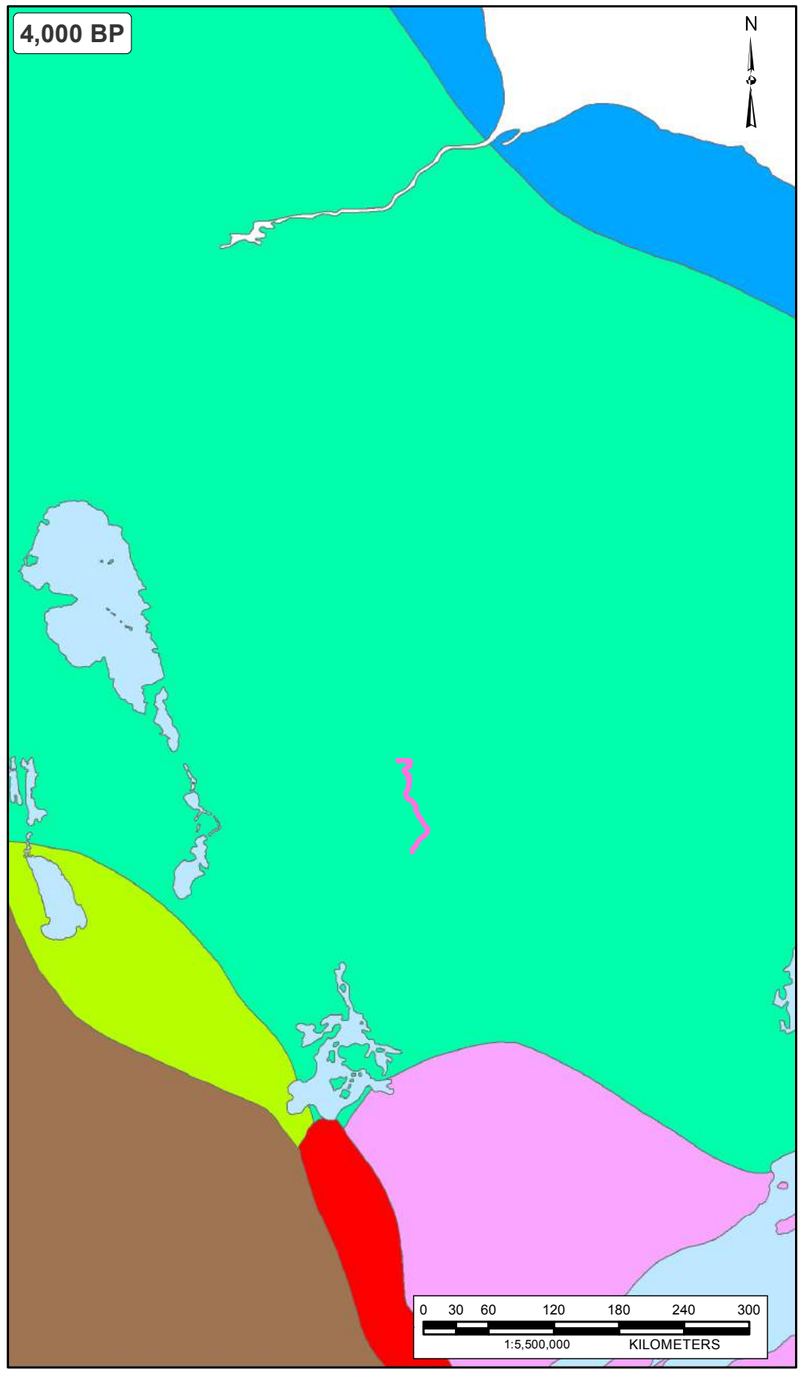

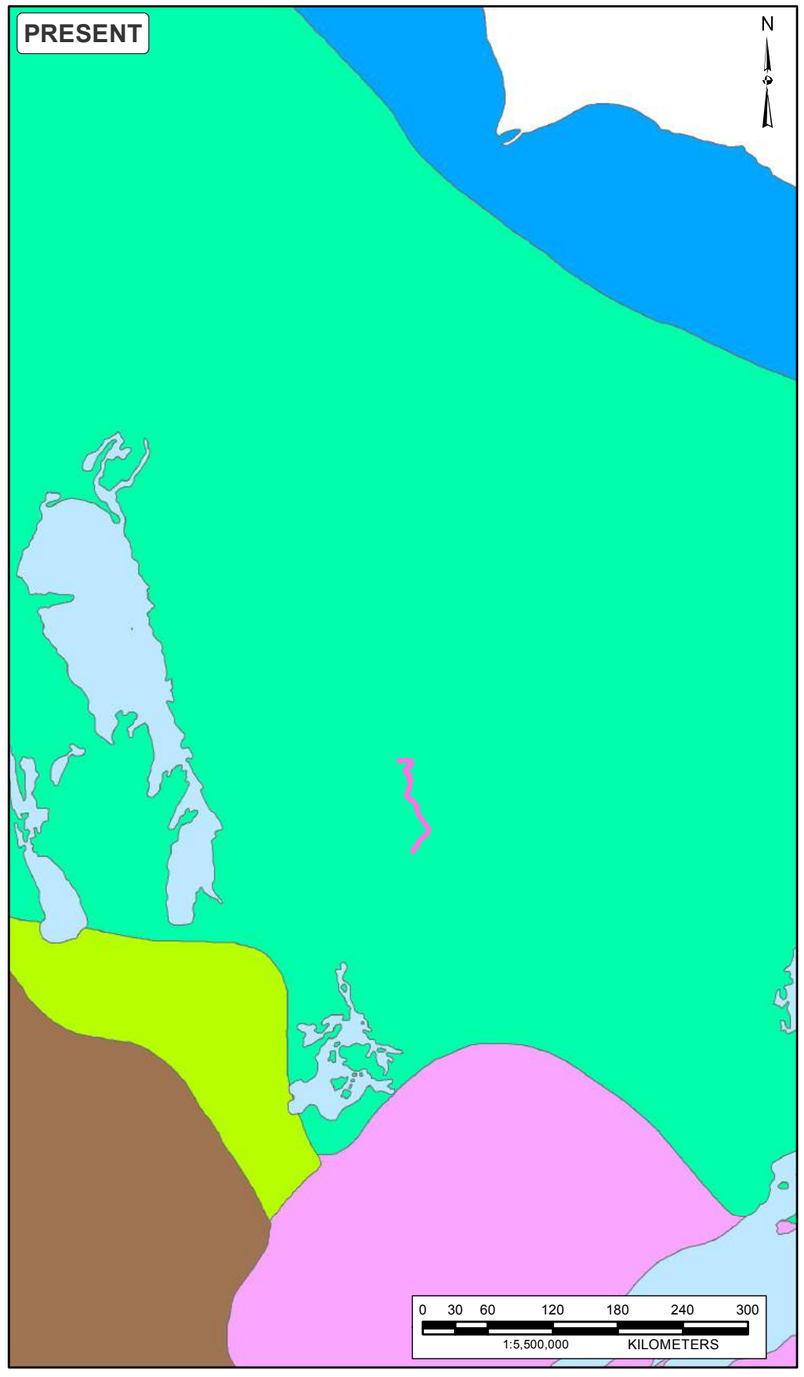

LEGEND

- Forest Tundra
- Boreal Forest
- Boreal Parkland
- Mixed Forest
- Grassland
- Water
- Project Limits of Work

REFERENCES

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2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
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NOTES

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CLIENT
WATAYNIKANEYAP POWER L.P.

CONSULTANT
Wataynikaneyap Power
Golder Associates

YYYY-MM-DD	2017-04-06
PREPARED	JR
DESIGN	PR/JMC
REVIEW	AM/BD
APPROVED	BT

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
POST-GLACIAL ENVIRONMENTAL SEQUENCE, NORTHWESTERN ONTARIO 7,000 B.P. TO PRESENT

PROJECT NO.	PHASE	REV.	MAP
1657738	-	-	**6**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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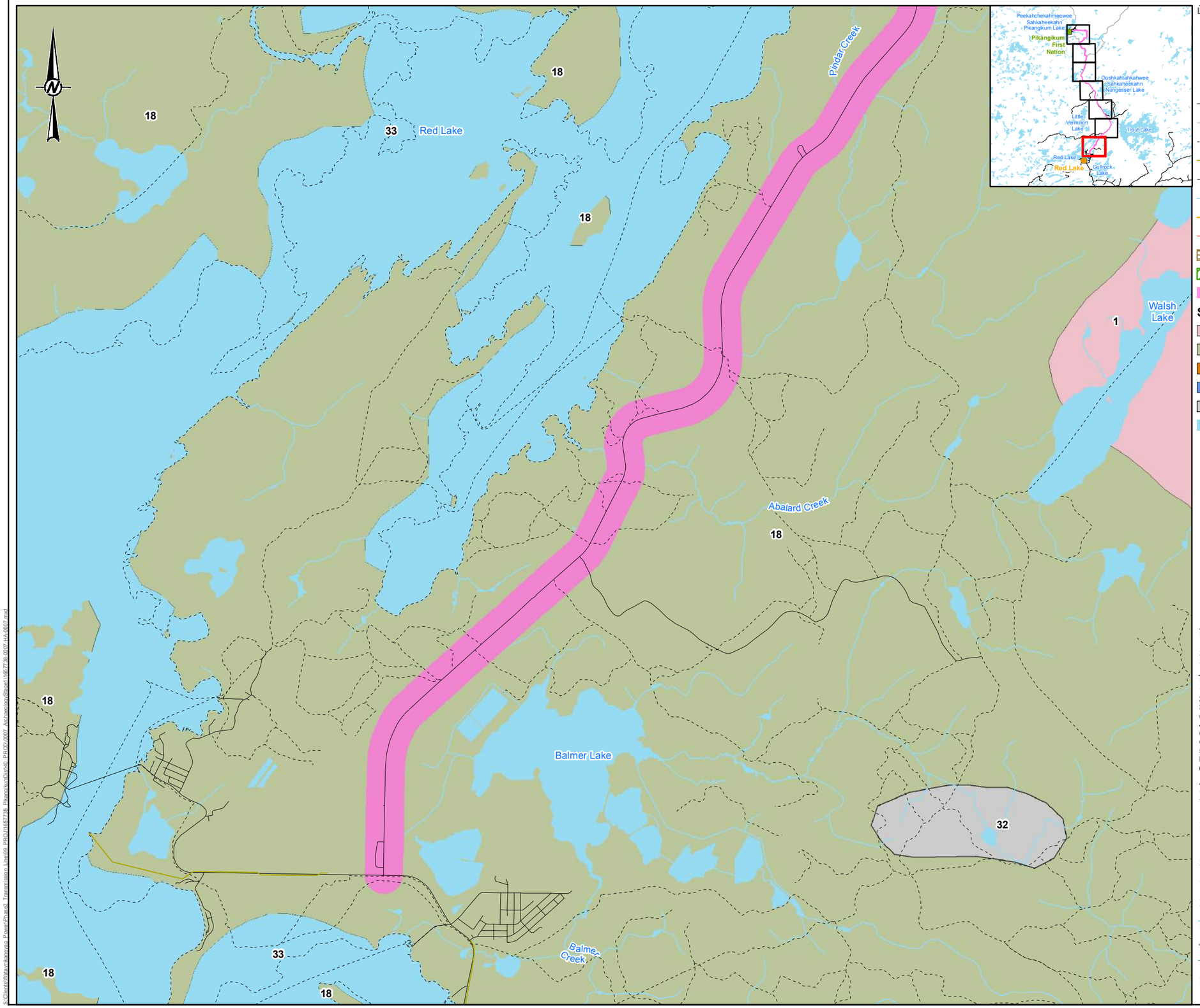

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

- 1: Bedrock
- 18: Till
- 22: Glaciofluvial Ice
- 24: Glaciolacustrine deposits
- 32: Organic Deposits
- 33: Lakes

0 0.5 1 2 3

1:50,000 KILOMETERS

NOTE(S)

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3. FIRST NATION COMMUNITIES FROM INDIGENOUS AND NORTHERN AFFAIRS CANADA (WWW.AINC-INAC.GC.CA)
4. SURFICIAL GEOLOGY (1:1,000,000) - ONTARIO GEOLOGICAL SURVEY, 1997. QUATERNARY GEOLOGY, SEAMLESS COVERAGE OF THE PROVINCE OF ONTARIO: ONTARIO GEOLOGICAL SURVEY, DATA SET 14.
5. PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2008
6. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 15

CLIENT

WATAYNIKANEYAP POWER L.P.

PROJECT

PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE

SURFICIAL GEOLOGY

CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**7-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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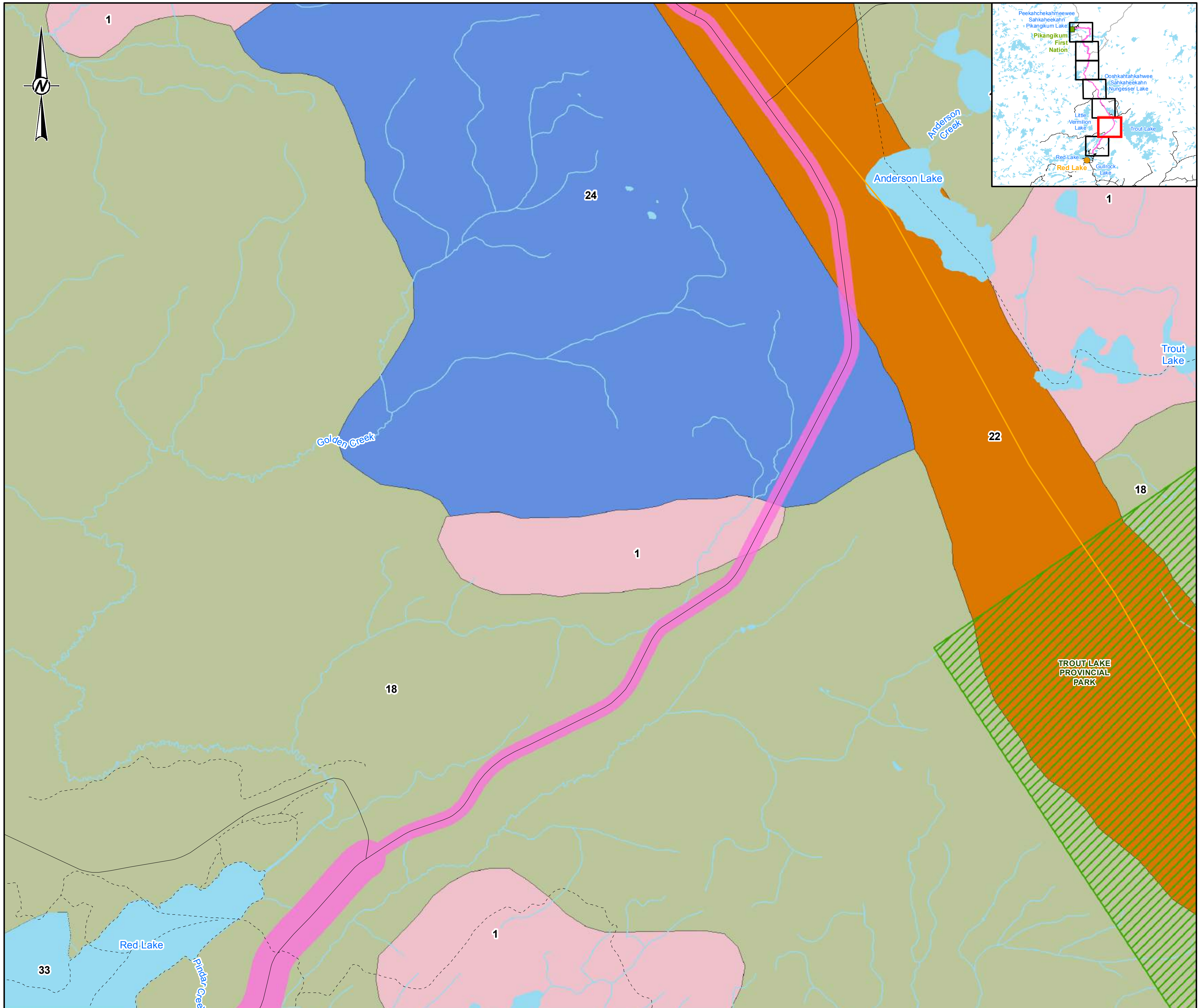

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

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0 0.5 1 2 3
1:50,000 KILOMETERS

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CLIENT
WATAYNIKANEYAP POWER L.P.

