



APPENDIX D

Archaeological and Heritage Resources Report



Valuable Component (VC) for EIA Section Heading: Heritage Resources

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1.0 Assessment on the Environmental Effects o Heritage Resources

The potential environmental effects of the Project on heritage resources are assessed in this section.

1.1 Scope and Rationale for the Valuable Component (VC) Assessment

‘Heritage Resources’ comprise both archaeological and heritage components; while archaeological resources are considered as non-renewable, tangible, material/physical remains of past human activity that are historical, cultural, or of scientific interest, heritage resources can be cultural or natural that hold a shared collective value to society, community, or group of people (Parks Canada 2019). All development projects in New Brunswick which trigger an Environmental Impact Assessment (EIA) and have a ground disturbance component (surface or sub-surface) and are located within 80m of a current or ancient watercourse, 100m from a current or ancient watercourse confluence, or within proximity to known historical or registered archaeological sites are considered to have elevated archaeological potential by the regulatory body, Heritage and Archaeological Services Branch (HASB)– Department of Tourism, Heritage and Culture, and supplemented with the regulations required archaeological potential predictive model (See Attachment 9.1). A focus on watercourses is derived from globally known data of site locations and the importance of watercourses for substance, resources and transportation. This reliance on predictive modelling grew out of Joseph Caldwell’s and Lewis Binford’s ‘New Archaeology’ of the 1950’s and 1960’s and post-processual emphasis on predictable cultural regularities and demonstrated by the Dutch in the 1990’s with ‘IKAW’ (Kamermans & Mansleben 1998; Trigger 2010:392). Wetlands, as watercourses, are inherently considered elevated potential for archaeological resources within the field of archaeology and there is ample evidence of people’s interactions with wetlands spanning tens of thousands of years (Menotti & O’Sullivan 2012).

1.2 Regulations, Policies, and Definitions

Heritage resources in New Brunswick are protected under the *Heritage Conservation Act* (2010) and administered by the regulatory body, Heritage and Archaeological Services Branch (HASB) at the Department of Tourism, Heritage and Culture. The Act outlines the province’s ownership or trusteeship of all archaeological, palaeontological, and military/burial site heritage objects (Government of New Brunswick 2020). Archaeological regulations are found in *The Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (hereafter referred to as ‘the Guidelines’) and define the requirements, responsibilities, ethics and purview of the AIA permit holder (Government of New Brunswick 2012). The following definitions are from the Act:

Archaeological object: “an object which shows evidence of manufacture, alteration or use by humans that may provide information about past human activities and which meets any criteria set by regulation, and includes a sample collected from that object”.

Archaeological site: “a place where evidence of past human activities, such as archaeological objects and features, is discovered on, buried or partially buried beneath the land, or submerged or partially submerged beneath the surface of a watercourse or permanent body of water”.

2.0 Established Boundaries

2.1 Spatial Boundaries

The assessment of heritage resources was confined to two spatial boundaries:

- The Project Development Area (PDA) is the geographic location of the footprint of the proposed development ground disturbance activities, in this case all activities are confined to Property Identification Designation (PID) 2514788 (as seen in Attachment 9.1).
- A five-kilometer radius surrounding the center of the PDA to establish known and/or registered heritage resources within significant proximity (5 km) of the assessment area.

2.2 Temporal Boundaries

The assessment of effects on heritage resources has been completed for the following temporal boundaries:

- The initial ditching and construction phase
- The peat harvesting phase of the Project; and
- The cranberry bog operational and maintenance phase of the Project.

3.0 Existing Heritage Resources

3.1 Archaeological Impact Assessment (AIA)

As part of the VC assessment, an Archaeological Impact Assessment (AIA) was conducted in order to meet the provincial requirements outlined in the *Heritage Conservation Act* (2010) and *The Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (hereafter referred to as 'the Guidelines') (Government of New Brunswick 2012). The final report for the AIA is included in Attachments (9.1). Chelsea Colwell-Pasch, M.M.A., RPA of Colbr Consulting Inc. was retained by Hive Engineering to complete the desktop and field components of this VC. The pedestrian survey was completed December 2, 2019 (Colwell-Pasch 2020).

3.2 Approach and Methods

A desktop study was completed in November 2019 in order to apply for an Archaeological Field Research Permit (AFRP) which is required by a professional archaeologist in order to conduct any fieldwork in New Brunswick, including the pedestrian survey conducted for this Project. The AFRP is issued by the regulatory body (HASB). The desktop study includes an assessment of all available information regarding heritage and natural resources within the spatial boundaries. The pedestrian survey is an in-field visual assessment of the PDA to determine the real and potential archaeological resources that will inform mitigation recommendations (if any) and record the PDA pre-development.

3.3 Existing Conditions

The findings of the desktop study portion of the AIA identified the entire PDA as medium potential for archaeological resources due to the importance of wetlands to past peoples. An area of high potential was identified in the southeast corner of the PDA within the 80m elevated potential buffer surrounding a possible glacial kettle lake.

The findings of the pedestrian survey of the Project area concurred with the desktop study identifications. Hydrophytic vegetation covered the surface almost entirely therefore no surficial finds of

artifacts or features were observable. The entire border to the PDA was walked by a professional archaeologist and then the center of the PDA was assessed. No prior disturbance or development was identified during the survey therefore any resources uncovered during any phase of this Project should be considered *in situ*, in archaeological context. Archaeological sampling (test pitting) of the PDA was not recommended due to the depth of the peat matrix (2.5-3m DBS), the scope of the Project, and the loss of marketable material (peat) from test pitting and possible interference with field drainage. Recommendations were made in consultation with HASB.

4.0 Residual and Potential Environmental Effects Assessment

4.1 Residual Effects Summary

Any ground disturbance has the potential to uncover previously unknown and undiscovered heritage resources. Residual effects to heritage resources are permanent alterations or destruction of heritage resources (especially archaeological resources and heritage structures) within the PDA. In the event that an identified site, located during any phase of the Project, is significant in nature or rare (i.e. Pre-Contact organic material culture) the residual effect to its loss would be considered immeasurable.

4.2 Potential Effects Summary

Potential effects to heritage resources are detailed in the following sub-sections during the initial ditching and construction phase, the peat harvesting phase and the cranberry bog operational and maintenance phase of the Project.

Initial Ditching and Construction Phase Potential Effects: Potential effects to heritage resources as a result of the initial ditching and construction associated with converting the undeveloped peat bog into a peat harvesting operation are possible, as the PDA is in an area determined to be of high to medium potential, especially around a glacial kettle lake in the southeast periphery of the PDA. Ditching to drain water from the peat field, as a form of significant linear ground disturbance, may disturb intact surface and sub-surface archaeological resources within the PDA. Especially if the resources have a large spatial distribution over the area being excavated.

