

**GLEN DHU WIND PROJECT:
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT**

Heritage Research Permit A2008NS41



July 2008

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**GLEN DHU WIND PROJECT:
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT**

**Heritage Research Permit A2008NS41
Category C**

Davis Archaeological Consultants Limited

Principal Investigator: April D. MacIntyre
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Cover: Bailey's Brook and the Northumberland Strait, viewed from Glen Dhu.

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EXECUTIVE SUMMARY

An archaeological resource impact assessment of the proposed Glen Dhu Wind Project development on the border of Pictou County and Antigonish County was conducted by Davis Archaeological Consultants Limited, in the form of a desktop study in 2007 and a field reconnaissance in 2008. The 2007 study revealed that the general area had been impacted by historical settlement, most heavily in the nineteenth century. The conclusion from the assessment was that the likelihood of encountering Mi'kmaq archaeological resources was low on the mountaintops within the study area, due particularly to the high elevations and lack of permanent waterways for access points along the mountain ridge. High potential existed for archaeological resources related to the nineteenth century Scottish settlement. However no significant historic resources were encountered directly within the impact areas and, therefore, no active mitigation is recommended at this time.

1.0 INTRODUCTION

In June 2007, Davis Archaeological Consultants (DAC) Limited was contracted by Fulton Energy Research to conduct an archaeological resource impact assessment of the proposed Glen Dhu Wind Project in Pictou County and Antigonish Counties. This assessment included a phase I archaeological desktop study of the development area which was conducted in July 2007 under Heritage Research Permit A2007NS45, as well as a phase II archaeological reconnaissance of the development area in June 2008 under Heritage Research Permit A2008NS41. A report was completed and submitted to the Nova Scotia Department of Tourism, Culture and Heritage (NSDTCH) for the first phase of the assessment in 2007. The results of the first phase of the assessment indicated that the study area was of high potential for historic period archaeological resources related to late eighteenth and nineteenth century occupation of the area. The likelihood of encountering Mi'kmaq archaeological resources was low on the mountaintops, though moderate to high potential existed in the intervening valleys as nearby Merigomish was of major importance in the Mi'kmaq seasonal round. Subsequently, a phase II archaeological reconnaissance of the development area was recommended.

This report details the results of the archaeological reconnaissance that was conducted between 23 June and 27 June and on 4 August 2008, and conforms to the standards required by the NSDTCH Heritage Division under the Special Places program.

2.0 DEVELOPMENT AREA

The Glen Dhu Wind Project development area is located north of the 104 highway at exit #29, straddling the border of Pictou County and Antigonish County, overlooking the Northumberland Strait to the North. For the purposes of the archaeological assessment, the study area is defined as those areas that will be directly impacted by construction of the turbines, necessary access roads, and associated substation. Thirty-six turbines have been proposed in the study area. Expected impact for the turbine pads will include excavation of a 1 acre radius around the base of the turbine in order to accommodate lay-down and parking areas. Access roads will be approximately 6 metres wide and will include upgrading of existing roads as well as construction of new roads.

The development area is located over a convergence of four Nova Scotia Theme Regions – 1. Pictou-Antigonish Highlands, 2. Dissected Margins (sub unit# 320b French River), 3. Northumberland Plain (sub unit# 521a Northumberland Strait) and 4. Pictou Valleys (sub unit# 582b McArras Brook).

The first of these, Pictou Antigonish Highlands (natural region # 312) is an area of old crustal rocks of Precambrian and Ordovician origin, characterized, within the current study area, by soils, "...developed on shaly loam tills derived principally from Silurian shales....[with the] Barney series [well-drained loam]...somewhat less stony and...finer

textured than the others”.¹ These soils are considered marginally productive and supported only subsistence level farming for the Scottish settlers here in the early nineteenth century. East of Kenzieville lie softer strata that have been downfaulted, such as the portion of the Arisaig Formation known as the Kenzieville Trough. This natural theme region has dendritic drainage patterns that are heavily influenced by fault lines and supports abundant wildlife of which relatively little is known, though it does include moose, fishers, White Sucker, Brook Trout, sticklebacks, Golden Shiner, Yellow Perch and Banded Killifish. The drainage patterns across these highland areas also support many mills constructed by settlers from the eighteenth to the twentieth centuries. Forests in the study area portion of this region are comprised of White Spruce, colonized on old farmlands, Yellow Birch, Sugar Maple, American Beech, Red Spruce, Eastern Hemlock and Balsam Fir with diverse and vigorous shrubby vegetation.

The French River sub unit (#320b) of the Dissected Margins theme region is defined by the kame and esker fields, which create foothills and uplifted plateaus. This landscape is hilly with steep narrow valleys and its soils result from varied bedrock and Carboniferous glacial material redeposited from the north. Here, again, Barney soils have developed on shaly clay loams that have been derived from Silurian shales. Animals in this region mimic the array in the Cobequid Hills region with Goshawk, Red-tailed Hawk, Barred Owl and the Great Horned Owl nest and others species present including Common Raven, Pileated Woodpecker, Ruffed Grouse, Grey jay, chickadees, warblers and insectivorous birds, Eastern Redback Salamanders, beaver, coyotes, bobcats and Snowshoe Hares as well as Brown Trout and Brook Trout, common in smaller tributaries.²

¹ Davis and Brown 1996:31

² Davis and Browne 1996:38.