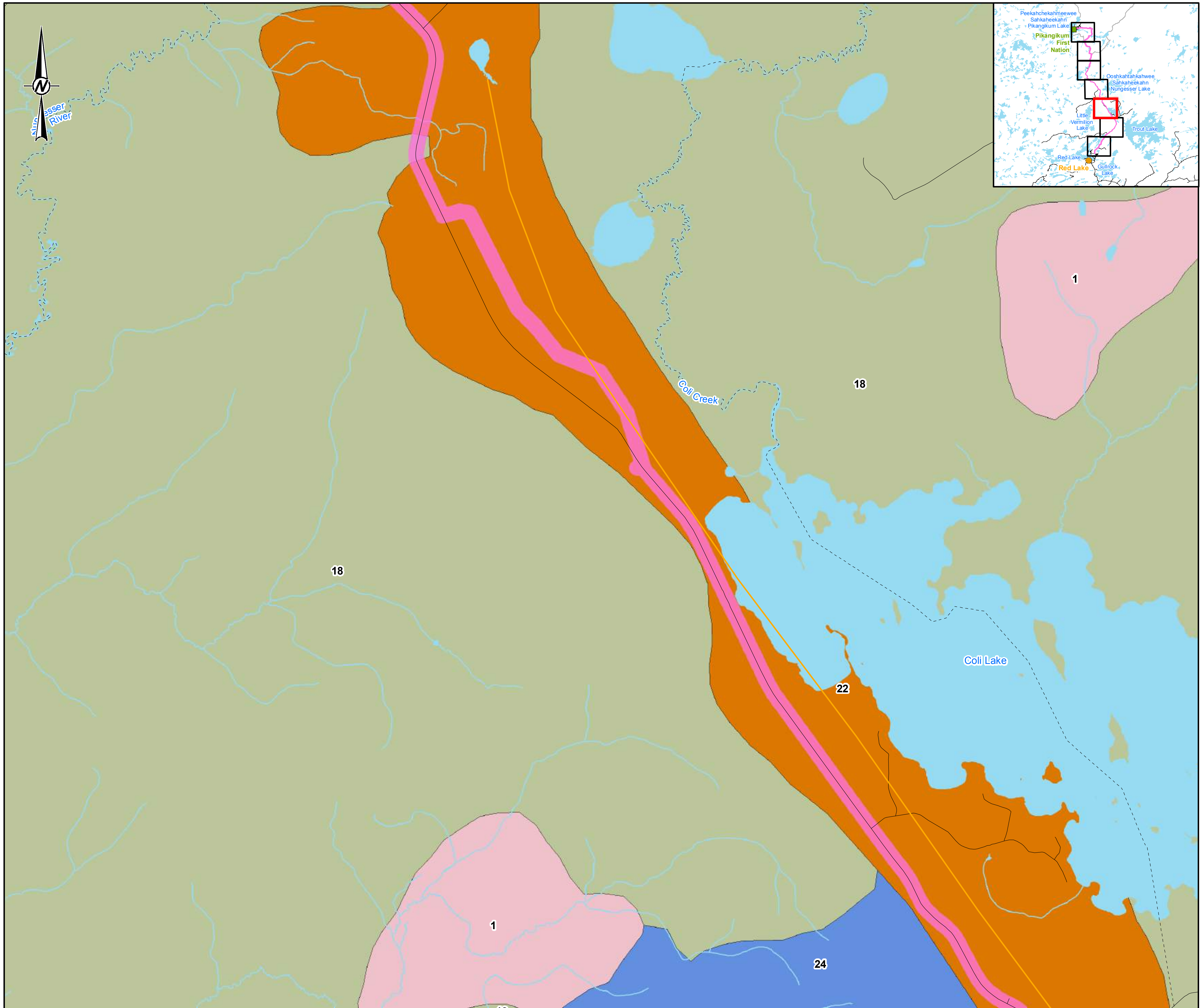
PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SURFICIAL GEOLOGY

CONSULTANT

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	7-2



LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

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1:50,000 KILOMETERS

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CLIENT

WATAYNIKANEYAP POWER L.P.

PROJECT

PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE

SURFICIAL GEOLOGY

CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**7-3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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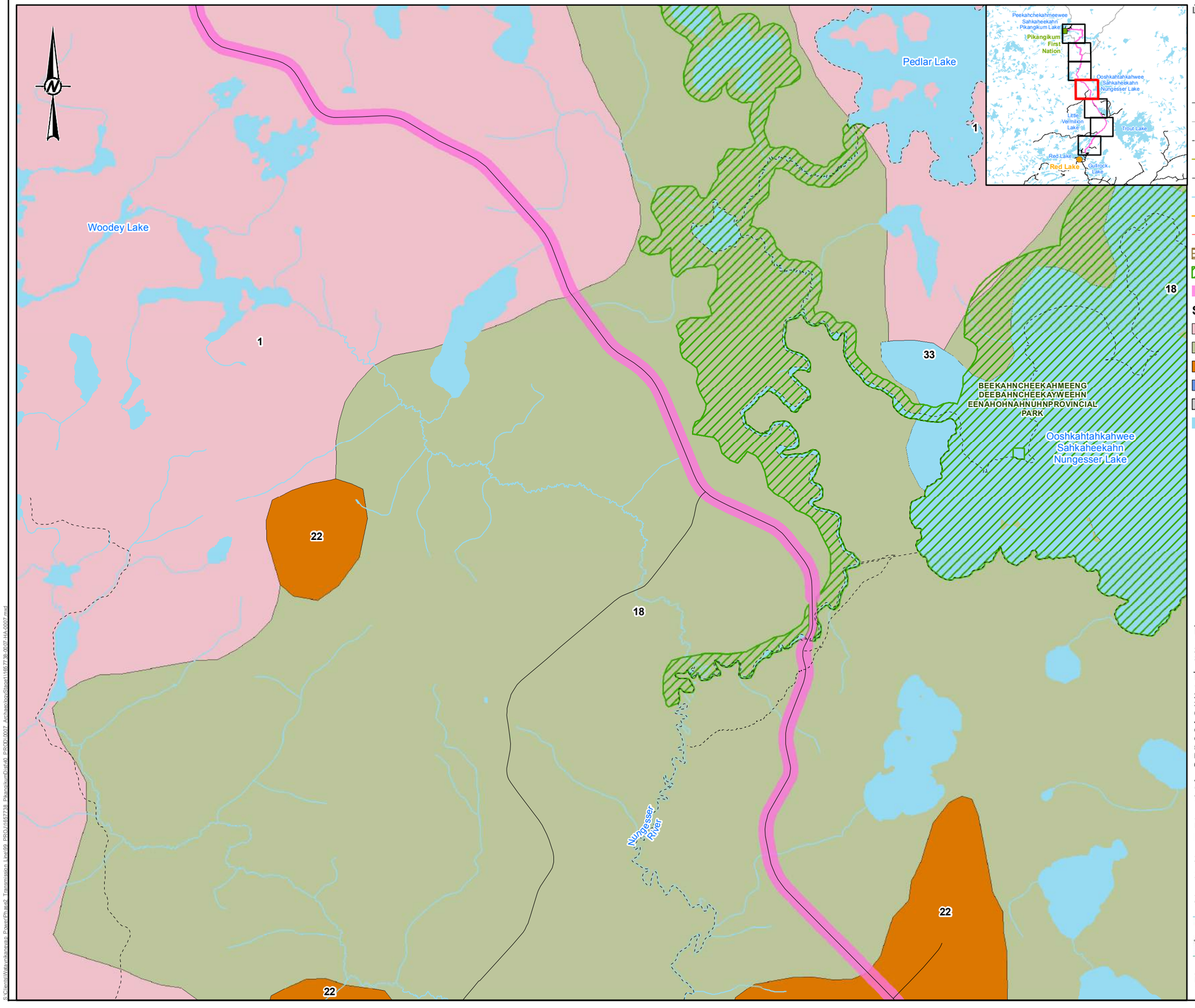

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

- 1: Bedrock
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- 33: Lakes

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1:50,000 KILOMETERS

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6. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 15

CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SURFICIAL GEOLOGY

CONSULTANT

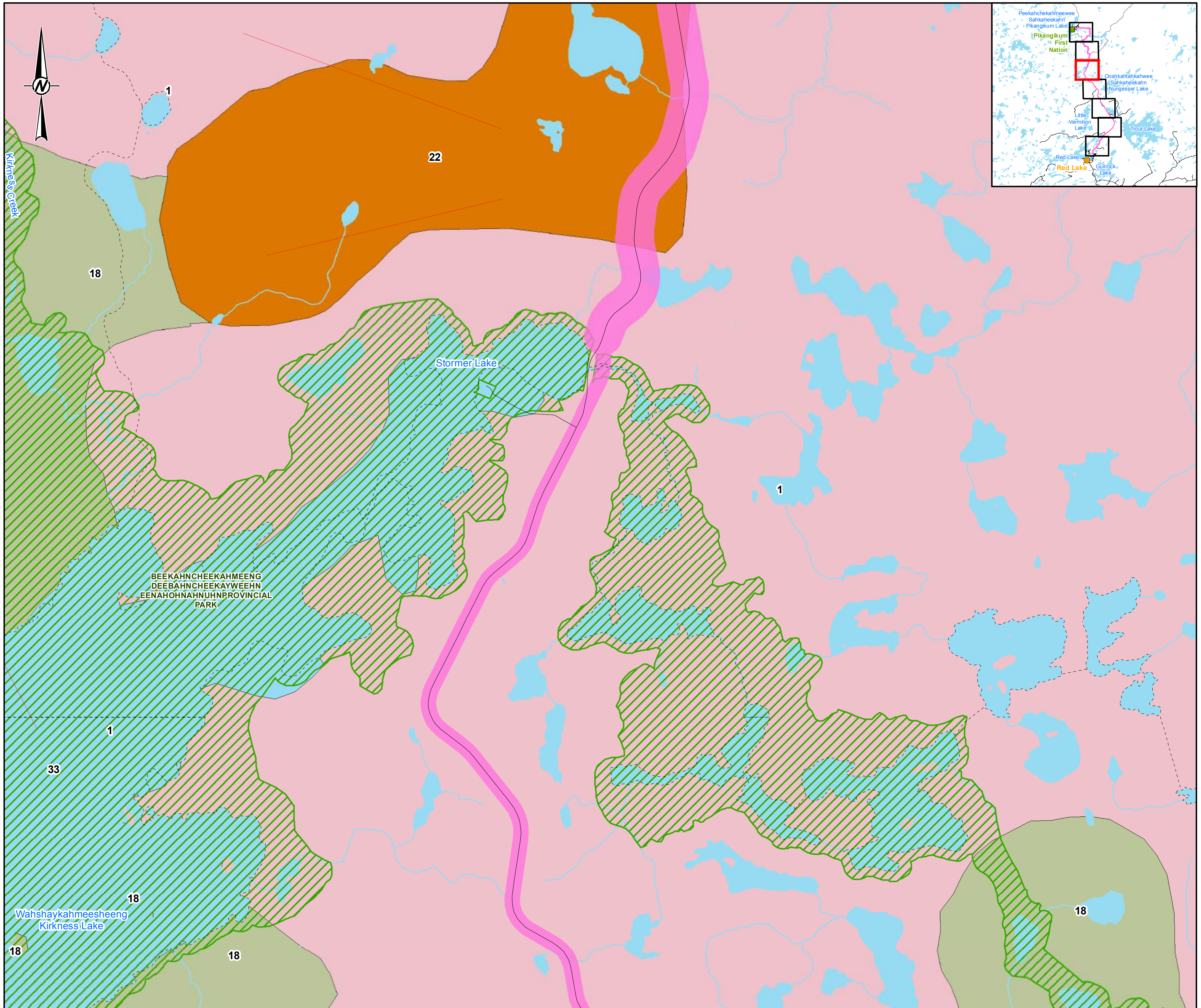
Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**7-4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0



LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

- 1: Bedrock
- 18: Till
- 22: Glaciofluvial Ice
- 24: Glaciolacustrine deposits
- 32: Organic Deposits
- 33: Lakes

0 0.5 1 2 3
1:50,000 KILOMETERS

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SURFICIAL GEOLOGY

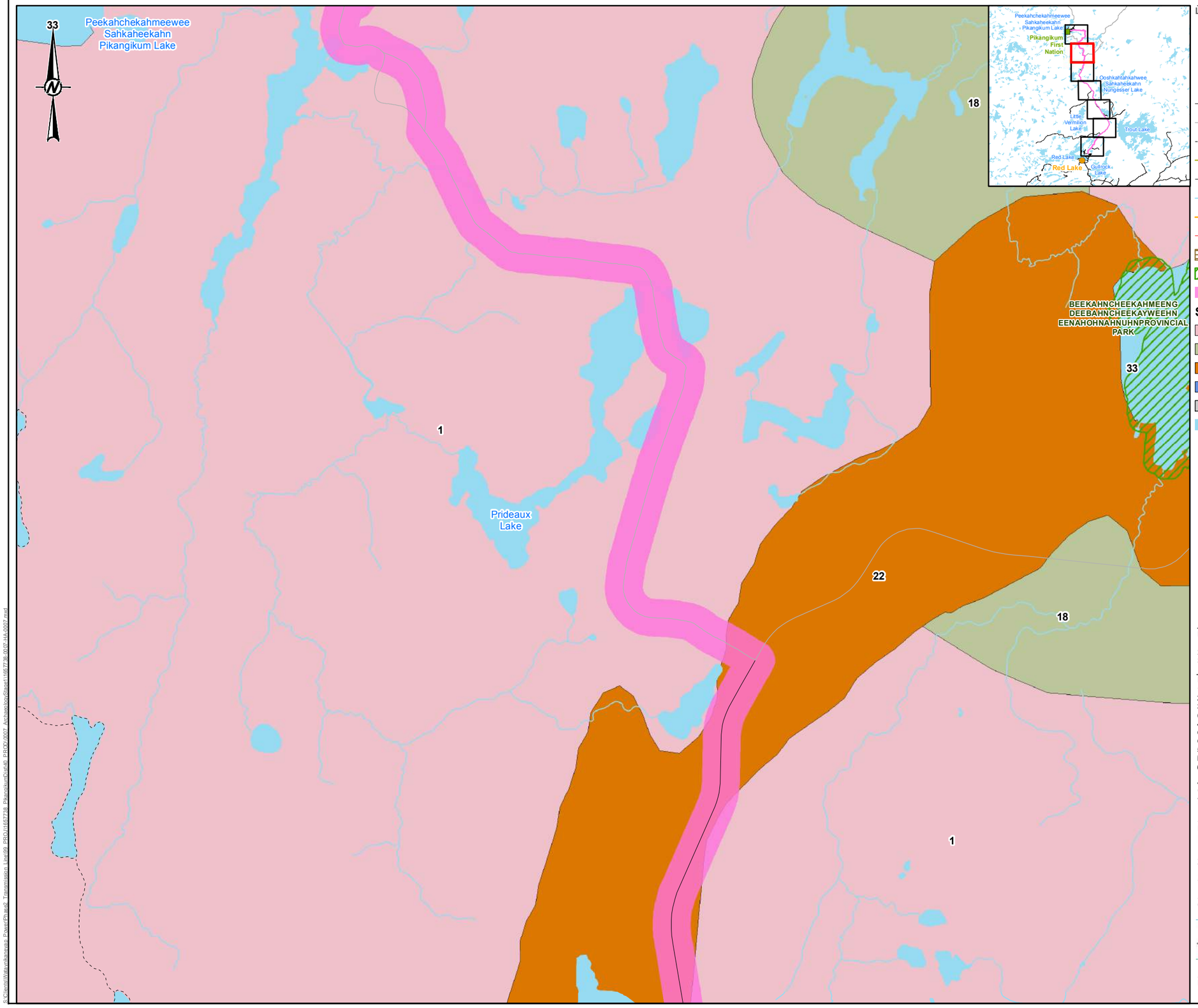
CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	7-5



LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

- 1: Bedrock
- 18: Till
- 22: Glaciofluvial Ice
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- 33: Lakes

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1:50,000 KILOMETERS

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SURFICIAL GEOLOGY

CONSULTANT

YYYY-MM-DD	2017-04-10
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**7-6**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm

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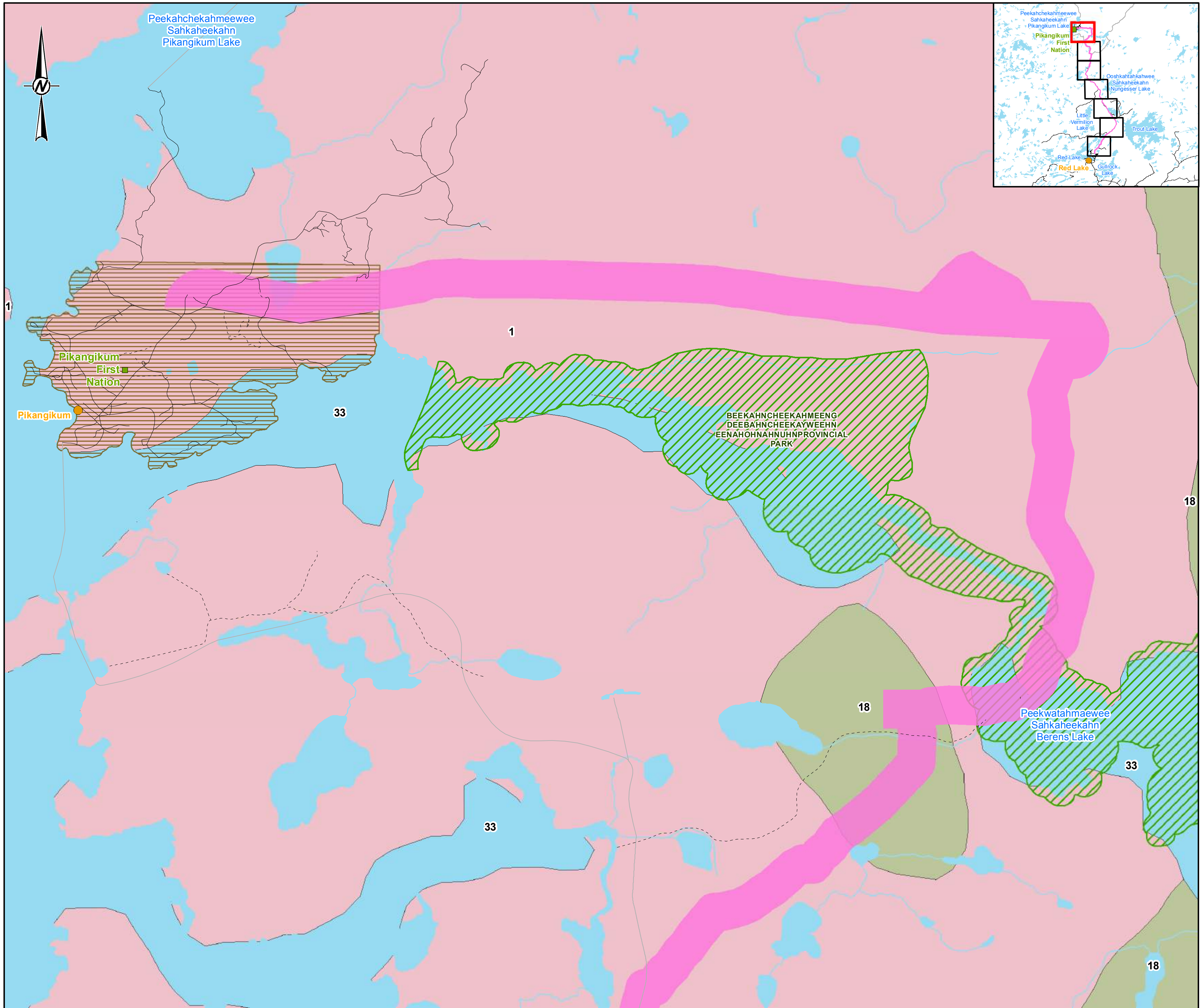

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work

Surficial Geology (1:1,000,000)

- 1: Bedrock
- 18: Till
- 22: Glaciofluvial Ice
- 24: Glaciolacustrine deposits
- 32: Organic Deposits
- 33: Lakes

0 0.5 1 2 3
1:50,000 KILOMETERS

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SURFICIAL GEOLOGY

CONSULTANT

YYYY-MM-DD	2017-04-10
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PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	7-7

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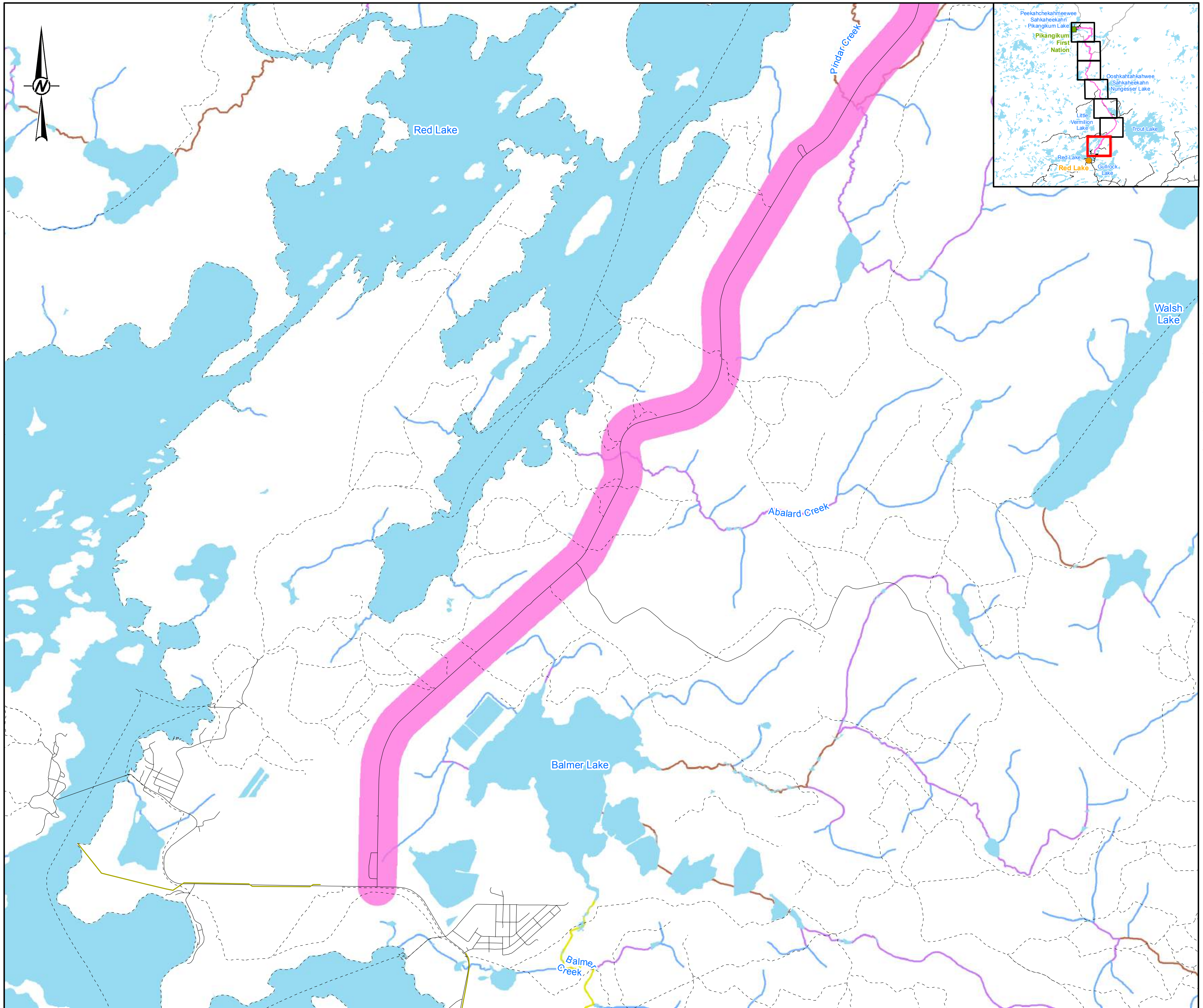

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Waterbody
- First Nation Reserve Land
- Conservation Reserve
- Provincial Parks
- Project Limits of Work

Stream Order

- 1
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1:50,000 KILOMETERS

NOTE(S)

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2. TRANSMISSION ROUTES - PROVIDED BY WATAYNIKANEYAP POWER L.P.
3. FIRST NATION COMMUNITIES FROM INDIGENOUS AND NORTHERN AFFAIRS CANADA (WWW.AINC-INAC.GC.CA)
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5. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83 COORDINATE SYSTEM: UTM ZONE 15

CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

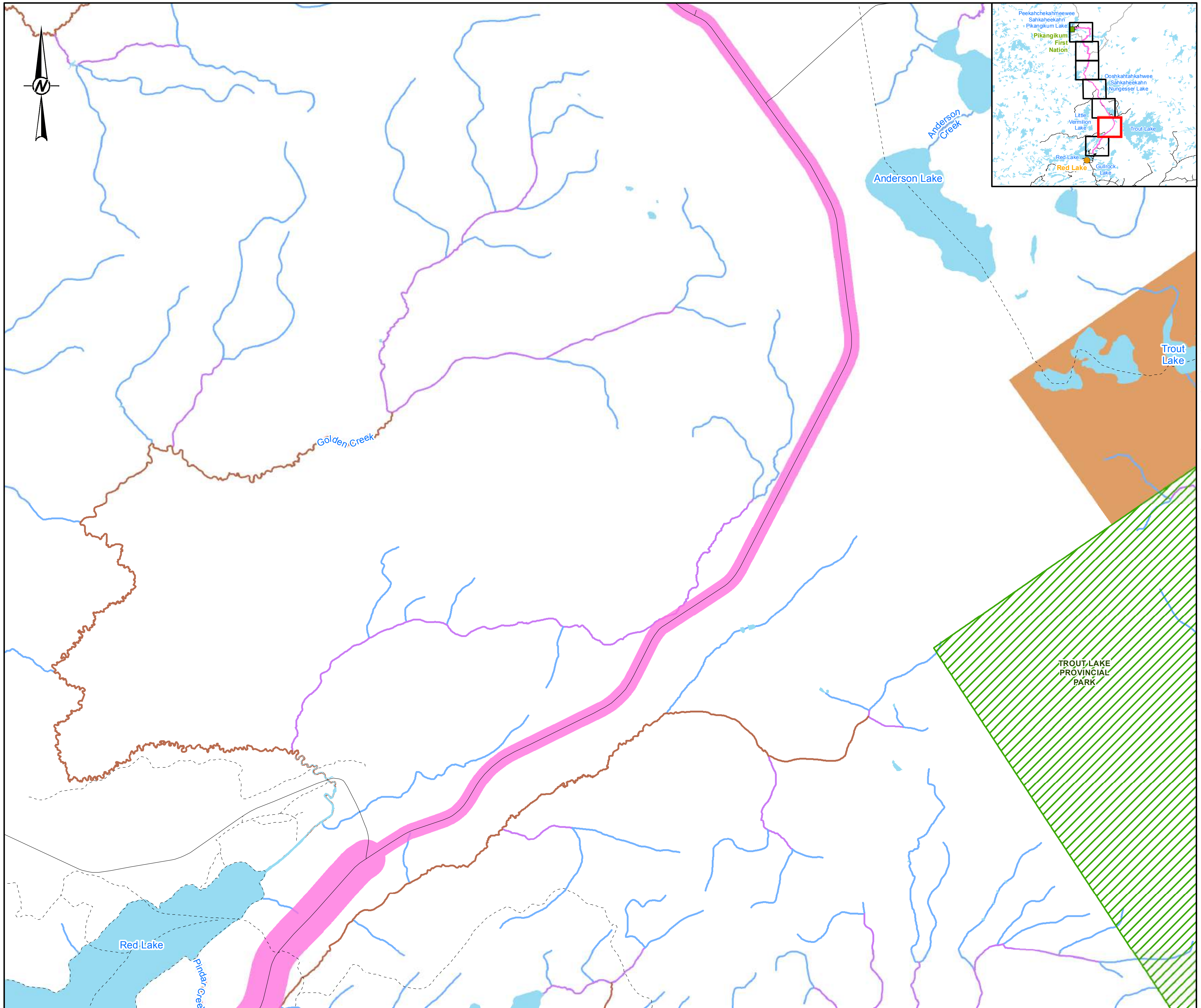
TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

YYYY-MM-DD	2017-04-17
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	8-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm 0



LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Waterbody
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Stream Order

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WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

Wataynikaneyap Power | Golder Associates

YYYY-MM-DD	2017-04-17
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APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	8-2

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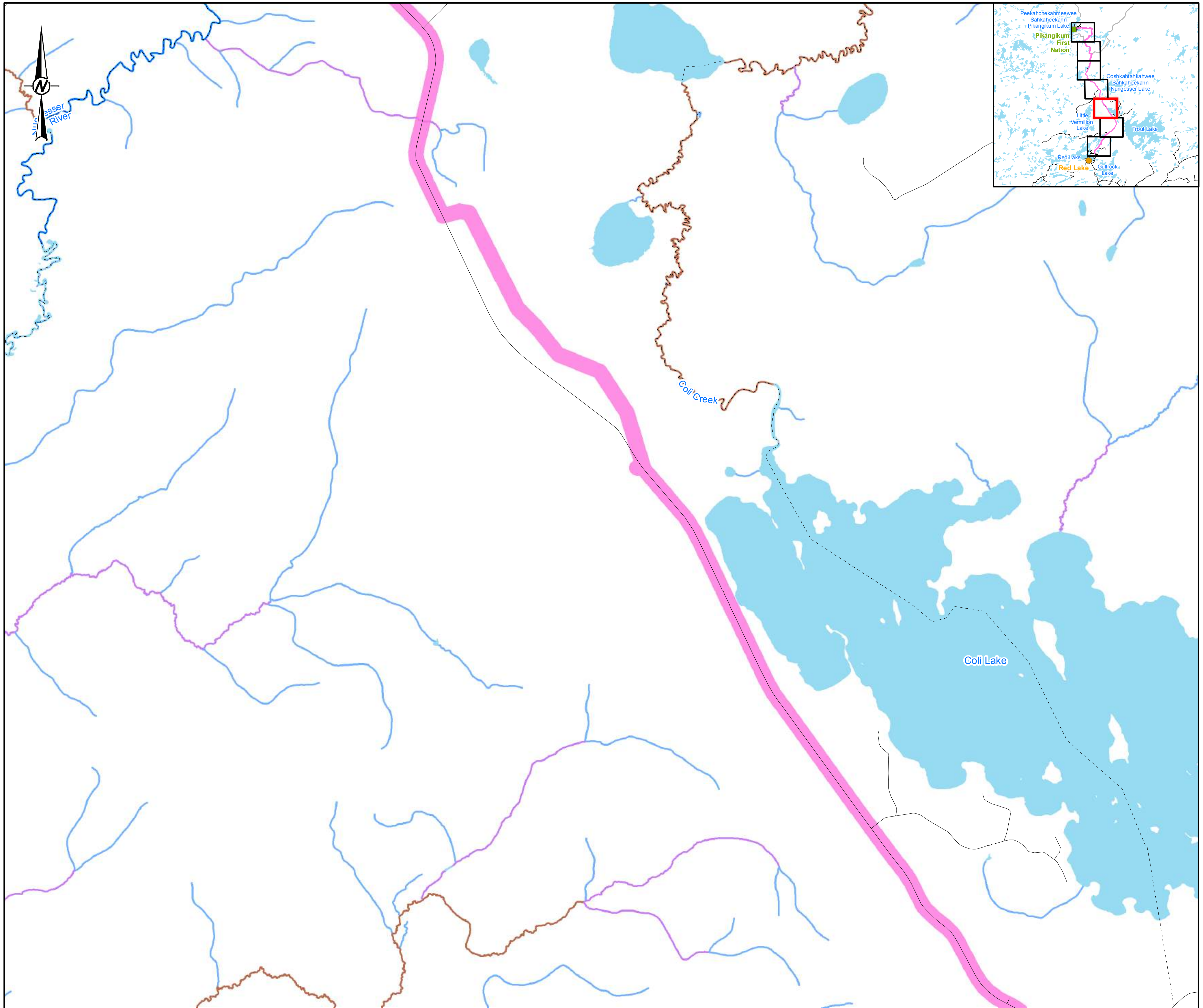