Peat Harvesting Phase Potential Effects: Potential effects to heritage resources as a result of the peat harvesting phase of the Project, which will occur over a 20-year harvesting life span of removing 15-20cm of peat per year, are possible. Harvesting peat is essentially continuous ground disturbance, the actual removal of peat over a long period of time. If there are archaeological resources within the PDA, they will be uncovered during this phase of the Project. Annual visual inspections will be integral to ensuring heritage resources are identified, reported and recovered during this phase.

Cranberry Bog Operational and Maintenance Phase Potential Effects: Potential effects to heritage resources as a result of the final designation of the PDA as a cranberry bog and its associated operations and maintenance are unlikely as the ground disturbance for the Project should be completed by the time this phase is reached.

Accidents, Malfunctions, and Unplanned Events: Potential effects to heritage resources as a result of accidents, malfunctions, and unplanned events are possible during all phases of the Project. These events may negatively impact heritage resources and can include:

- Fire; and

- Accidental release of chemicals (including petroleum products).

5.0 Mitigation Measures

The Potential effects can be mitigated by the implementation of a Heritage Resource Emergency Management Plan (HREMP), recommended by Colbr Consulting Inc. and HASB, in order to minimize the potential effects to heritage resources during any phase of the Project (see Attachment 9.2).

Colbr Consulting Inc. recommends monitoring by the proponent during the initial ditching phase of the Project, paying extra attention to the peat removed from the ditches for observable heritage resources. Additionally, Colbr Consulting Inc. recommends continuous monitoring by the proponent of the PDA during the peat harvesting phase, ideally on an annual basis, in order to identify heritage resources (if present). Chance finds during any phase of the Project must follow the HREMP (Attachment 9.2) which will include a stop work order and HASB must be notified as soon as possible.

6.0 Summary of Project Environmental Effects on Heritage Resources

Table 6.1: Summary of Mitigation Measures for Heritage Resources

Valued Component (VC)	Summary of Potential Effects	Mitigation Measures	Additional Recommended Mitigation Measures
Initial Ditching Phase			
Heritage Resources	Ground disturbance for ditching could alter or destroy archaeological resources or context.	Follow Heritage Resource Emergency Management Plan (HREMP)	No additional mitigation measures are recommended by Colbr Consulting Inc.
Peat Harvesting Phase			
Heritage Resources	Ground disturbance/removal for peat harvesting could alter or destroy archaeological resources or context.	Follow HREMP	No additional mitigation measures are recommended by Colbr Consulting Inc.
Accidents, Malfunctions, and Unplanned Events			
Heritage Resources	Fire; and Accidental release of chemicals (including petroleum products) during any phase of Project	Follow HREMP	No additional mitigation measures are recommended by Colbr Consulting Inc.

7.0 Determination of Significance

The PDA has been determined to be of high to medium potential for heritage resources, especially *in situ* heritage resources. The initial ditching and peat harvesting phases of the Project may result in the disturbance and/or destruction of heritage resources. Any surface or sub-surface heritage resources (if any) identified within the PDA during construction would be considered *in situ* or in context (undisturbed) and may be impeccably preserved due to the anerobic environment a peat bog creates. This would be especially true about organic materials (i.e. leather, wood, bone), charcoal, pollen, and

protein residues associated with said artifacts (Colwell-Pasch 2020). Since we have very little preserved organic Pre-contact artifacts, any identified by the proponent would be very significant. Currently, testing the entire PDA is not advisable and a Heritage Resource Emergency Management Plan (HREMP) is in place to advise the proponent in case of a chance find during any phase of the Project to minimize the any adverse effects. These recommendations were made in consultation with HASB.

8.0 References

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9.0 Attachments

9.1 Archaeological Impact Assessment Report



*Archaeological Impact Assessment:
Saint-Charles Station Cranberry Farm Expansion
and Peat Extraction, Kent County, New
Brunswick*



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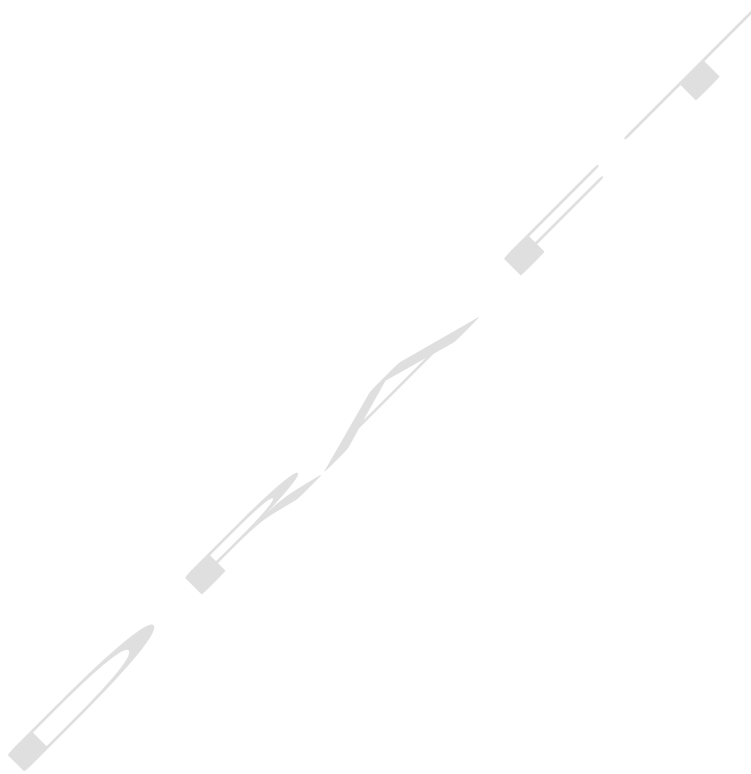
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Executive Summary

In December of 2019, Colbr Consulting Inc. (Colbr) conducted a pedestrian survey Archaeological Impact Assessment (AIA) for Hive Engineering (Hive) proposed construction of a cranberry bog and peat extraction Environmental Impact Assessment (EIA) in Saint-Charles Station, New Brunswick in Kent County. The purpose of the AIA is to determine if archaeological or heritage resources fall within the PDA and will be impacted by construction and peat harvesting. This AIA was conducted in compliance with Heritage and Archaeological Services Branch (HASB), Department of Tourism, Heritage, and Culture standards and followed *The Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (hereafter referred to as the Guidelines) (Government of New Brunswick 2012). This evaluation was necessary in order to meet the requirements of the *Heritage Conservation Act* (2010). All work was carried out in consultation with HASB and Hive, on behalf of their proponent.