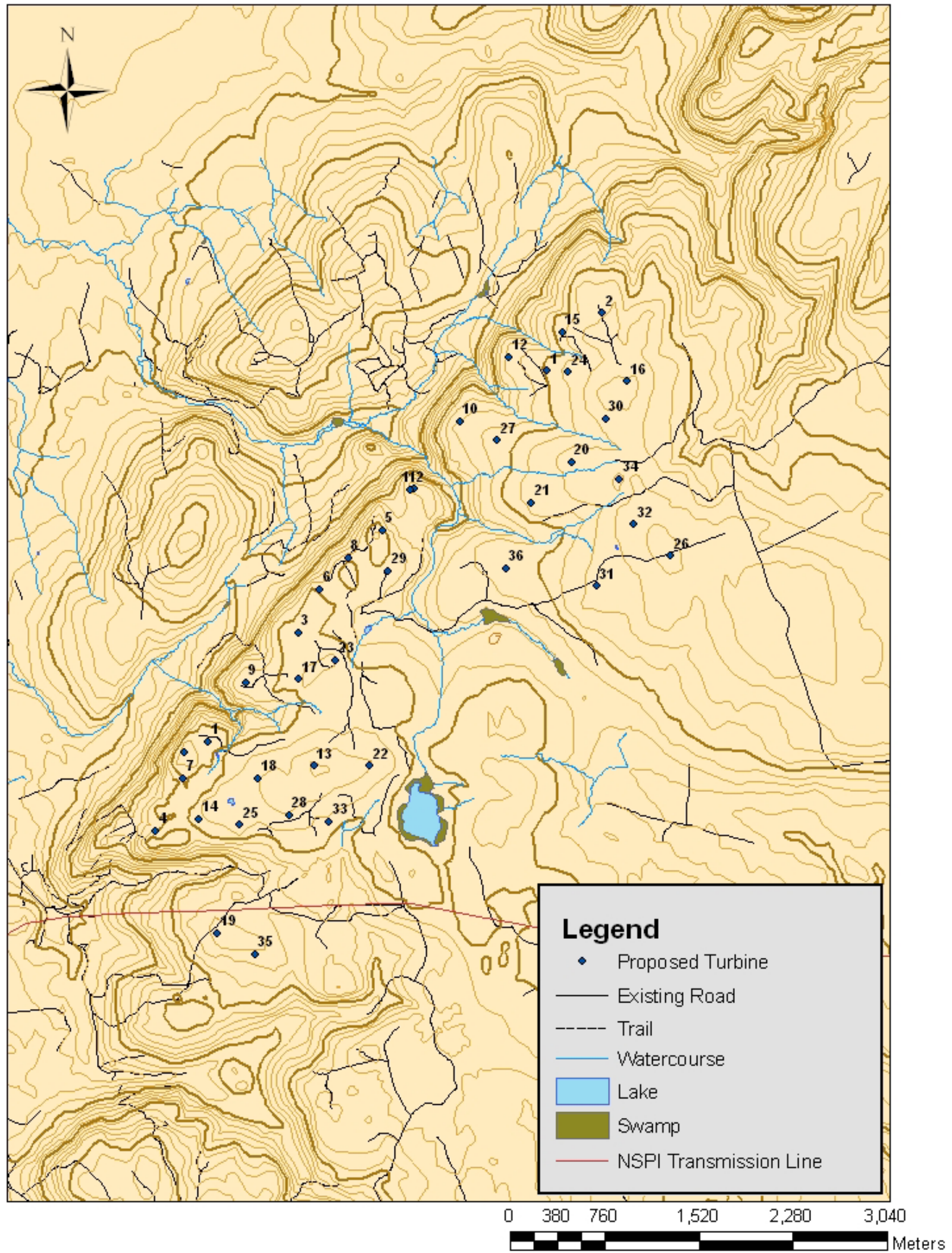


Figure 2.0-1: Proposed development area.

Table 2.0-1: Fulton Energy Research Proposed Turbine Sites.

<i>Projection UTM Datum NAD 83</i>	
Turbine	Location
T1	20 T 558950 5056300
T2	20 T 562125 5059750
T3	20 T 559675 5057175
T4	20 T 558525 5055575
T5	20 T 560350 5058000
T6	20 T 559850 5057525
T7	20 T 558750 5056000
T8	20 T 560075 5057775
T9	20 T 559250 5056775
T10	20 T 560975 5058875
T11	20 T 560575 5058325
T12	20 T 561375 5059400
T13	20 T 559800 5056100
T14	20 T 558875 5055675
T15	20 T 561800 5059600
T16	20 T 562325 5059200
T17	20 T 559675 5056800
T18	20 T 559350 5056000
T19	20 T 559025 5054750
T20	20 T 561995 5058495
T21	20 T 561550 5058225
T22	20 T 560250 5056100
T23	20 T 559975 5056950
T24	20 T 561850 5059275
T25	20 T 559200 5055625
T26	20 T 562575 5057775
T27	20 T 561275 5058725
T28	20 T 559600 5055700
T29	20 T 560400 5057675
T30	20 T 562150 5058900
T31	20 T 562124 5057666
T32	20 T 561329 5057798
T33	20 T 562466 5058440
T34	20 T 559900 5055775
T35	20 T 558834 5054097
T36	20 T 561346 5057695