LEGEND

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

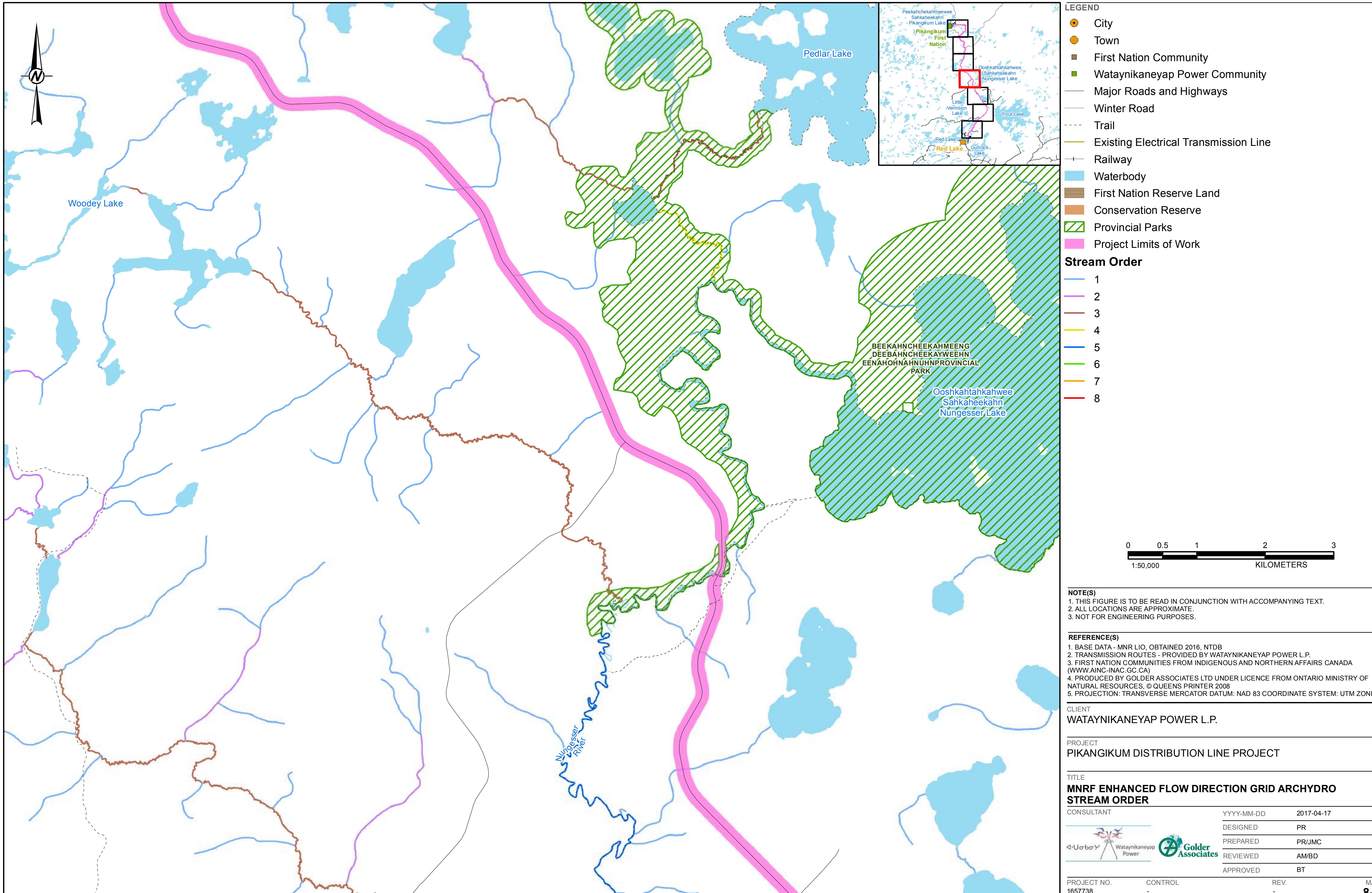
TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

ᐊᐧᐅᑕᐱᔅ Wataynikaneyap Power
Golder Associates

YYYY-MM-DD	2017-04-17
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**8-3**



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PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

Wataynikaneyap Power
Golder Associates

YYYY-MM-DD	2017-04-17
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PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	8-4

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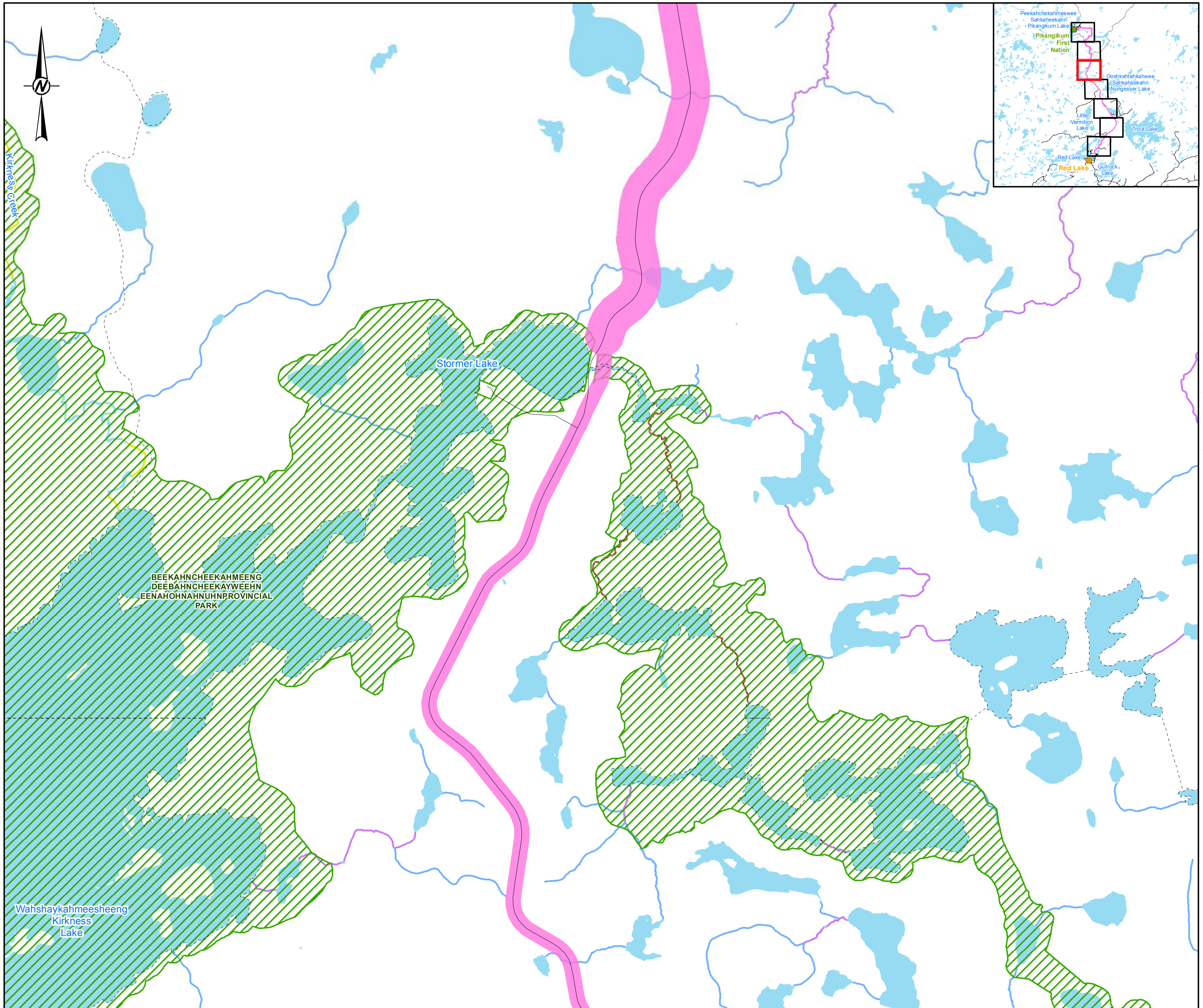

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- Town
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PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-17
DESIGNED	PR
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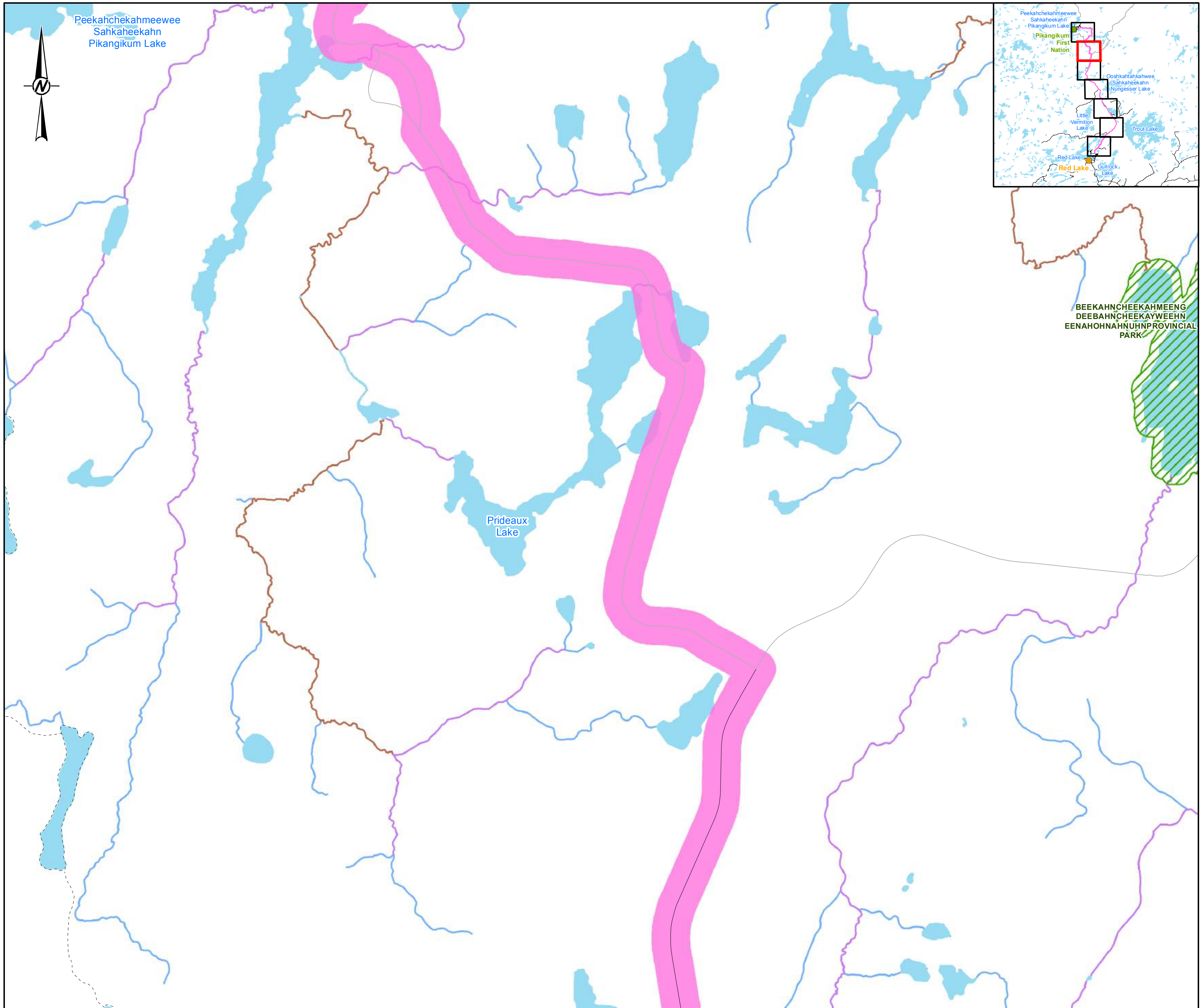
PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	8-5

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

ᐊᐧᐅᓂᑲᓀᔭᑊ Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-17
DESIGNED	PR
PREPARED	PR/JMC
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APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	8-6

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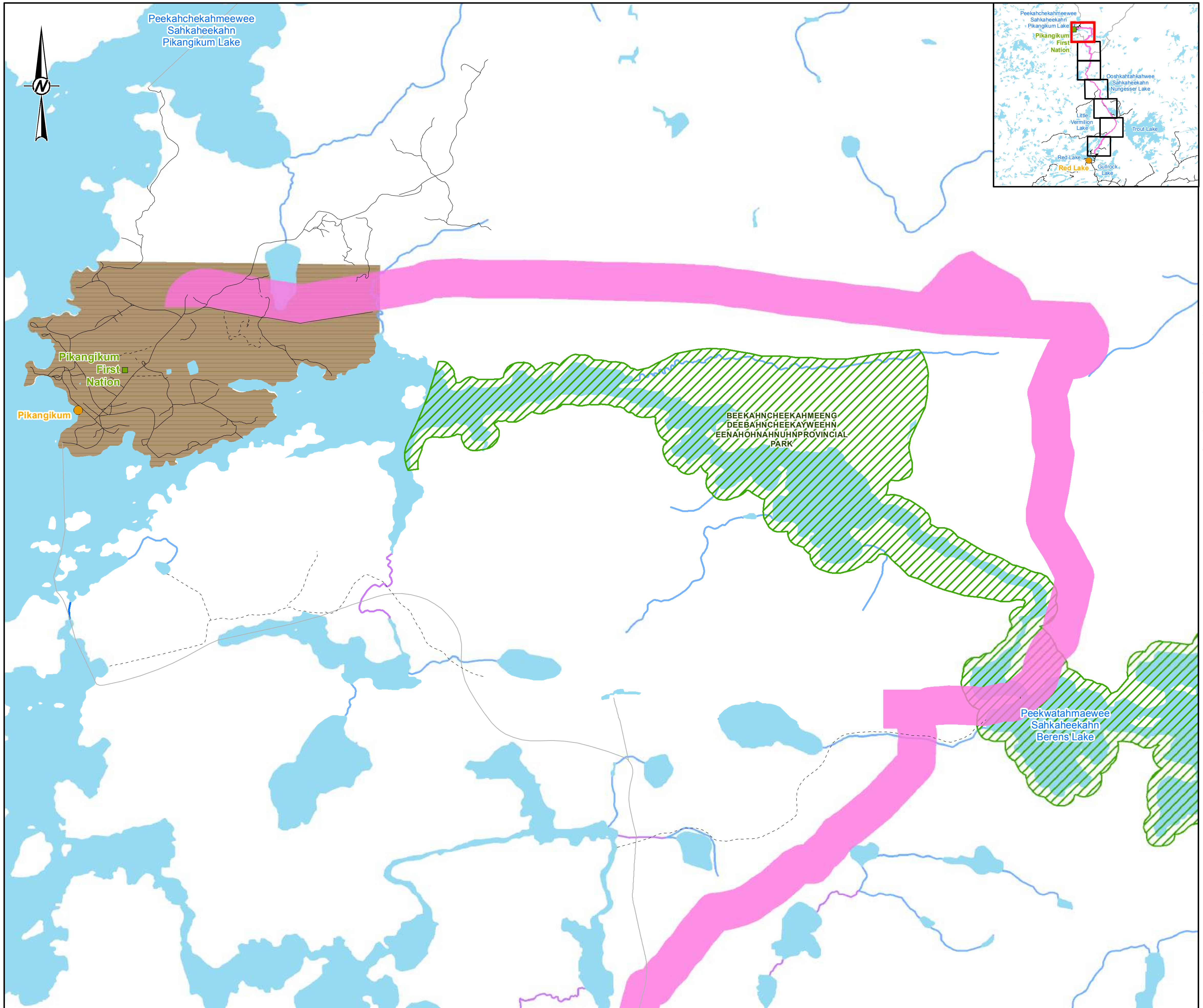