A pedestrian survey AIA for this project was completed in December 2019 by Colbr. The entire 58-acre Project Development Area (PDA) is comprised of unaltered peat bog. The proponent plans to harvest peat over a 20-year period. Harvesting takes place when the peat is not frozen and they harrow the top 10-15cm of peat, allow it to dry in the sun for a few days and then vacuum up the loose, dry material for resale. They repeat this process weekly. The entire bog is considered high archaeological potential with high organic archaeological resource conservation potential (i.e. leather, bone, wood, etc.). The PDA is consistently peat bog with a small lake (possibly a glacial kettle lake) in the SE corner of the PDA and forested wetland to the west, just outside of the PDA. Initially Colbr proposed avoidance of the 80m buffer zone surrounding the kettle lake, however after consultation with HASB, it is recommended that entire PDA, especially the lake buffer (80m), be annually inspected by the proponent for archaeological material and an Emergency Management Plan (EMP) be implemented in case of accidental finds. It is also recommended that HASB intermittently inspect and/or monitor the activities in the PDA over the lifespan of the peat harvesting activities, with special attention to the 80m buffer surrounding the kettle lake. Due to the methodical nature of peat extraction; the entire PDA should be surveyed for surface artifacts annually by the proponent and/or an archaeological monitor/archaeologist to ensure any archaeological resources are identified in a timely manner and stratigraphic control is somewhat maintained. This annual inspection is more economical than testing the entire lake buffer within the PDA, which is covered in 2.5-3m of dense peat.

The EMP requested by HASB and recommended by Colbr will be included as part of the overall EIA for the project and outlines what the procedure is when an archaeological resource is found during peat extraction and conservation first aid methods for organic material. No significant cultural resources were encountered on the surface during the AIA, mostly due to the significant vegetation ground cover (near 90-95% coverage).



Introduction

This report describes a pedestrian survey or preliminary investigation AIA completed for Hive Engineering (hereafter Hive), representing a private proponent, and their proposed expansion of an existing cranberry farm and associated peat extraction in Saint-Charles Station, New Brunswick in Kent County approximately 10kms west of Rexton, New Brunswick (Figures 1 & 2). The results of this survey will inform an Environmental Impact Assessment (EIA) for the overall project and meet provincial regulatory requirements. The proposed project location lies on undeveloped wetland/peat bog land parcel that is a filtering tributary to the Richibucto River to the south (Figure 2 & 3) and lies on PID 2514788 which is currently Crown land. The PID will be part of a land exchange program with the Cranberry farmers. This Archaeological Impact Assessment (AIA) was conducted in compliance with Heritage and Archaeological Services Branch (HASB), Department of Tourism, Heritage, and Culture standards and followed *The Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (hereafter referred to as 'the Guidelines') (Government of New Brunswick 2012). This evaluation is necessary in order to meet the requirements of the *Heritage Conservation Act* (2010).

Results of the pedestrian survey identified the requirement for annual archaeological surface surveying within the PDA, especially of the 80m archaeological potential buffer surrounding a possible kettle lake in the southeast corner of the PDA (Cover & Figure 3). An Emergency Management Plan (EMP), outlining the steps the proponent needs to take if archaeological material is discovered during harvesting and artifact conservation first aid, will also be required to be submitted with the final EIA. All of the work was completed by Chelsea Colwell-Pasch, M.M.A., R.P.A. (Senior Archaeologist and Project Manager) of Colbr Consulting Inc., on December 2, 2019 under Archaeological Field Research Permit (AFRP) No. 2019NB167. All field methods and procedures followed the Guidelines (Government of New Brunswick 2012).

Proposed Project

Colbr has been retained by Hive to conduct a preliminary investigation or pedestrian survey of an undeveloped parcel of land that their clients, the proponent, want to harvest peat and create a cranberry bog in Saint-Charles Station, New Brunswick in Kent County approximately 10kms west of

Rexton, New Brunswick. After the peat has been harvested (after a 20-year harvesting life span of removing 15-20cm of peat a year) the excavated PDA will become a proposed cranberry bog. The proposed project location lies solely on PID 2514788 which is currently Crown land and will be subject to a land exchange with the proponent. The PDA has a possible kettle lake in the southeast corner of the PDA (Cover & Figure 3) which Colbr and HASB recognize as elevated archaeological potential and recommends annual inspections of the entire PDA, especially the 80m buffer surrounding the lake; the northern part of the PDA borders a current peat extraction field (Figure 4); to the East is a forested wetland (Figure 5) which has an ATV trail (the old railway) (Figure 6); and the south is a continuation of the bog for 2-3km (Figure 7). Note: if the plans provided by Hive after the AIA are outside of the assessed areas then the new area will have to be subject to another AIA prior to beginning peat extraction.

Project Area

Physical Description

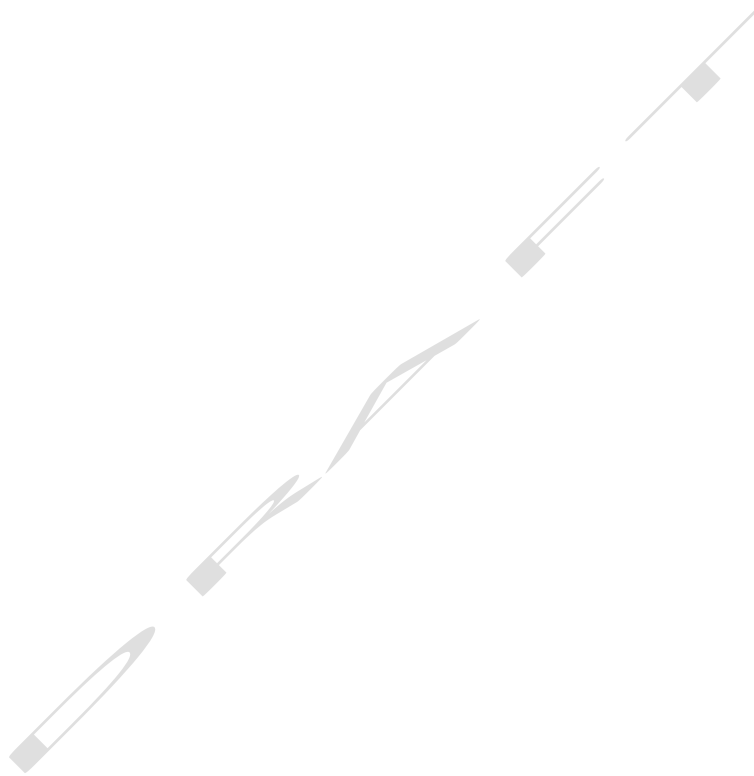
The project is located on current Crown land in a registered wetland in Saint-Charles Station, Kent County, New Brunswick, ~10 km southwest of Rexton, NB and close to the Richibucto River, to the Southwest. The project is on PID 2514788 and is located in Borden block CdDf.