3.0 METHODOLOGY

3.1 Historical Background

In 2007, a desktop study of this area was conducted by Davis Archaeological Consultants Limited.³ A total of nine archaeological sites were recorded in the Maritime Archaeological Resource Inventory near the study area, eight of which clearly date to the historic period and one for which a date is not clear, comprised of possible human skeletal material. This last site was reported in 1929 and no analyses were done on the material, nor was any archaeological excavation carried out in the area (at Barney's River bridge, likely at the mouth of Barney's River) to suggest cultural affiliation. Given the fact that Merigomish Harbour and its tributary, Barney's River were touted as a "major Micmac (sic) camping ground"⁴, it is possible that these remains were from an Aboriginal burial. The eight historic sites were recorded in 2004 by Michelle LeLièvre. Although within the vicinity of it, none of these historic sites are located directly within the development area. These sites represent some of the industrial features in the area associated with the railway as well as sites and structures related to grist and saw mills.

First Nations' presence in Pictou County bordered the coast and river valleys to exploit both the food sources and transportation routes that the water afforded. We know that Merigomish, whose name comes from the Mi'kmaq language and means, "the merrymaking place" was an important area for summer food collection and gathering of Mi'kmaq bands. There is little to suggest that Mi'kmaq people or their ancestors inhabited the mountaintops in and around the study area, but they may have been used for sighting and hunting ungulates passing through or along the many valleys, streams, and rivers. Cascades and waterfalls are considered to have greater potential for Mi'kmaq archaeological resources, including those of a spiritual nature. Therefore, the potential for First Nations' archaeological materials to be encountered is at least moderate.

³ Davis Archaeological Consultants 2007

⁴ Ferguson 1967: 34.