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ENHANCED FLOW DIRECTION GRID ARCHYDRO STREAM ORDER

CONSULTANT

YYYY-MM-DD	2017-04-17
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**8-7**

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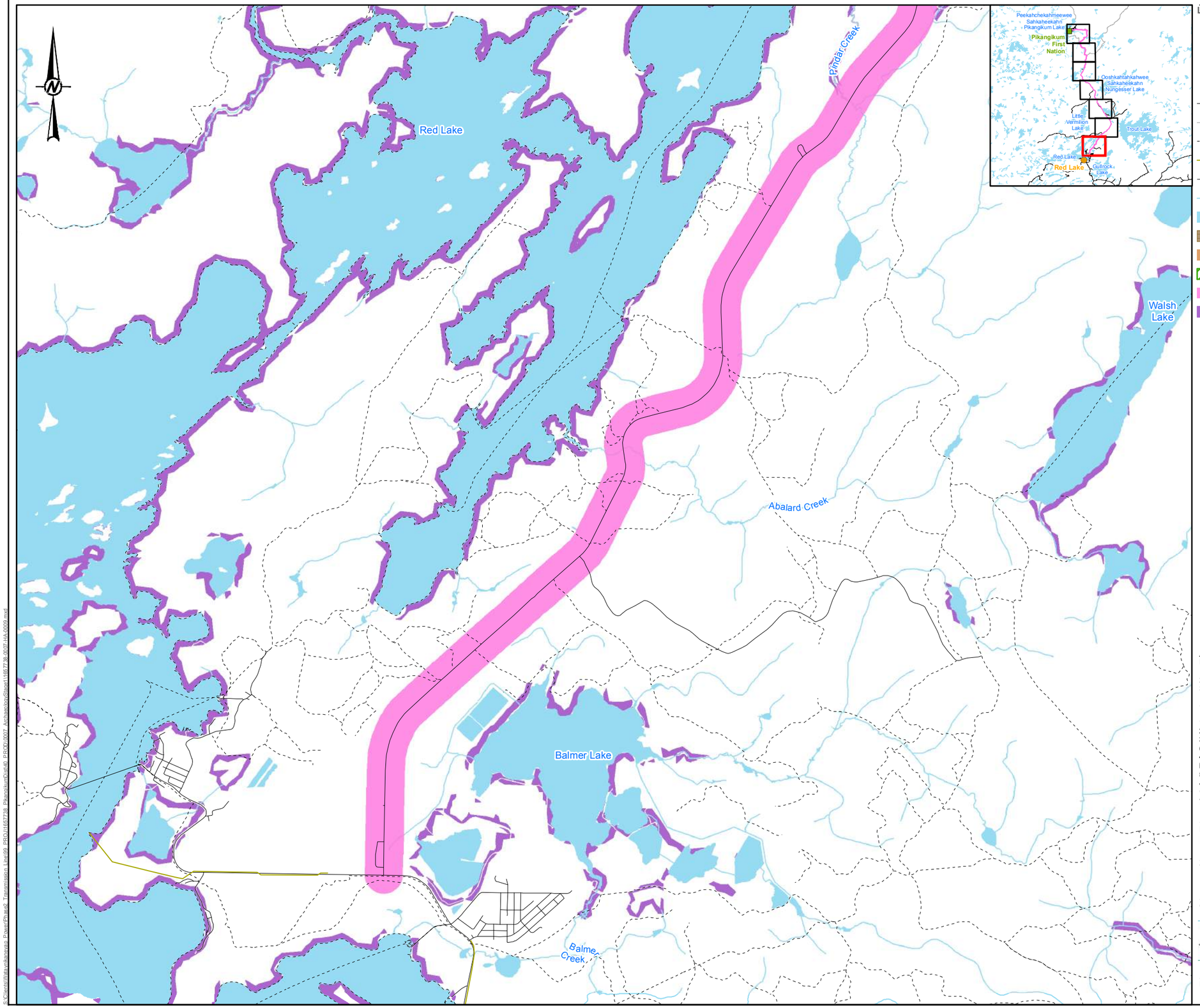

LEGEND

- City
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- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
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1:50,000 KILOMETERS

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CLIENT

WATAYNIKANEYAP POWER L.P.

PROJECT

PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE

MNRF ARCHAEOLOGICAL POTENTIAL

CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-17
DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**9-1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

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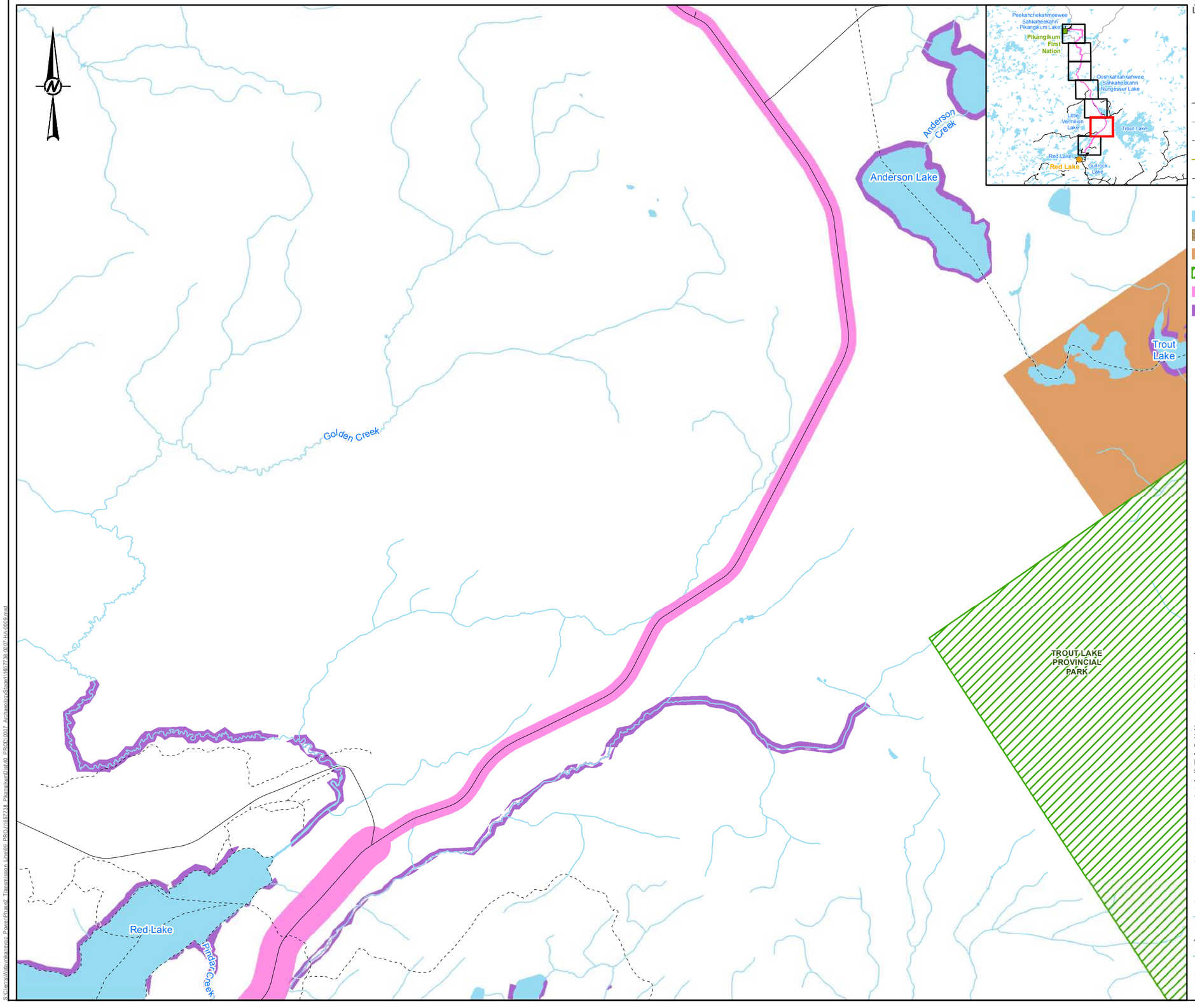

LEGEND

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PROJECT

PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE

MNRF ARCHAEOLOGICAL POTENTIAL

CONSULTANT			
		YYYY-MM-DD	2017-04-17
		DESIGNED	PR
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		APPROVED	BT

PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**9-2**

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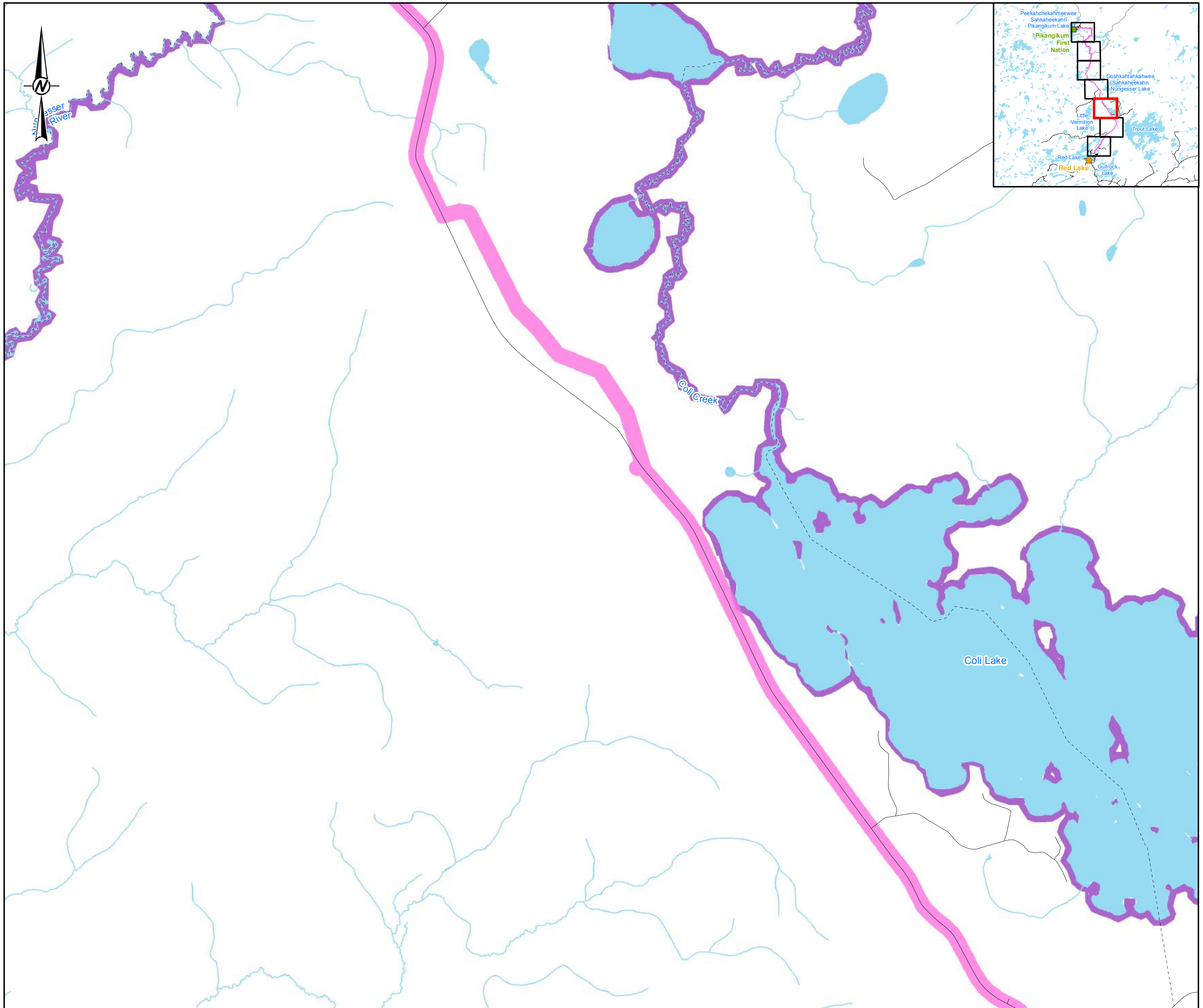

LEGEND

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CLIENT
WATAYNIKANEYAP POWER L.P.

PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
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CONSULTANT

YYYY-MM-DD	2017-04-17
DESIGNED	PR
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PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**9-3**

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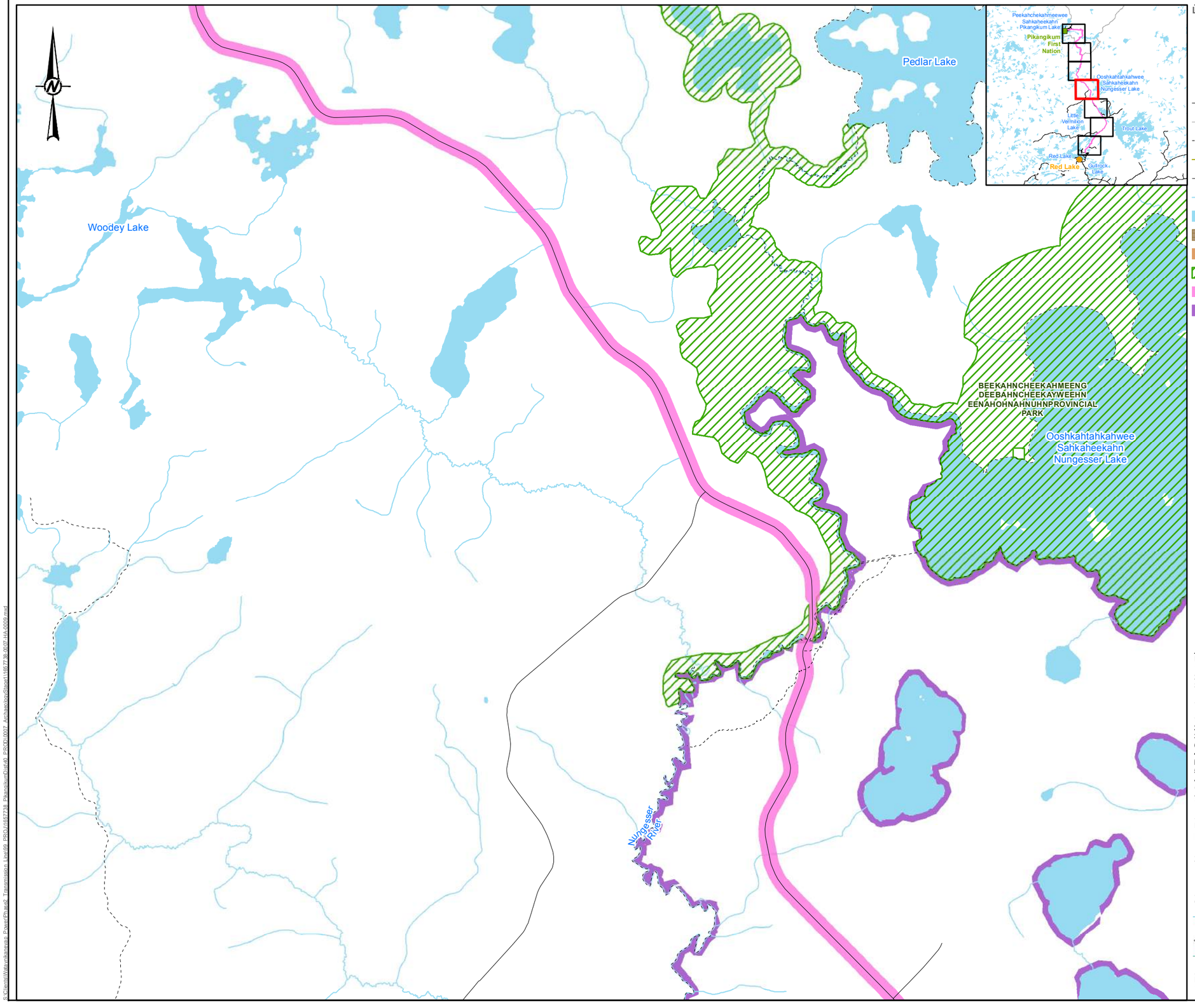

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PROJECT

PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE

MNRF ARCHAEOLOGICAL POTENTIAL

CONSULTANT

Wataynikaneyap Power

Golder Associates

YYYY-MM-DD	2017-04-17
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PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**9-4**

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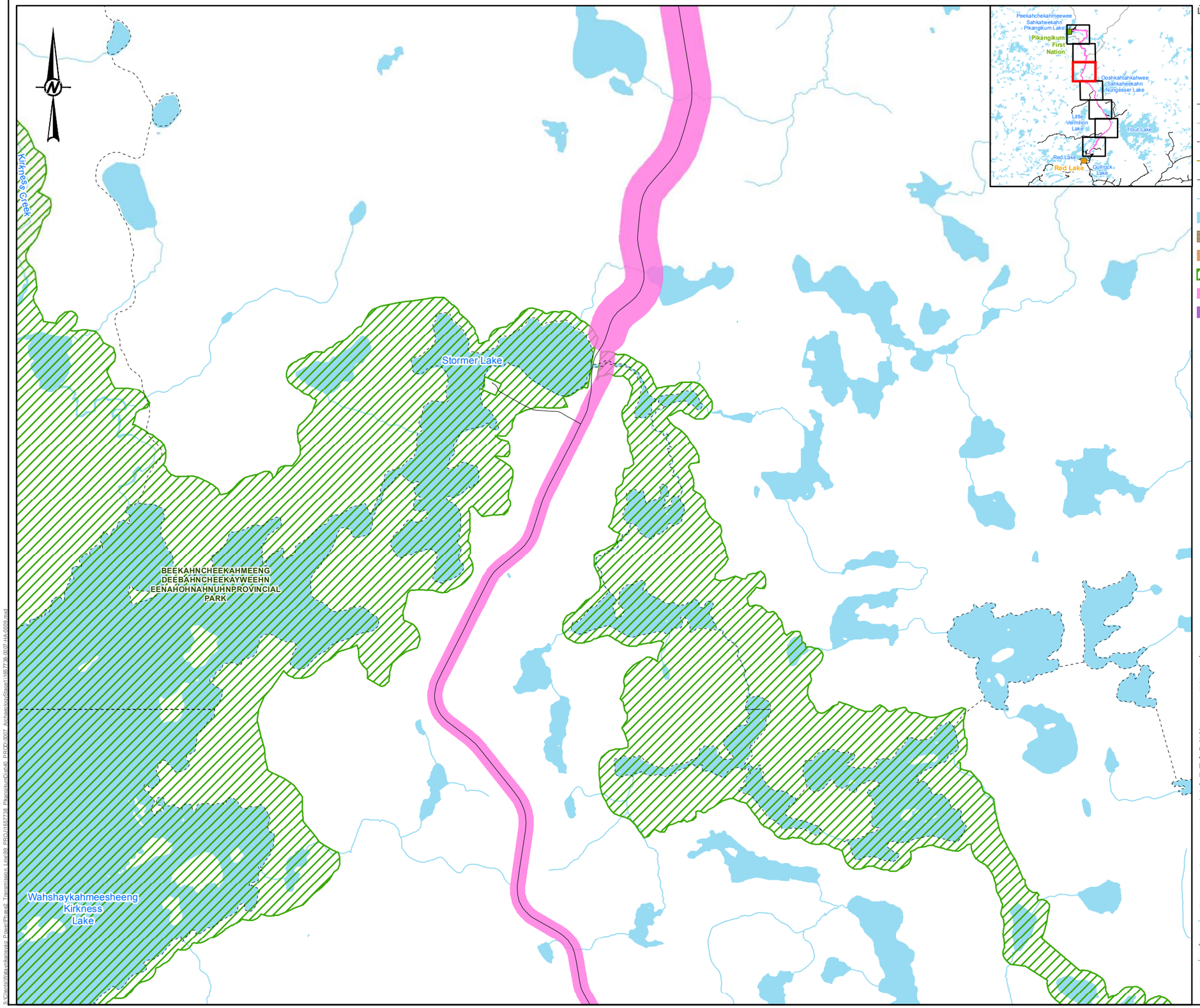

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PROJECT

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CONSULTANT

Wataynikaneyap Power

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PROJECT NO.	CONTROL	REV.	MAP
1657738	-	-	**9-5**

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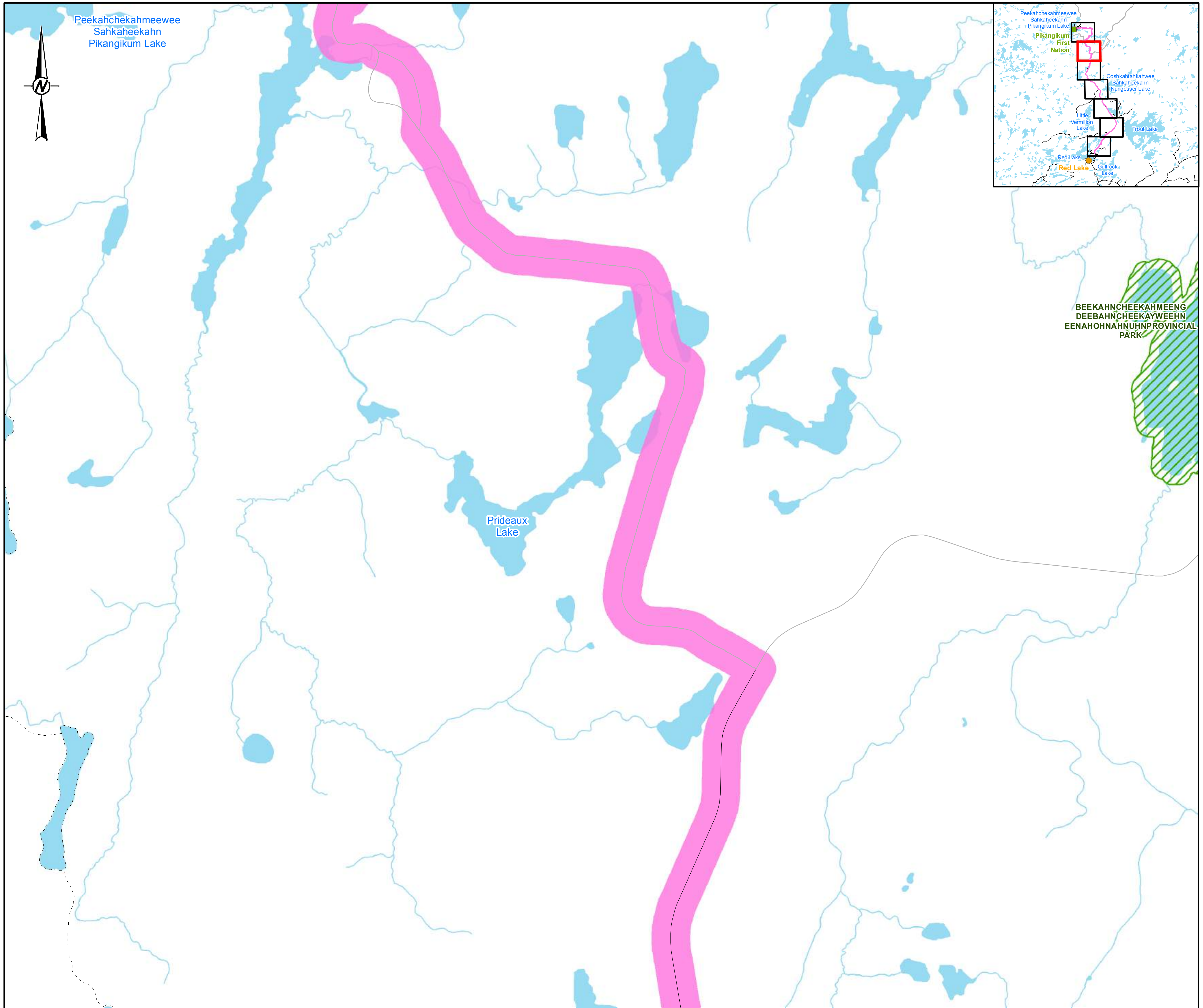

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CLIENT
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PROJECT
PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
MNRF ARCHAEOLOGICAL POTENTIAL

CONSULTANT

Wataynikaneyap Power

Golder Associates

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DESIGNED	PR
PREPARED	PR/JMC
REVIEWED	AM/BD
APPROVED	BT

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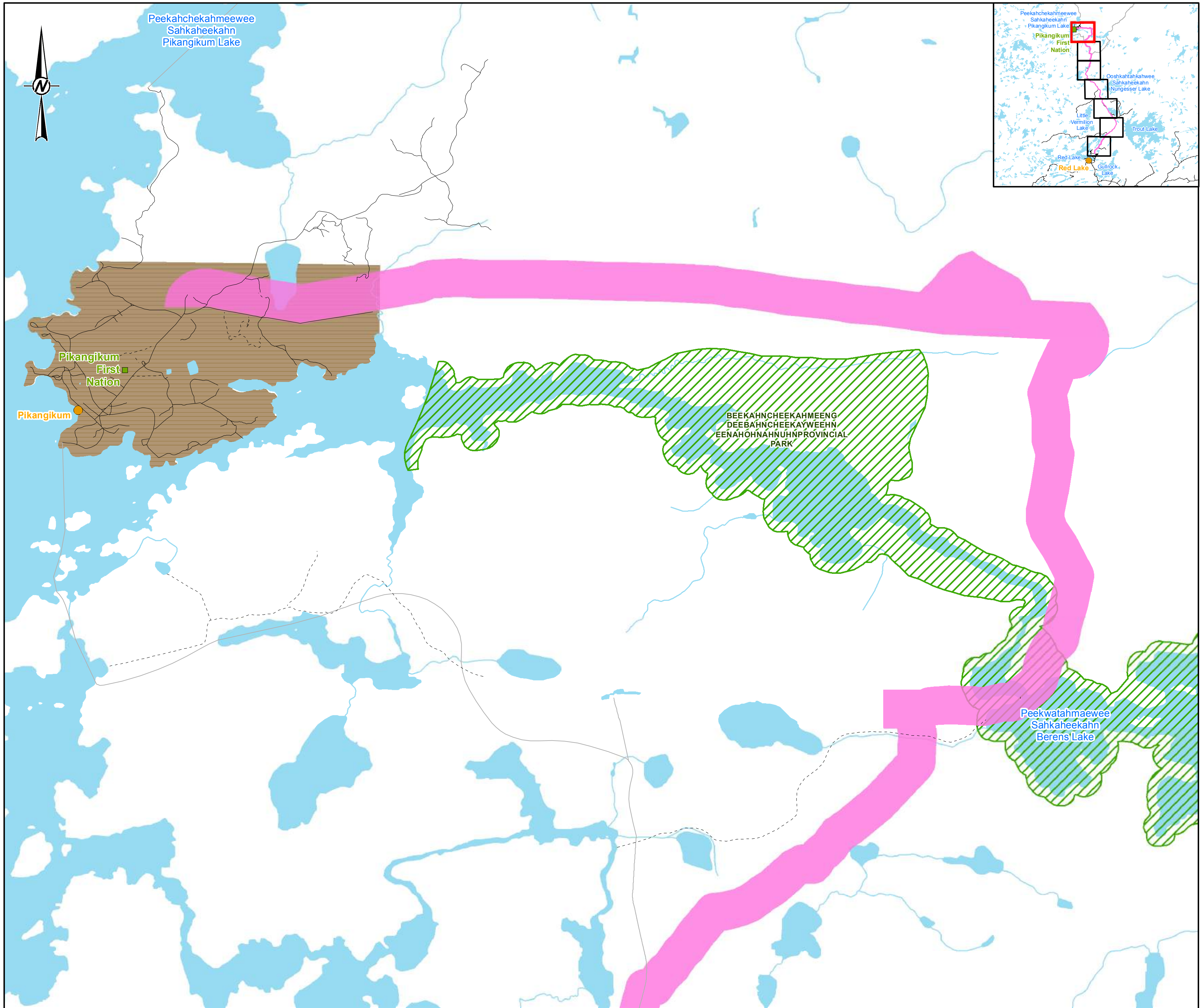

LEGEND

- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Watercourse
- Waterbody
- First Nation Reserve Land
- Conservation Reserve
- Provincial Parks
- Project Limits of Work
- MNRF Archaeological Potential Methods