Geographic Coordinates:

NE Corner	46°39'25.37"N, 64°56'54.52"W
NW Corner	46°39'9.96"N, 64°56'56.85"W
SE Corner	46°39'24.32"N, 64°56'36.32"W
SW Corner	46°39'7.51"N, 64°56'38.68"W

The PDA falls within the Eastern Lowlands Ecoregion (ELE) and, within this ecoregion, the Kouchibouguac Ecodistrict. The ELE is a relatively flat, poorly drained terrain encompassing much of eastern New Brunswick and underlain by Carboniferous marine-associated sedimentary bedrock (Zelazny, 2007). Because of its overall low relief, it is characterized by relatively developed O horizons, abundant wetlands, and boreal forests dominated by fire-adapted species such as jack pine, red pine, white pine, and black spruce (Zelazny, 2007). The assortment of early successional tree species is due to

the high incidence of forest fires, with trembling aspen typically regenerating first, followed by jack pine, grey birch, yellow birch, and red maple (Wang & Rees, 1983).



The Kouchibouguac Ecodistrict encompasses most of the eastern shore of New Brunswick, and penetrates 15-20 km inland. River estuaries dominate this ecodistrict, creating highly productive ecosystems (Zelazny, 2007). Salmon and other fish species common in these estuaries created important resources for humans and animals, both in the past and presently. Black spruce and other early successional species are common in the Kouchibouguac Ecodistrict, while jack pine and tolerant hardwoods such as red maple are found where soils are better drained, particularly on slopes or along sandy rivers (Zelazny, 2007).

Wetlands in Canada are defined as “land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity which are adapted to a wet environment” (Tiner 2017:9; National Wetlands Working Group 1987). Wetlands were a large part of the pre-contact North American landscape, of which 70% of all recorded wetlands in Canada have been lost since historical documenting began in the mid to late-19th century (Colwell-Pasch et al. 2018). Wetlands, though not an ideal settlement location, would have been an attractive and favorable environment in the past, as they would have provided a reliable source of plants, animals, medicine, and other raw materials. New Brunswick’s wet areas are no exception and approximately 4% of the province is regulated wetland but on-going research incorporating LiDAR, on-ground forestry data, and aerial mapping suggest the number actually being about 12% (Colwell-Pasch et al. 2018; DELG 2018; Forest Watershed Research Centre 2018) (Figure 8). In fact, most of the wetland areas throughout the province have been demarked as areas with a high archaeological sensitivity and are flagged for increased potential in the Province’s Archaeological Predictive Model. Contemporary New Brunswick wetlands may have been used in the past for habitation/settlement prior to being wet areas or may have been utilized as wetlands for resource procurement (Colwell-Pasch et al. 2018). Neither can be excluded therefore wetlands are considered high potential based on their accessibility to, and proximity to, water. Heritage and Archaeological Services Branch’s predictive model depicts areas within 50m of a watercourse to be “high potential” and areas 50-80m from a watercourse to be “medium potential”, watercourse confluences buffers are increased to 100m.

Past and Present Land Use

The area falls within the traditional Mi'kmaq district called 'Sigenigteoag', and the coast and its rivers are dotted with important burials and settlements (Allen, 1981); (Zelazny, 2007). Rivers have played a large part in how people used the landscape in the ELE (Ganong, 1899); (Wang & Rees, 1983); (Zelazny, 2007). One of the largest Mi'kmaq and oldest continuous settlements in the Maritimes, Metepenagiag (Red Bank), is located near modern-day Miramichi, New Brunswick some 140 kilometers north along the coast. The Oxbow and Augustine Mound sites were excavations of these ancient Mi'kmaq settlements and revealed the long history from at least 3000 years ago (Allen, 1981).

The New Brunswick Eastern Coast was first settled by French Europeans in 1767 and was settled by French making their way North from Beaubassin in an attempt to avoid the 1755 Acadian Expulsion after being starved out of Miramichi (Ganong, 1904). Eventually the settlers were granted the land in 1772 (Ganong, 1904). The Intercolonial Railway (ICR) was completed in 1876 and ran from Quebec to Halifax (Soucoup 2010). The ICR had many branch lines; in Kent County the ICR ran North-South and in 1883 a 26-mile (41.8 km) branch line ran from the inland ICR to the coastal region of Richibucto and was called the Kent Northern Railway (Soucoup 2010: 74-75). The rail line ran mostly gravel and was decommissioned in 1989 (Soucoup 2010: 76). The Kent Northern Railway ran right through Saint-Charles Station.

There is one registered archaeological site within a five-kilometer radius of the project area (see Table 1). A review of the Canada's Historic Places and New Brunswick Register of Historic Places databases showed no registered historic places within the immediate area of the PDA. Additional documentary research will be completed to confirm the presence/absence of archaeological and built heritage resources within the project area.

Table 1: Registered Archaeological Sites within 5 km Radius of PDA

Borden Number	Distance to PDA (boat ramp)	Component Type
CdDf-5	4.68 km (SE)	Pre-Contact

METHODOLOGY

Documentary research was previously undertaken by Colbr Consulting, Inc. in November/December 2019 for the Archaeological Field Research Permit (AFRP) application. The preliminary research provided an evaluative framework for any new archaeological resources.

Documentary research has included a review of the following sources: Preliminary project maps provided by Hive; the New Brunswick Historic Places Database (online); the Canadian Register of Historic Places (online); and the National Archives of Canada (online); Geo NB LiDAR Data Base (online); Geo NB Aerial Photographs (Hugh John Flemming Center – Fredericton); New Brunswick Museum Archives (online). Archaeological predictive modeling was provided by HASB (Figure 3). Predictive modelling evaluates existing conditions such as archaeological sites, geographic, and geologic conditions in New Brunswick and ranks areas as having “high”, “medium,” or “low” archaeological potential. The model generally concludes that areas within 80m of a current or ancient watercourses and areas that are flat and elevated have a higher propensity for Pre-contact sites being found. Currently only desktop studies increase the likelihood of predicting historical sites.