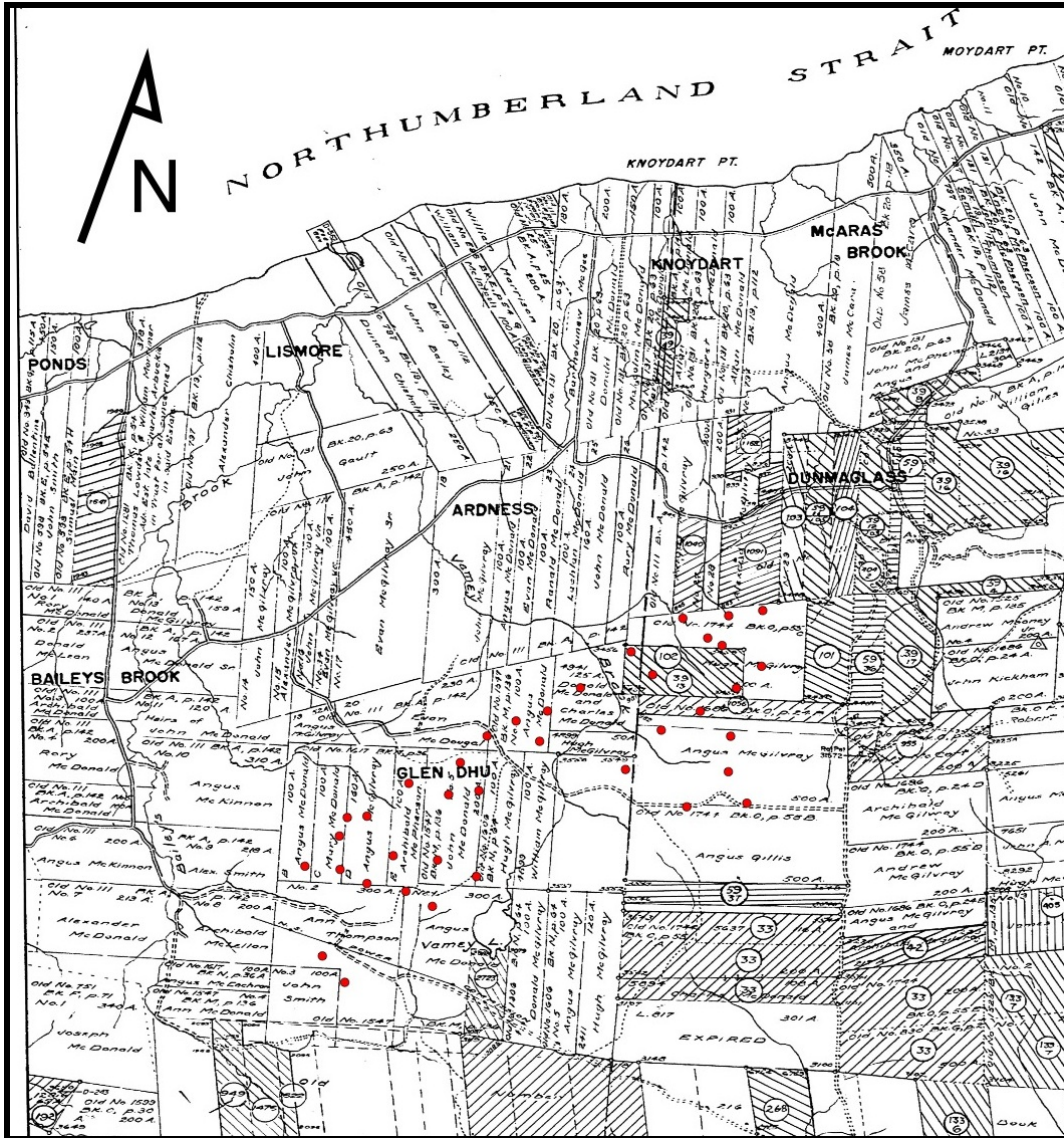


Figure 3.1-1: Detail of Crown Land Grant mapsheet no. 98. Turbine locations are indicated in red. The entire mapped area and some surrounding terrain, particularly Barney's River to the south, was considered part of the study area.

The earliest indications of historic land use at Barney's River and the area immediately surrounding it suggests that an Irishman, Barnabas McGee (for whom the river is named), settled here in 1776 or 1777. In 1886, McGee's property was being occupied by a Mr. McDonald⁵. Shortly after McGee, in 1788, to the east of the mouth of Barney's River, John Bailey settled at Bailey's Brook. Waves of Scottish settlers followed between 1790 and 1805. In this period, William Hattie is supposed to have constructed the first mill in

⁵ NSARM, mfm 9589, MG100 vol.92 # 31 (Bruce, 1886)

the area opposite the burying ground at Avondale⁶. It's likely that much of this early settlement was concentrated in the lowlands, valleys and around the rivers, brooks and shorelines of the area, however given that the majority of historical settlement of the area was by Highland Scots, it may be that the settlement of the more mountainous areas was simply less-well documented.

We are able to define a substantial trace through historical cultural landscape evolution in the development area through historical map products. Among the earliest are the Crown Land Grant maps, however the information portrayed is largely cultural, with the only natural features available for orientation being hydrological features. Still, these maps provide information about land owners and allow us to gain a sense of familial ownership and occupancy in an area over time. When used in conjunction with the other types of maps, we gain a sense of the property boundaries that reflected broad landscape features and the progress of settlement over the years. Among the grantees in the development area, surnames such as McGilvrays and McDonalds dominate the grants. In the southeast portion of the Glen Dhu Wind Project study area, many grants have been laid out but their ownership remains anonymous. This suggests that early settlement of the area did not extend across this part of the landscape, though it would soon become populated and heavily used for transportation, via the Old Road and the Old Crockett Road⁷ (Figure 3.1-2). The latter travels across the unlabelled expanse, though it appears to lead to the homestead of William Crockett, a grantee bordering the western edge of this expanse noted on Crown Land Grant sheet #98. Though not mapped, the presence of these roads would make cultural use of the area along them more feasible.

The Great Map, dating to 1831, shows settlement in the area of Barney's River and Barney's River Station as being limited to the area along the river itself. In the southern portion of the study area, just below the latter community, this map shows a D. Robertson settled where A.F. Church later (1867) shows an A. Robertson along the lower portion of Barney's River. Likewise, William McKenzie, Peter Grant, J. McKenzie, Mrs. Hattie and John Ross appear along this stretch of the river ending at the Free Church. For each of these places, structures are shown along the course, though for William McKenzie, two structures as opposed to one appear associated with his homestead. According to the Great Map, the area east of the hydrological feature known as Barney's River, where the impact area is located, is unpopulated at this point. It should be noted that nineteenth century mapping standards were not as precise as they are today. Middle and lower class residents were often not represented for a variety of reasons. As well, difficult terrain could present obstacles and obscurity for mapping of socio-cultural landscape features, such as highland and other rural homesteads.

⁶ NSARM, mfm 9589, MG100 vol.92 # 31 (Bruce, 1886)

⁷ Each of these roads are so labelled on the 1893 Geological Survey of Canada (GSC) map (sheet # 35)