0 0.5 1 2 3
1:50,000 KILOMETERS

NOTE(S)
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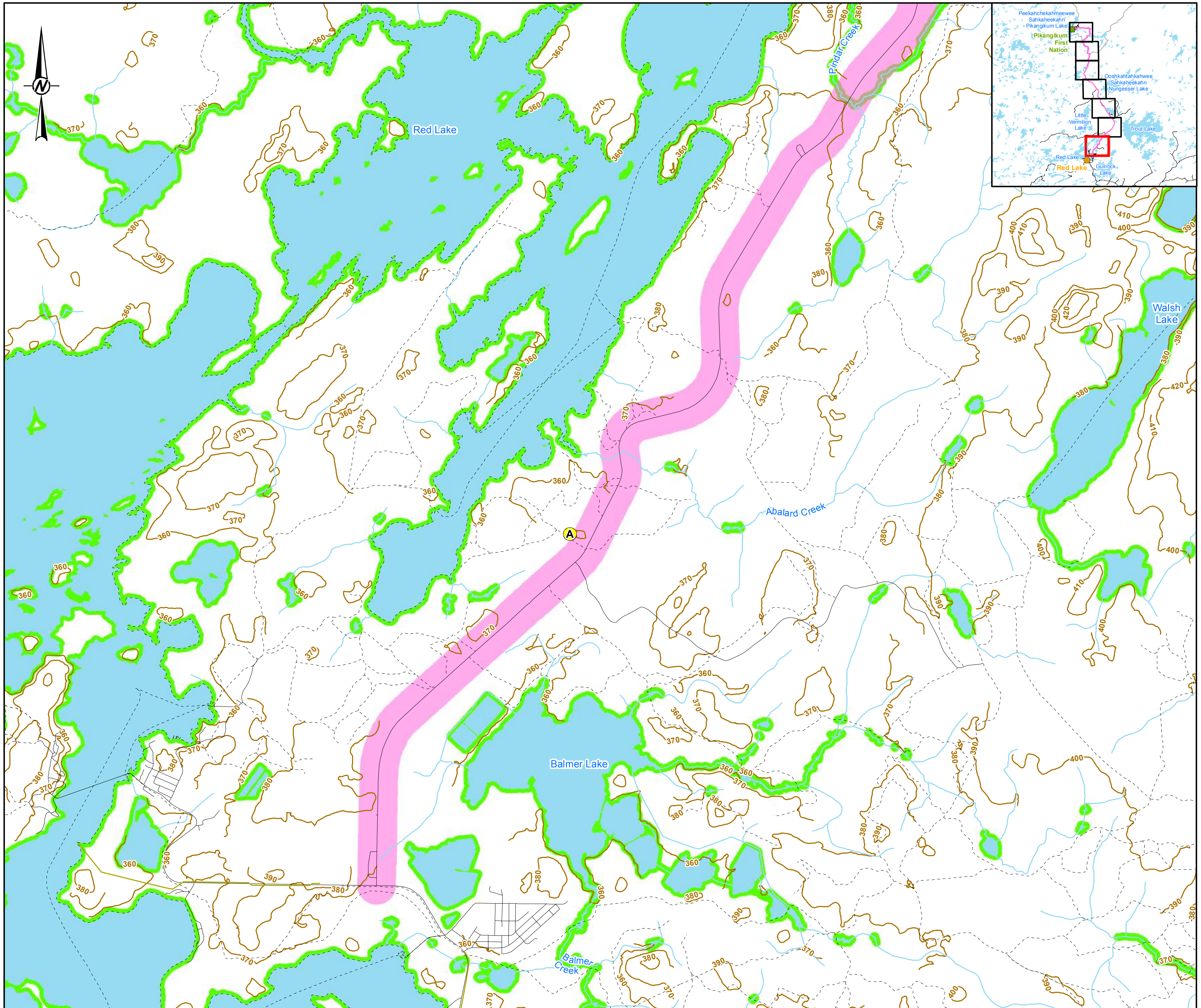

LEGEND

- (A) Areas of Removed Archaeological Potential
- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
- Railway
- Trend of end moraine crest
- Area of DeGeer or minor moraine forms
- Elevation (10 m)
- Watercourse
- Waterbody
- First Nation Reserve Land
- Conservation Reserve
- Provincial Parks
- Project Limits of Work
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PROJECT
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TITLE
AREAS REQUIRING STAGE 2 ARCHAEOLOGICAL ASSESSMENT

CONSULTANT

Wataynikaneyap Power | Golder Associates

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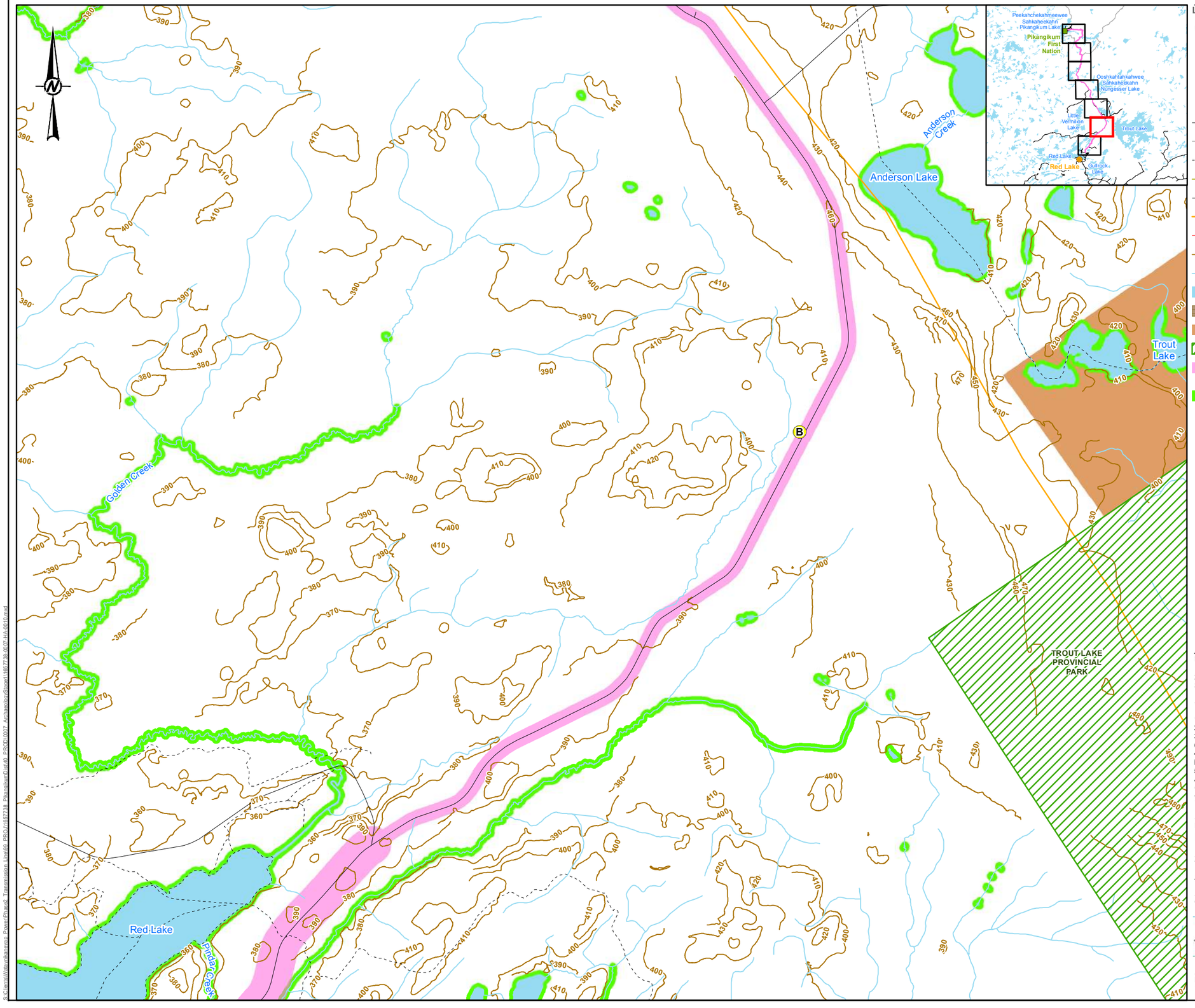

LEGEND

- Areas of Removed Archaeological Potential
- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Existing Electrical Transmission Line
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0 0.5 1 2 3

1:50,000 KILOMETERS

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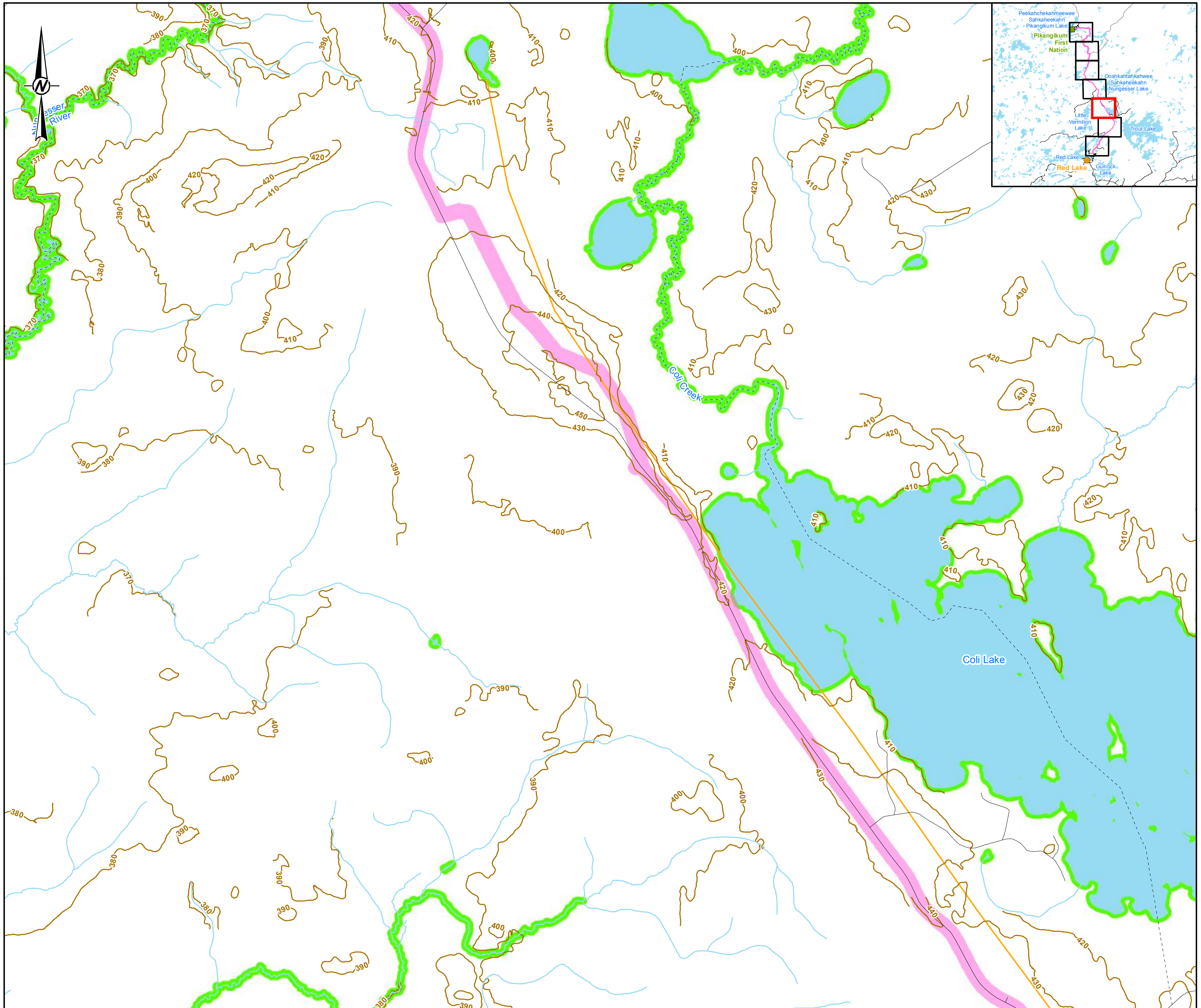

LEGEND

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- City
- Town
- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
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CONSULTANT

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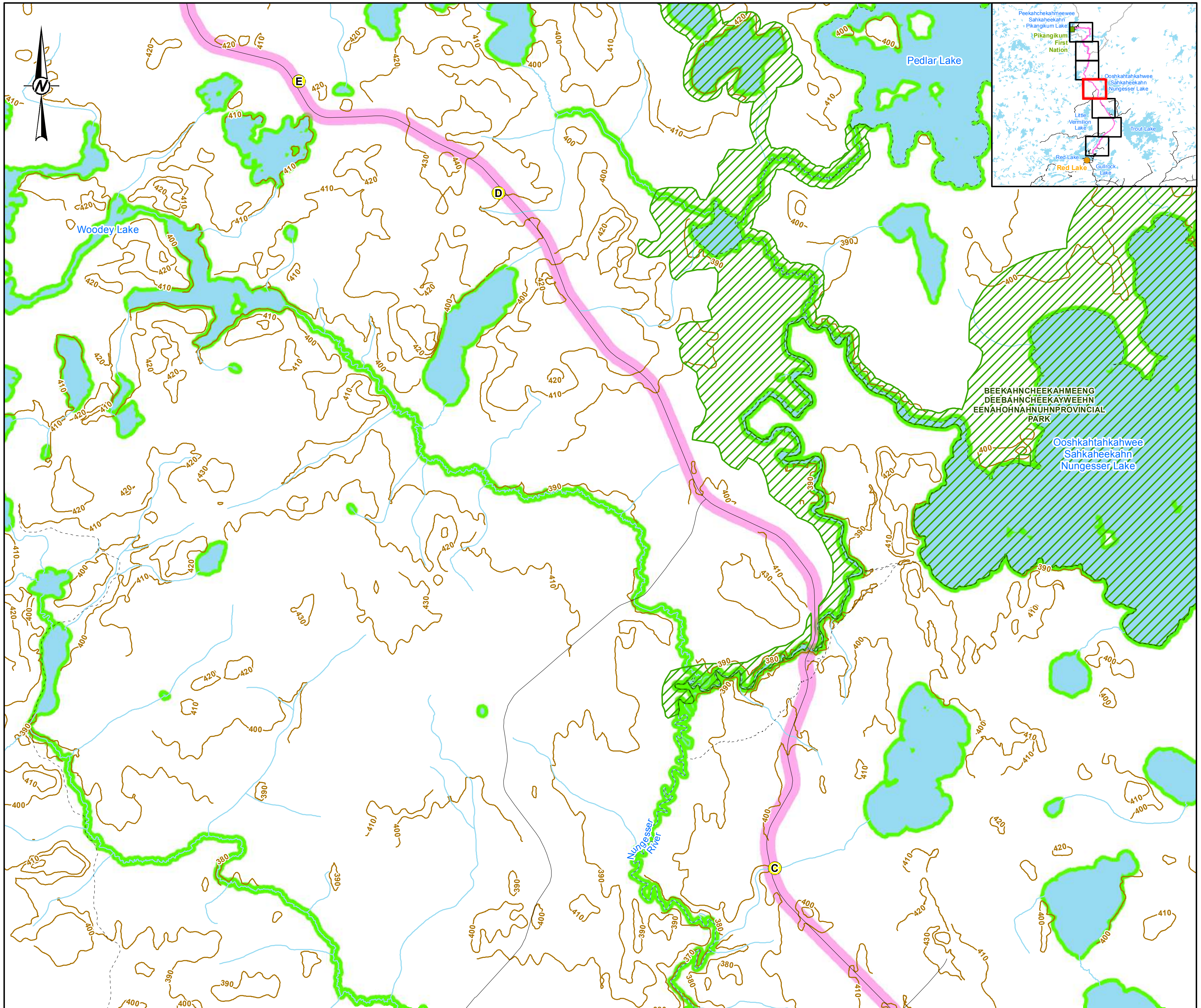