Documentary research that has been undertaken on the project area did not reveal any archaeological resources within the PDA, but predictive modeling (Figure 3), LiDAR (Figure 9), and the walkover identified elevated potential for archaeological resources on either a contemporary watercourse (possible kettle lake) and within the entire PDA’s peat matrix. Wetlands should be considered high potential with an increased potential for preservation of organic materials.

Preliminary Field Investigation

The areas within the PDA to be monitored were identified during a pedestrian survey conducted by Colbr Consulting, Inc. on December 2, 2019. An 80m buffer around a small lake within the peat bog was identified as high/medium potential (Cover figure) as well as the entire PDA’s peat matrix having medium potential (Figure 2). Due to the nature of peat extraction (slowly over many years) it was determined, in consultation with HASB, that an annual surface survey by the proponent and/or archaeological monitor/archaeologist of the final PDA would be appropriate in lieu of testing the entire bog and an EMP be in place for any archaeological finds during harvesting and/or operations. The survey was completed in one day by one Colbr archaeologist and numerous photographs, GPS waypoints, and field observations were made in the field as well as a GPS track log of the survey (Figure 10). Field notes were taken during the survey about observations in the field and recommendations are based on a combination of desk-based research and field observations.

FINDINGS

Peat Bog (Figure 7): A pedestrian survey of the PDA revealed the entire PDA provided was a peat bog/wetland. The surface was covered in wetland (hydrophytic) vegetation and no sediment/soil was visible through the surface vegetation. Adjacent, current peat fields (Figure 4) show that the peat is approximately 2.5-3m thick over a clay matrix (Figure 11). The entire PDA is high/medium potential; however, testing can be avoided if annual surface surveys are performed by the proponent and/or archaeological monitor/archaeologist. Special attention to be given to the lake 80m buffer. To systematically test peat is difficult, expensive, and time consuming and best avoided if possible; however, it can be done if the annual survey results in a find. The adjacent peat fields show an abundance of organic material (ie. wood) being uncovered from the peat being extracted (Figure 12). This illustrates the increased potential of preserved organic material culture within these ecozones. Nothing of cultural significance was identified or recovered during the pedestrian survey. An EMP must be in place for any archaeological finds during harvesting and/or operations.

Possible Kettle Lake (Cover figure): Located at the SE corner of the provide PDA limits, this small lake is mapped in GeoNB and has a heightened archaeological potential due to it being accessible water all year round. The lake is possibly formed as a kettle lake, a depression/hole in an outwash plain (in this case a bog) formed by retreating glaciers or draining floodwaters. The kettle lakes are formed as a result of blocks of dead or buried ice left behind by retreating glaciers, which become surrounded by sediment. This lake and its 80m buffer are flagged for high archaeological potential. It is recommended to thoroughly monitor the 80m heightened archaeological potential buffer around this lake in order to identify material, if there, annually. While avoidance of this area would have been ideal, annual inspections are a suitable compromise and acceptable to HASB. An EMP must be in place for any archaeological finds during harvesting and/or operations.

RESOURCE SIGNIFICANCE AND INTEGRITY VALUE

No significant archaeological material was identified within the PDA. It is recommended to carefully monitor the archaeological buffer around the possible kettle lake in the SE corner of the PDA and to forego systematic test pitting of the bog for an annual surface survey of the peat field due to the slow, methodical extraction of the peat over 20 years. An Emergency Find Management Plan (EMP) must also be put in place for if/when an artifact is found during peat extraction and will be a requirement from HASB for clearance of the EIA application.

IMPACT IDENTIFICATION AND ASSESSMENT

The primary focus of the pedestrian survey was to determine the impact peat harvesting would have on any archaeological resources within the PDA. As a result of the pedestrian survey, sub-surface testing is warranted however it is not recommended. Instead, annual inspection of the 80m buffer zone surrounding the kettle lake and the peat field will satisfy HASB's requirements (based on consultation with HASB) as well as recommended intermittent inspections by HASB. Based on the findings of the archaeological survey, the proposed project will potentially impact significant archaeological sites and/or materials. An EMP will also be required.

CONCLUSION AND RECOMMENDATIONS

Areas of elevated archaeological potential were identified within the entire PDA peat bog area (medium potential) and within the 80m buffer surrounding the possible kettle lake (high potential) during a preliminary field investigation in December 2019. Sub-surface testing is not recommended, instead, special annual inspection of the lake buffer and annual surface surveying of the peat field by the proponent and/or archaeological monitor/archaeologist during the 20-year extraction process is recommended in consultation with HASB. An Emergency Management Plan (EMP) for archaeological material found during monitoring, harvesting or operations is also required for the EIA and by HASB, coupled with annual surveying in lieu of systematic testing. No Pre-contact or historic archaeological material was identified or recovered during the survey. If at any time during project construction archaeological material is found, all ground disturbance must cease, the EMP must be implemented and HASB must be contacted immediately. HASB will require the EMP prior to approving the EIA application. If plans or scope of work fall outside the assessed survey area, then an additional AIA may be required prior to development.

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Appendix A: Figures

Appendix A: Figures



Figure 1: Satellite image of the proposed PDA in Saint-Charles Station, Kent County, New Brunswick (Hive 2019).



Figure 2: The location of the proposed PDA in Saint-Charles Station, Kent County, New Brunswick (GoogleEarth 2019).



Figure 4: A current peat field to the north of the PDA; facing North (C. Colwell-Pasch 2019).



Figure 5: A forested wetland that borders the PDA to the west; facing Southwest (C. Colwell-Pasch 2019).



Figure 6: An ATV trail, branched off the old railway main trail to the West, runs through the southern periphery of the PDA; facing Southeast (C. Colwell-Pasch 2019).



Figure 7: The continuation of the bog south of the PDA, note the construction of a large windmill in nearby Rexton, due South (C. Colwell-Pasch).



Provincial Area Representation of Wetness Index Class

	DARK BLUE						LIGHT BLUE	WHITE
Wet-Areas-Map	0 to 10cm (water incl.)	0 to 10cm (water excl.)	10 to 25cm	25 to 50cm	50 to 75cm	75 to 100cm	100 to 250cm	250cm+
Area (m ²)	9,888,664,100	8,337,605,321	3,739,054,500	5,278,437,200	4,355,842,200	3,689,573,500	14,213,475,200	31,642,318,400
Area (ha)	988,866	833,761	373,905	527,844	435,584	368,957	1,421,348	3,164,232
Area (km ²)	9,889	8,338	3,739	5,278	4,356	3,690	14,213	31,642
% of Total	13.6%	11.4%	5.1%	7.2%	6.0%	5.1%	19.5%	43.5%

Figure 8: Provincial Area Representation of Wetness Index Class Map (Forest Watershed Research Center 2018).