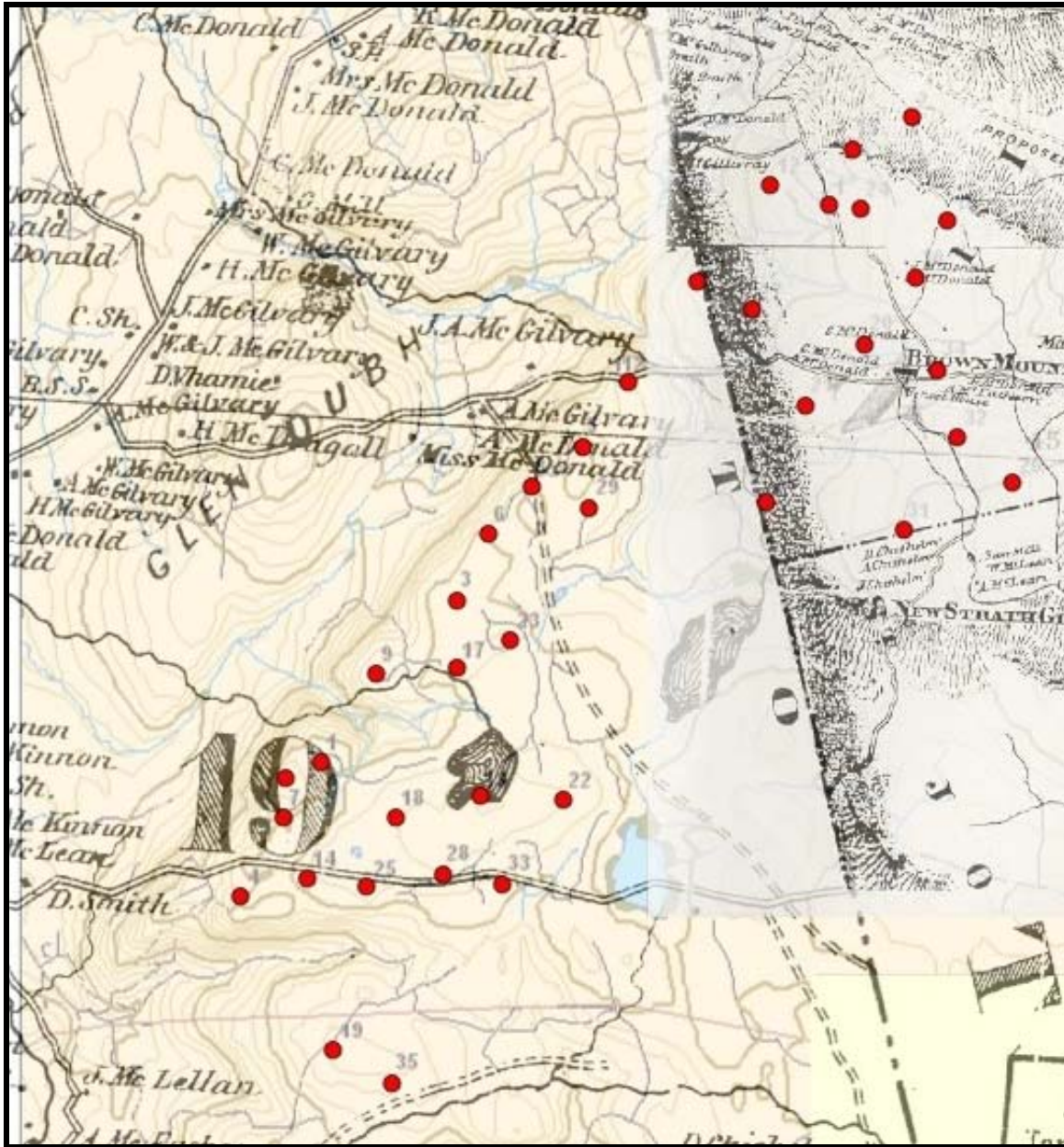


Figure 3.1-2: A.F. Church's maps of Pictou County and Antigonish Counties (1867) roughly aligned to map of turbine locations, at Glen Dhu.

Ambrose F. Church's Map of Pictou County (1867) shows significantly greater settlement of the area of the Glen Dhu Wind Project (Figure 3.1-2). His map of Antigonish County, covering the eastern-most turbines, suggests settlement patterns mimic those across the county line. The "Old Road", noted on the 1893 GSC map, (Figure 3.1-3) appears on Church's map surrounded by a dozen homesteads, a dye mill and a saw mill. As Church's map precedes the GSC map by only 25 years, this suggests