LEGEND

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- City
- Town
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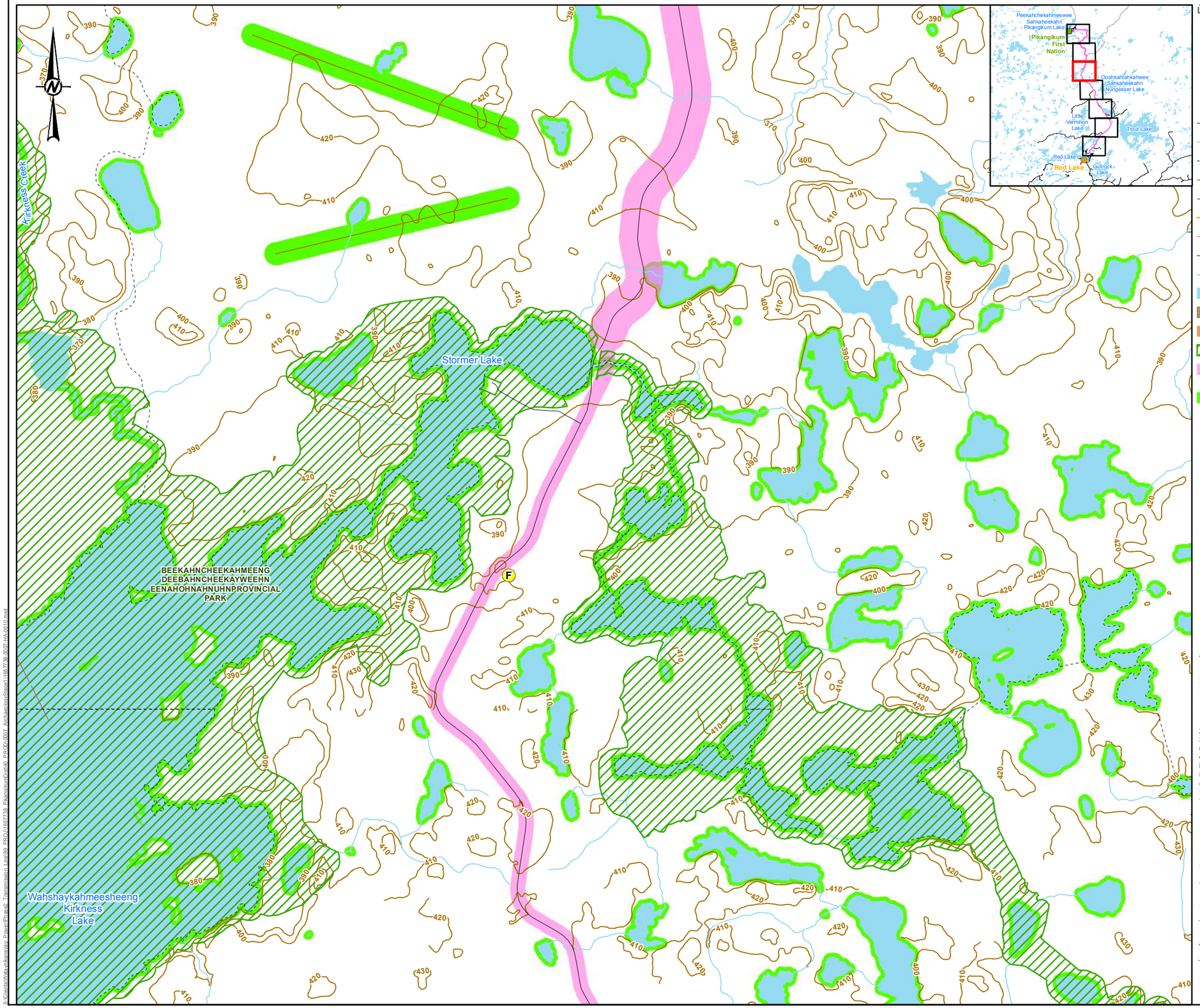

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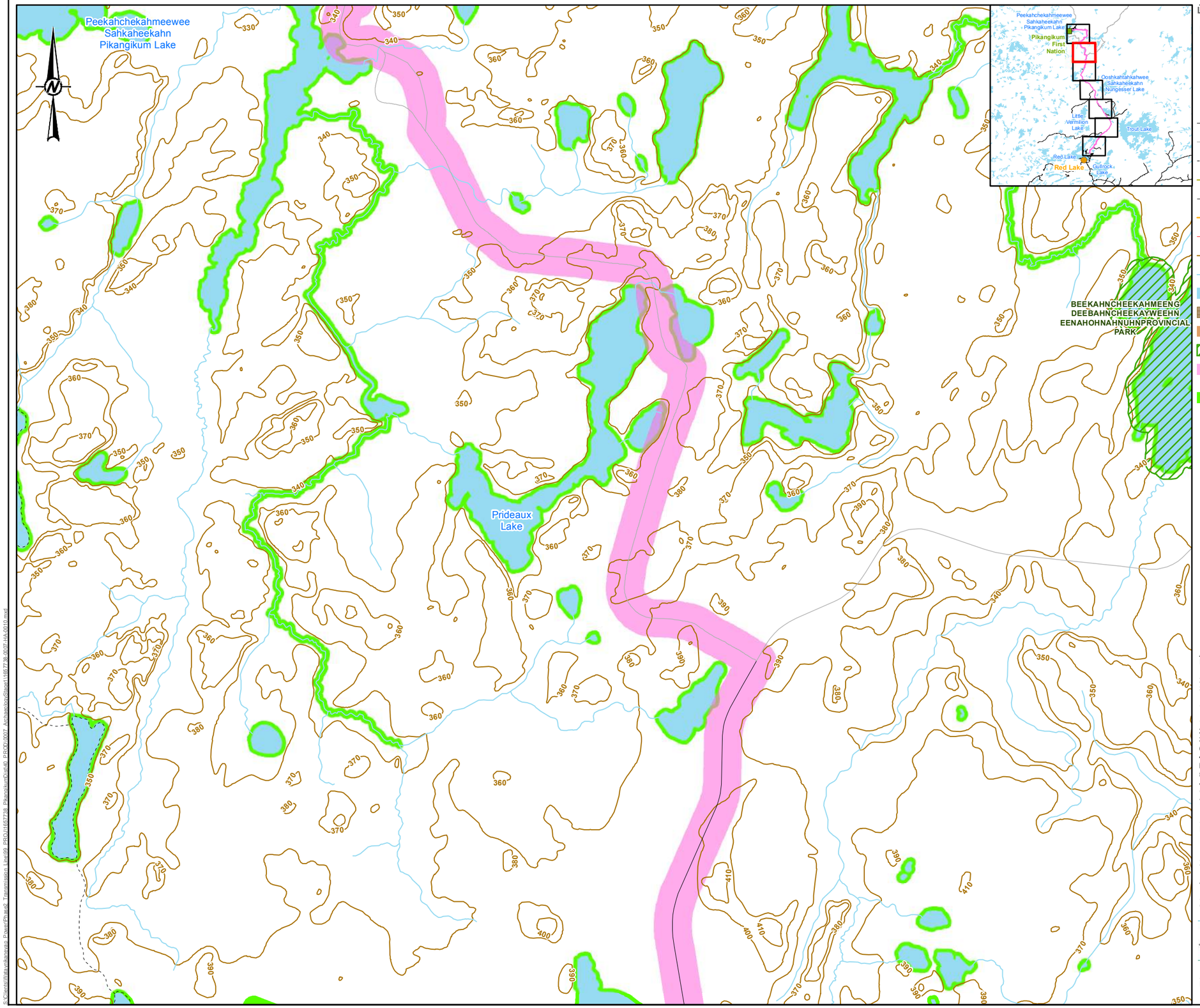

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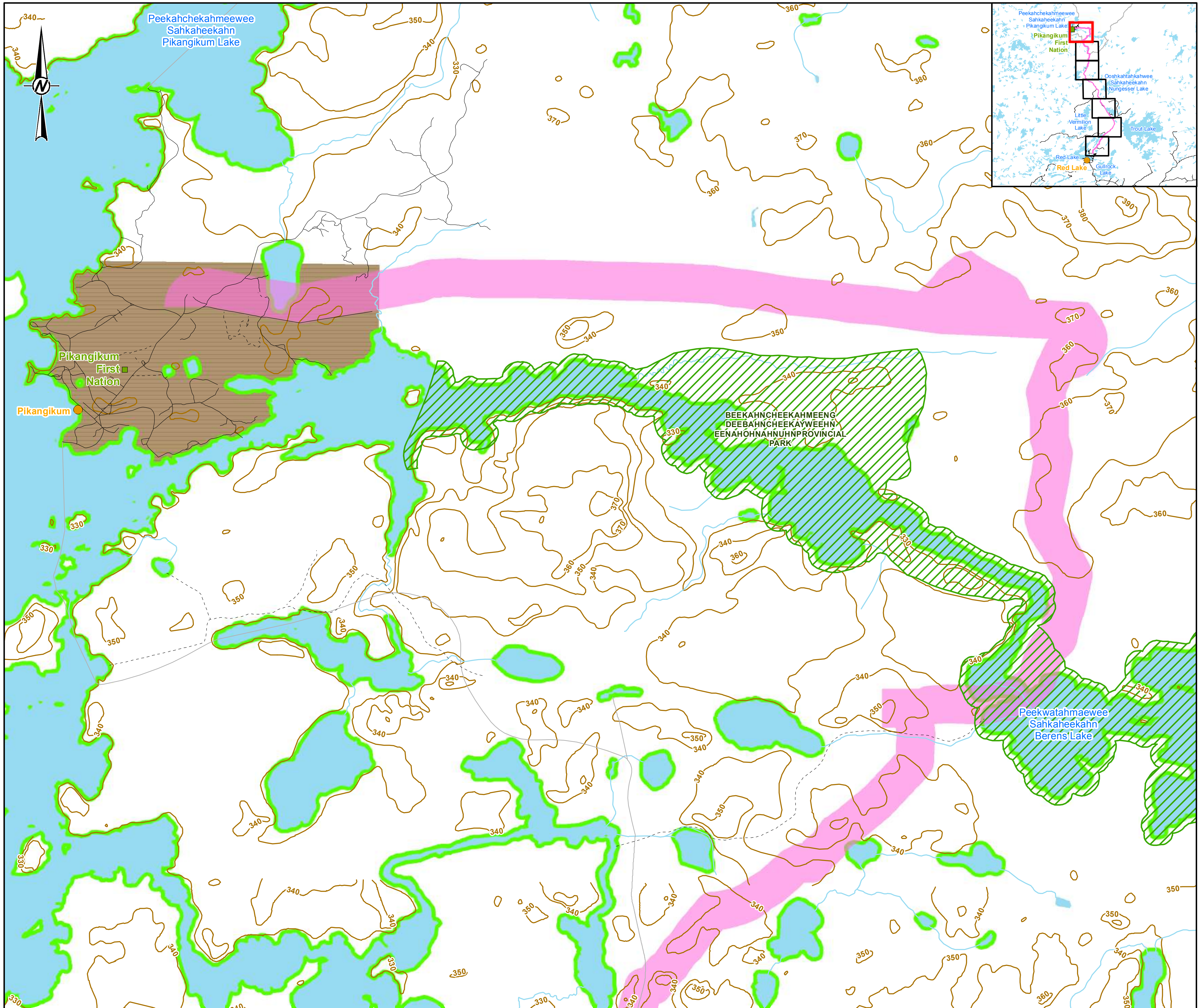

LEGEND

- Areas of Removed Archaeological Potential
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11.0 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Golder has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

This report has been prepared for the specific site, design objective, developments and purpose described to Golder by Wataynikaneyap Power L.P. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project.

Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain archaeological resources. The assessment strategies incorporated in this study comply with those identified in the Ministry of Tourism Culture, and Sport's *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011).

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GOLDER ASSOCIATES LTD.

Bradley Drouin, M.A.
Staff Archaeologist

Aaron Mior, M.A.
Archaeologist

Carla Parslow, PhD
Associate and Senior Archaeologist

AM/CAP/jc/hp/wlm

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Golder Associates Ltd.
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Mississauga, Ontario, L5N 7K2
Canada
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SUPPLEMENTARY DOCUMENTATION

June 2017

STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Wataynikaneyap Power L.P. Pikangikum Distribution Line Project, District of Kenora, Ontario

Submitted to:
Juan Anderson
Wataynikaneyap Power L.P.

Licensees: Bradley Drouin, M.A.., Golder Associates Ltd.

Licence Number: P311

PIF Number: P311-0311-2017

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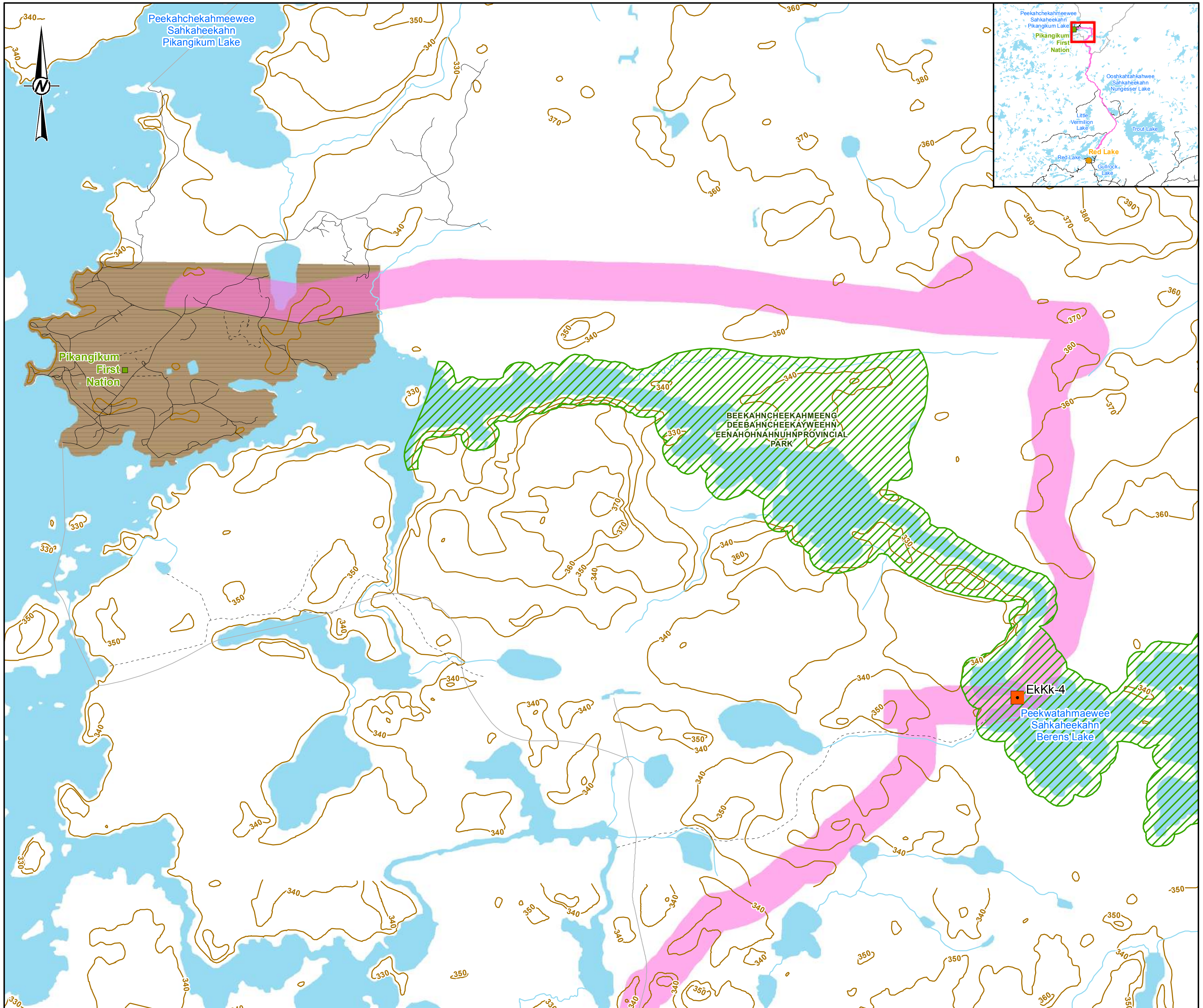
FIGURES

1.0 SUPPLEMENTARY DOCUMENTATION – REGISTERED ARCHAEOLOGICAL SITES WITHIN 1 KM OF THE LSA – PIKANGIKUM DISTRIBUTION LINE PROJECT

The figure follows on the succeeding page.



LEGEND

- First Nation Community
- Wataynikaneyap Power Community
- Major Roads and Highways
- Winter Road
- Trail
- Elevation (10 m)
- Watercourse
- Waterbody
- First Nation Reserve Land
- Provincial Parks
- Project Limits of Work
- Known Archaeological Site

0 0.5 1 2 3
1:50,000 KILOMETERS

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PIKANGIKUM DISTRIBUTION LINE PROJECT

TITLE
SUPPLEMENTARY DOCUMENTATION: KNOWN ARCHAEOLOGICAL SITES WITHIN 1 km OF THE PROJECT LSA

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Bradley Drouin, M.A.
Senior Archaeologist

Carla Parslow, PhD
Associate/Senior Archaeologist

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