Figure 9: LiDAR imaging of the PDA and surrounding peat/cranberry developments; note the lake in the SE corner of the PDA (adapted from GeoNB 2020: hillshade_dtm_1m_utm20_w_14_161 by C. Colwell-Pasch).

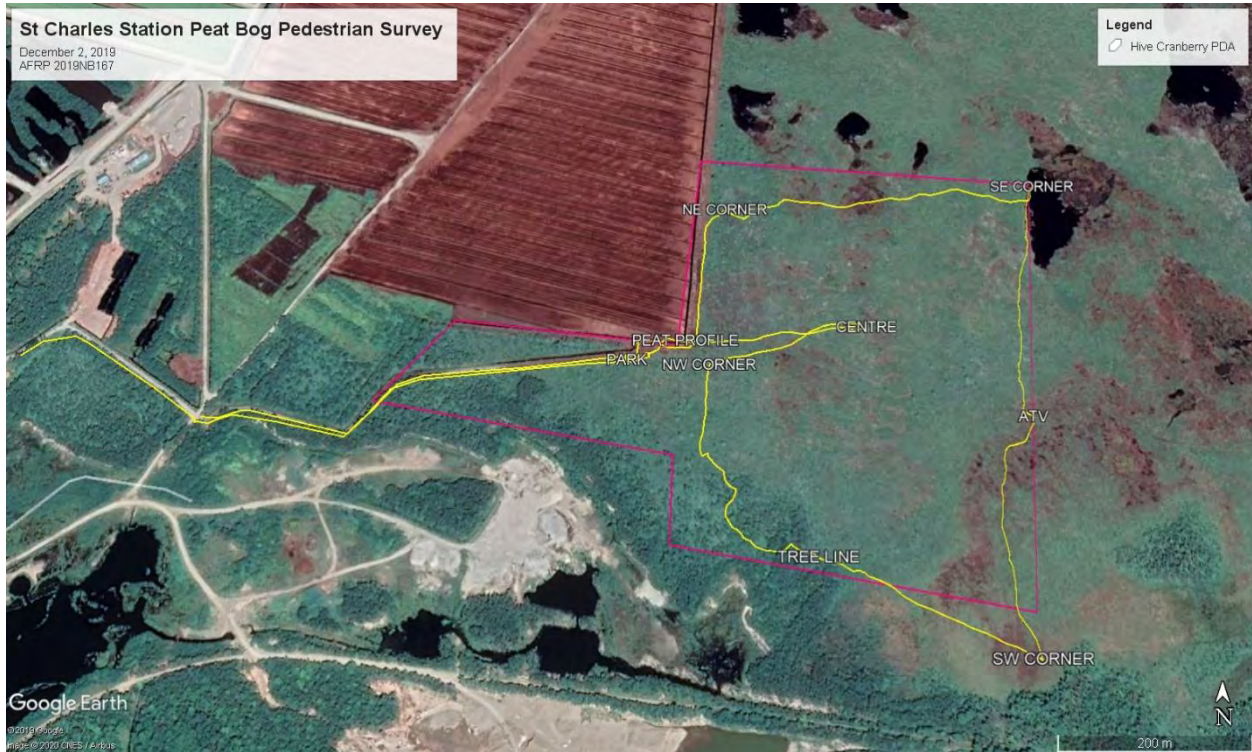


Figure 10: An aerial image of the PDA (red polygon) with the GPS track log (yellow line) and waypoints (adapted from GoogleEarth 2019).

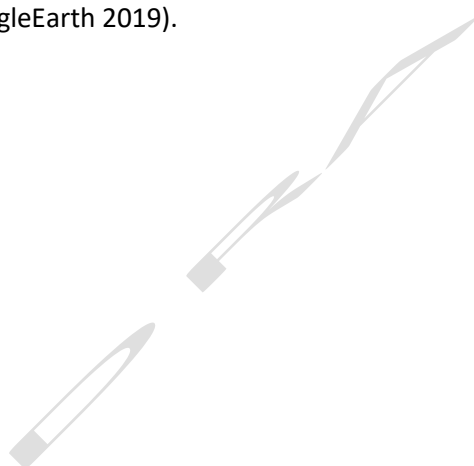
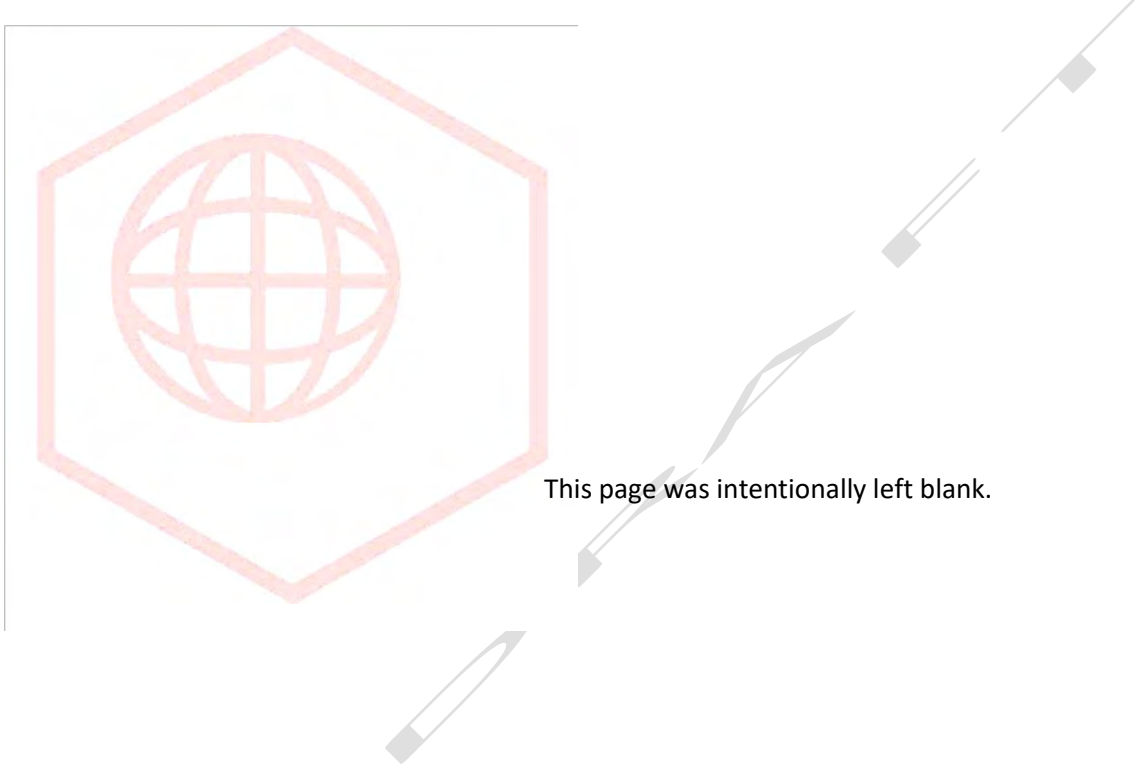




Figure 11: The Peat profile from the adjacent active peat harvesting operation ~20m North of the PDA; note the depth of peat is observed to be 2.5-3m DBS (C. Colwell-Pasch 2019).