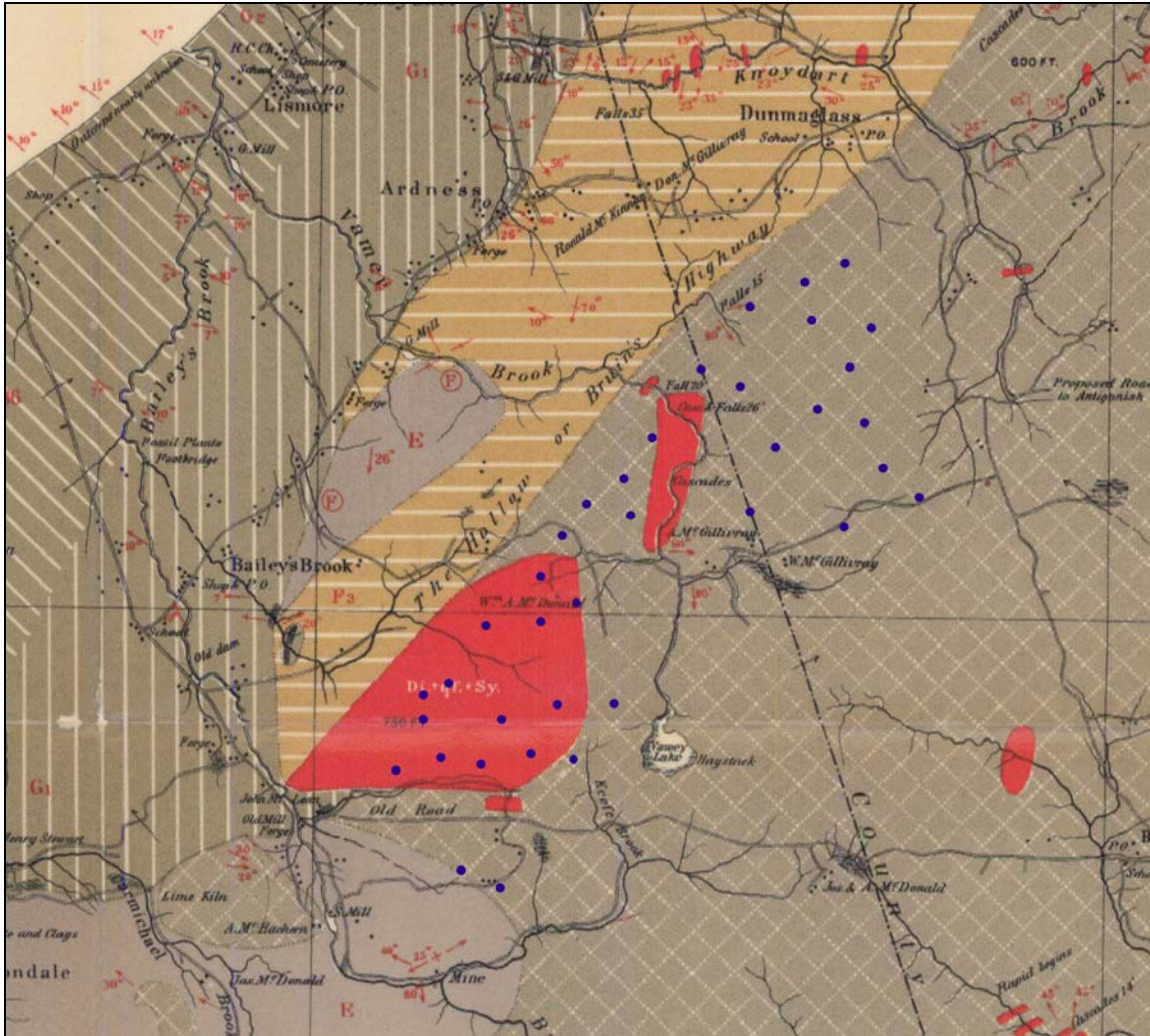


Figure 3.1-3: Subset of a Geological Survey of Canada map (sheet #93 (or 35)) of the area from 1893 overlaid on the Glen Dhu Wind Project area (approximate locations of turbines shown in blue).

that the “old” road was created at least between 1831 and 1867. The “Old Crockett Road” does not appear on Church’s map, but this road does provide access to main roads for the Oulton residents near Marshy Hope. S. Olton and S. Olton Jr. appear on the 1867 map while a C.W. Oulton appears on the 1893 map above where the earlier Oultons are located. It is accepted that minor inaccuracies in Church’s maps have appeared and, so, it is possible that the Old Crockett Road, serving as an early nineteenth century “driveway” for the Oultons/Oltons was, at the time Church was collecting data for his maps, a pathway not well-known or mapped. William Crockett does appear on the Crown Land Grant map, though the origin of this path/roadway may derive from the need for a shortcut from Marshy Hope to the mouth of Barney’s River and Merigomish, rather than a throughway to Marshy Hope for residents of the lower portions of the river. We do know, thanks to Meacham’s Atlas of Pictou County, that several homesteads of

McGillvray and McDonald families along the “Old Road” existed that no longer appear on the 1893 GSC map. Finally, Bruce’s 1886 article mentions the presence of a “little graveyard”, on a farm at East Branch where James McDonald owns the former Robertson homestead⁸ (Figure 3.1-3). This highlights the need to be aware of the potential for family cemeteries on the homesteads established across the study area.

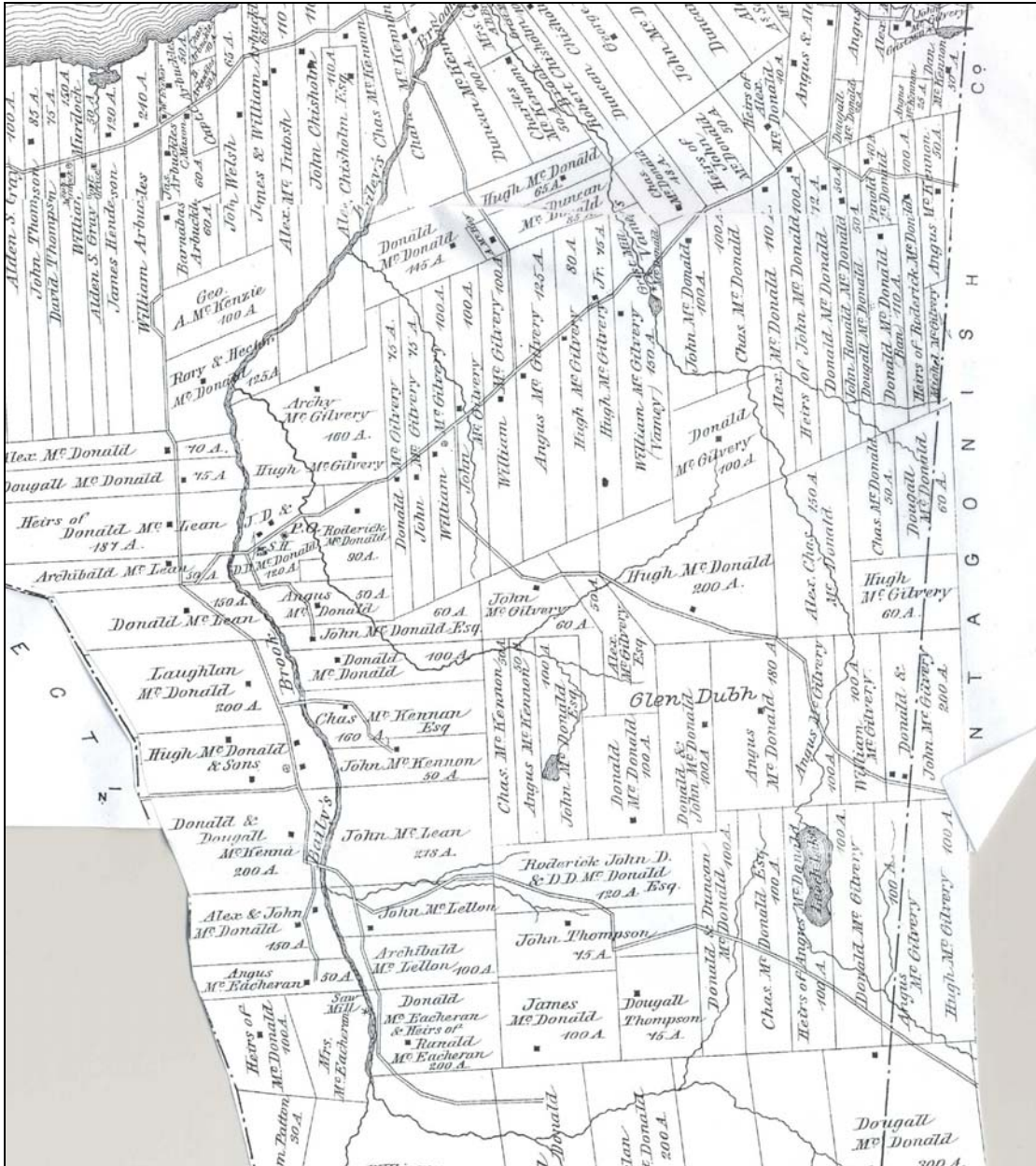


Figure 3.1-4: Coverage of study area in Section 19 from Meacham’s Atlas of Pictou County (1879).

⁸ NSARM, mfm 9589, MG100 vol.92 # 31 (Bruce, 1886: 7).

Aerial photos over the study area taken in 1945 clearly show vegetation and field delineation patterning that reflects property boundaries as defined in the Crown Land Grant maps and Meacham's 1879 Atlas of Pictou County, though significant forest reclamation has also, clearly, taken place.⁹ In sum, significant changes in landscape settlement and use appear to have occurred rapidly over the course of the nineteenth century, quickly obscuring historic homesteads and cottage industrial sites into the early twentieth century.

3.2 Archaeological Field Survey

A field reconnaissance was conducted by April MacIntyre and Laura de Boer between 23 June and 27 June and by Stephen Davis and Matt Munroe on 4 August 2008. Each of the turbine sites and access roads were surveyed using GPS data provided by Fulton Energy Research, at sub-decametre accuracy (Figure 2.0-1 and Table 2.0-1). Approximately a 1 acre radius was surveyed around each proposed turbine site. For each of the proposed turbine sites and access roads, archaeologists made note of positive as well as negative evidence of cultural activity including potential cultivation, stone piles, stone property boundaries, modern cultural and natural disturbance, shallow soil, and rugged topography in the vicinity of the impact areas. Locations of archaeological resources were recorded using GPS technology and field notes and photographs were taken to document the survey. As per the standards followed by DAC on previous wind power projects, a 25-metre radial non-disturbance buffer was assumed around any significant heritage resource that might be encountered during the course of the survey. This standard is used by DAC to determine the potential impact to such resources when making recommendations for mitigation.

Eleven areas of field clearing were noted in the form of either irregular or linear stone piles. The linear features may have doubled as markers for property boundaries. A twelfth site is potentially cultural, and appears to be a burrow pit, but its significance is unconfirmed. The pit and some of the field clearing sites were marked using GPS technology, while the other sites were noted in approximate relation to the nearest turbine locations. No surface artifacts were collected, and no subsurface investigations were conducted.