Figure 12: The active peat field to the north of the PDA, note the peat has been harvested to about 80-90cm DBS and there are many organics (ie. wood) within the peat matrix (red circles) (C. Colwell-Pasch 2019).



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9.2 Heritage Resources Emergency Management Plan (HREMP)



Heritage Resources Emergency Management Plan (HREMP) for Wetland Specific Chance Finds

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1.0 Introduction

1.1 Summary

The intent of the Heritage Resource Emergency Management Plan (HREMP) for Wetland Specific Chance Finds is to provide the proponent with general guidelines for the appropriate response to the discovery of known or suspected heritage resources (i.e. archaeological materials), including human remains, during annual surface surveying and/or daily operations within a wetland area.

The purpose of this HREMP is to address the possibility of cultural resources becoming exposed during peat harvesting, construction and operations within the Project Development Area (PDA) and to provide procedures to follow in case of a chance archaeological find to ensure that archaeological sites are identified, documented and protected as required by Provincial legislation and regulations. Another objective is to promote proper site management of cultural resources within the unique wetland ecozone.

1.2 Relevant Legislation and Guidelines

Heritage resources in New Brunswick are protected under the *Heritage Conservation Act* (2010) and administered by the regulatory body, Heritage and Archaeological Services Branch (HASB) at the Department of Tourism, Heritage and Culture. The Act outlines the province's ownership or trusteeship of all archaeological, palaeontological, and military/burial site heritage objects (Government of New Brunswick 2020). Archaeological regulations are found in *The Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (hereafter referred to as 'the Guidelines') and define the requirements, responsibilities, ethics and purview of the AIA permit holder (Government of New Brunswick 2012). The following definitions are from the Act:

Archaeological object: *"an object which shows evidence of manufacture, alteration or use by humans that may provide information about past human activities and which meets any criteria set by regulation, and includes a sample collected from that object"*.

Archaeological site: *"a place where evidence of past human activities, such as archaeological objects and features, is discovered on, buried or partially buried beneath the land, or submerged or partially submerged beneath the surface of a watercourse or permanent body of water"*.

2.0 Annual Surface Surveying Procedure

2.1 Purpose of Annual Surface Survey

A purposeful annual survey of the entire PDA by the proponent or a party acting on behalf of the proponent (i.e. archaeologist) is required to ensure that valuable heritage resources, especially organic cultural materials, are identified, recorded and collected if found during any phase of development,

harvesting or daily operations and management. By conducting an annual surface survey, during peat harvesting in particular, provenience or context can be maintained within 10-15cm due to the gradual, even, method of peat removal. The entire PDA will be excavated over a 20-year period, 20-25cm a year, making annual surface surveys an appropriate means of identifying heritage resources *in situ*, if they are present. This recommendation was made in consultation with Heritage and Archaeological Services Branch (HASB).

2.2 Scope of Annual Surface Survey

The entire PDA should be walked over annually, preferably during the driest point of the year, and cover the entire PDA. Any infrastructure requiring ground disturbance should also be monitored for heritage material at the time of ground disturbance. Annual surface surveys cannot occur when the ground is covered by snow.

2.3 Conducting a Surface Survey

The entire PDA should be walked over, preferably by a group of people, spaced 10m apart. The participants should look for any material that looks man-made (i.e. historic items) or modified (i.e. stone tools) with special attention paid to unstable organic materials (i.e. bone, leather, wood). Photos, GPS coordinates (track log of survey and waypoints of finds) and notes of the annual survey would be highly recommended.

2.4 Reporting of Annual Surface Survey

In the event of a survey identifying heritage material within the PDA, the following Chance Find Procedure will require HHASB be notified immediately. This procedure must be followed for all possible finds. In the event an annual survey was deemed negative for an observable heritage material, an email to HHASB Regulatory Services Unit Manager (see Section 5.0) stating the date of the survey and names of those involved and negative results will suffice.

3.0 Wetland Specific Chance Find Procedure

3.1 Discovery of Intact or Disturbed Archaeological Deposits/Artifacts

In the event that heritage resources are found during initial ditching, peat harvesting, operations and maintenance or during an accident or disaster within the PDA; the following steps must be followed to ensure the timely reporting of the find, the stabilization of the artifacts and the reduction in further

negative impact to the possible site. This procedure is based on the HHASB Guidelines “Sample Protocol for Accidental Discovery of Archaeological Resources for Projects Under an EIA” (Government of New Brunswick 2012: Appendix B).

3.1.1 Initial Response by Proponent

Identification: All proponent employees and contractors are responsible for reporting any unusual materials unearthed during any phase of development, harvesting, operations and maintenance and/or accidents/disasters to the field supervisor or manager immediately. Do not remove the material, if exposed, cover with wet peat (do not lose location).

3.1.2 Initial Action by Proponent

STOP WORK: In those situations where the find is believed to be an archaeological resource, the supervisor/manager will immediately stop work in the vicinity of the find (200m radius) and notify her/his immediate supervisor. As per the *Heritage Conservation Act (2010)* the find must be reported to HHASB within 24 hours. The material is to remain in place (not removed if partially buried) and the supervisor/manager will take a photo of the material and send it to HHASB (contact information in Section 5.0). The material should remain in place and marked for easy relocation. The material should be covered with wet peat if partially exposed. If fully exposed, the item can be placed in a clean (non-chemically or food contaminated) container with wet peat and stored at room temperature away from sunlight. The container should not be allowed to get too hot or to freeze. HASB will direct the supervisor/manager with additional required procedures during reporting.

Returning Work: Work CANNOT resume in the find buffer until HASB has investigated the find and provided clearance. The buffer surrounding the find location is 200m.

3.1.3 Management Options

Upon positive identification of heritage resources within the PDA, an appropriate mitigation and management strategy will be developed and implemented in consultation with HASB. Input may be sought from First Nation representatives (if applicable), typically from the closest First Nation community.

No person, other than one authorized by the Minister responsible for the Department of Tourism, Heritage, and Culture may move, destroy, damage, deface, obliterate, alter, add to, mark or in any other way interfere with a heritage resource.

3.2 Discovery of Human Remains in a Wetland Environment

In the event that possible human remains are found during initial ditching, peat harvesting, operations and maintenance or during an accident or disaster within the PDA; the following steps must be followed to ensure the timely reporting of the find, the stabilization and respect of the possible human remains and the reduction in further negative impact to the possible site. . This procedure is based on the HHASB Guidelines “Sample Protocol for Accidental Discovery of Human Remains” (Government of New Brunswick 2012: Appendix C). The following sections are directly from the HASB Guidelines (2012).

3.2.1 Types of Human Remains

Human remains will basically fall into the following four categories:

- 1) Legal evidence: All human remains that are discovered must be initially treated as potential forensic evidence.
- 2) Cemeteries registered under the *New Brunswick Cemetery Companies Act (1973)*.
- 3) Historic Cemeteries and Family plots: These include human remains buried in currently neglected and overgrown early twentieth century cemeteries and family plots. Living relatives or descendants may exist.
- 4) Archaeological remains: Archaeological human remains include Pre-Contact human remains and historic period remains that were interred as a result of religious/social burial practices. Pre-Contact human remains may occur as a single burial or as multiple burials such as unrecorded First Nations burial sites. Historic period archaeological human remains typically occur in historic cemeteries and long forgotten (pre-twentieth century) family plots.

3.2.2 Legislation and Agencies Involved

Section 11 of the *Heritage Conservation Act (2010)* prohibits the alteration of any burial ground without an Archaeological Site Alteration Permit (SAP).

Section 182(b) of the *Criminal Code of Canada* states: “Every one who improperly or indecently interferes with or offers any indignity to a dead human body or human remains, whether buried or not, is guilty of an indictable offence and liable to imprisonment for a term not exceeding five years.”

Agencies Involved:

Depending on the circumstances surrounding the discovery of human remains, several agencies may be involved and include:

- Lead police agency (RCMP or municipal police force): The lead police agency will decide what course of action to initiate.

- Regional Coroner's Office: The Coroner's Office may become involved in criminal investigations and in determining the cause of death.
- Chief Medical Officer's Office: The interest of the Chief Medical Officer relates to health issues.
- Heritage and Archaeological Services Branch, Department of Tourism, Heritage and Culture: If it is determined that the human remains are not associated with a forensic matter or recent mishap, HASB will be consulted to determine the proper course of action. Pre-Contact burials are an extremely sensitive issue and will require the involvement of First Nations representatives, typically from the closest First Nations community.

3.2.3 Protocol to Follow in the Event of Discovery of Human Remains or Evidence of Burials

Halt all Activities

Halt all activities (STOP WORK) in the vicinity (200m radius) of the human remains/burial immediately. Until determined otherwise, the remains must be treated as evidence in a forensic investigation. If the remains are found in the bucket of heavy equipment, the bucket must not be emptied as physical evidence may be destroyed.

Secure the Area

The area must immediately be designated as 'Out of Bounds' to all personnel and the public. Depending on the weather and other conditions, the human remains discovered must be provided with non-intrusive protection, such as covering with a cloth or canvas tarp (non-plastic preferred). All personnel and traffic must exit the site by one common non-intrusive path. Curiosity seekers must be kept off the site. The remains must not be touched, moved or removed under any circumstances.

Inform the Lead Police Agency (RCMP or municipal police force)

The nearest detachment of the lead police agency must be informed immediately. For reasons of site security and sensitivity, it is recommended not to use a cell phone. Upon verbal description of the situation the lead police agency may dispense with a site visit to view the site/remains. Typically, the lead police agency is on the scene in less than 24 hours. The lead police agency will make a decision as to whether the Coroner and/or HASB must be involved.

The lead police agency specialists may be called to determine if the situation is associated with a crime or an archaeological feature. If it is concluded to be related to a crime, the lead police agency specialist will inform the Coroner, collect data, and remove the remains.

If the lead police agency determines the situation not to be associated with a criminal matter, then HASB will be consulted (contact information in Section 5.0) to determine the proper course of action in consultation with stakeholders.

If HASB determines that the human remains are not associated with an archaeological feature but still have to be removed, certificates of removal are required from both the Coroner's Office and the Chief Medical Officer of New Brunswick.

Resuming Work

Work can only resume in the vicinity of the discovery once clearance has been received from all of the authorities and agencies concerned.

4.0 Regulatory Inspections

At any point during development, harvesting or operations and maintenance, HHASB can arrive on site to conduct a spot inspection of the PDA. During the spot inspection, any or all employees on site may be asked what to do in the event of a chance find of a heritage resource. It is the responsibility of the proponent to ensure all active employees are aware of this HREMP and can access it in the event of a chance find.

5.0 Chance Find Reporting Contact Information

In the event of a possible chance find, HHASB must be notified within 24 hours of the find. The contact information for the responsible party is below:

Anne Hamilton, M.A., RPA – Acting Manager, Regulatory Services Unit, Heritage and Archaeological Services Branch, Department of Tourism, Heritage and Culture

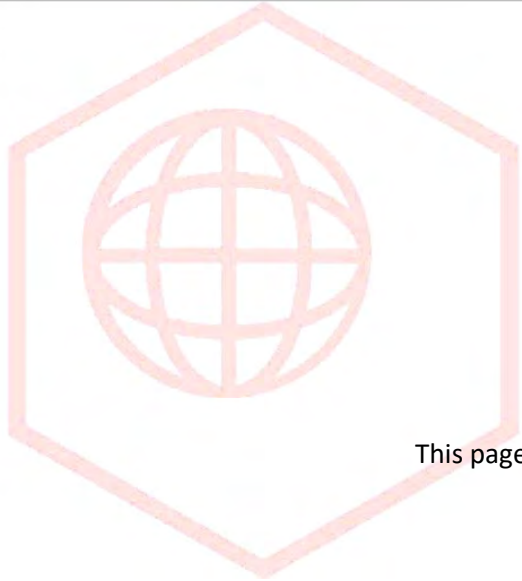
Or

Brent Suttie, M.A., RPA – Provincial Archaeologist and Director, Heritage and Archaeological Services Branch, department of Tourism, Heritage and Culture

HHASB Reception: 506-453-3014

Regulatory Services Unit: 506-238-0438

Email: Anne.hamilton@gnb.ca or brent.suttie@gnb.ca



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