4.0 RESOURCE INVENTORY

No significant historic cultural activity was noted within the impact areas. The majority of the terrain on Glen Dhu Mountain is rugged with indications of past and current clear cutting (Plate 1). In most of the proposed turbine locations, the surrounding terrain was characterized by either very shallow till, or on slopes subject to heavy wind, both unsuitable for extensive cultivation. Wooded areas varied between White Spruce,

⁹ Department of Energy, Mines and Resources, 1945.

hardwoods, and mixed growth forests, with few trees over the age of approximately 60 years, attesting to the extensive clear cutting on the mountain in the past century. Several areas of cultural activity were recorded within the study area. However, these were limited to field clearing stone piles and are of low archaeological significance as the potential for yielding additional information from these features is negligible.

A stone pile resulting from field clearing was observed approximately 80m northeast of turbine T3. A maple tree at least 50 years old is growing on top of it, indicating that the stone pile is at least as old as the tree, and probably older. The current road layout does not appear to impact this location. Another stone pile rests southeast of the T3 turbine site, and is approximately 8 meters by 2 meters in size (Plate 2). This pile may be impacted by the planned development, as it is within 20 meters of the turbine location. A linear field clearing pile appears approximately 150 metres northeast of T3 and does not appear to be in the path of the planned access road to the turbine. No associated features were encountered.

A stone pile, this one also in the form of linear field clearing, is located roughly 60 metres south of turbine T23. The stones are visible running for about 20 metres, arranged in a pile approximately 2 metres wide (Plate 3). A second linear field clearing pile is also located approximately 8 metres northwest of turbine T23, the full extents of which are obscured by brush growth (Plate 4).

Another observed incidence of field clearing, again linear, was observed 150 metres northeast of turbine site T9.

A field clearing mound was also located 300 metres southeast of turbine T12, measuring approximately 6 metres by 4 metres (Plate 5). Some slightly corroded metal strapping rests on top of the pile. The feature is located approximately 5 metres immediately west of an old roadway leading north to T12, and if the road were to be significantly widened, the feature may be impacted.

Multiple piles of field clearing stones were observed within one field, this time on the east side of the same roadway bordering the previous feature. All are around 6 metres by 4 metres, and one of the piles can be attributed to a date of no less than 60 years ago, as a birch tree of about this age growing on top of it. The clearing is full of blueberry plants, which could be remnants of the agricultural activities for which the field was cleared. All of the visible stone piles are well spaced off the current road and do not appear to be in the path of the planned development. This feature area was also marked using GPS technology (Table 4.0-1). More stone piles were noted spaced off of either side of this same road leading to turbine T12. It is unlikely that these features will be disturbed.

Another field clearing stone pile was encountered approximately 400 metres northeast of turbine T27. No evidence of cultivation agriculture was observed around the feature.

Approximately 40 metres southwest of T19 is a cleared area that appears to have been cultivated in the past. Several stone piles and a linear field stone feature were noted. The

ground surface is obscured by heavy ferns and brush, making it difficult to determine if additional features are present (Plate 6).

Another linear field stone feature, measuring approximately 30 metres in length, was discovered 105 metres northwest of T35. This feature appears to have been a property boundary as it had a section of rusted barbed wire at the north end. The ground surface surrounding the boundary wall does not appear to have been cultivated. The turbine site itself is located in a dense spruce wood forest with numerous tree falls.

Four apple trees were noted 200 metres east of where the power line passes over Brown's Mountain Road and Bailey's Brook. No evidence of historic features were seen and the apple trees lie at least 900 metres away from the nearest turbines and access roads.

Finally, a possible small burrow pit was recorded 20 metres east northeast of turbine T11. The pit is steep-sided, approximately 3 metres deep, and is slightly oblong, measuring 5.5 metres on its shorter side (Plate 7). Stone that appears to have been quarried is scattered approximately 10 metres around the pit, concentrated on the east side. A very small fill pile is located on the south side, not nearly large enough to refill the pit, indicating that something has probably been quarried from the site. The pit is located at the top of a hill, centred in the crowning plateau, at least 600 metres from any apparent road. This location is what draws the pit's function as a quarry into question, as large glacial erratics are also scattered around, and in the shallow till of the area a more accessible location for quarrying would not be difficult to find. The feature may be related to hunting and may represent a moose pit.

Table 4.0-1: GPS locations of the archaeological resources identified during 2008 field reconnaissance.

<i>Projection UTM</i> <i>Datum NAD 83</i>	
Archaeological Resource	GPS Location
Historic Field Clearing(s)	20 T 561682 5059288
Possible Burrow Pit	20 T 560606 5058334
Historic Field Clearing(s)	20 T 559711 5057267
Historic Field Clearing(s)	20 T 559775 505730
Historic Field Clearing(s)	20 T 559972 5056923
Historic Field Clearing(s)	20 T 559972 5056961
Historic Field Clearing(s)	20 T 559383 5056829
Historic Field Clearing(s)	20 T 561665 5059207
Historic Field Clearing(s)	20 T 558996 5054731
Linear Stone Property Boundary	20 T 559270 5054675

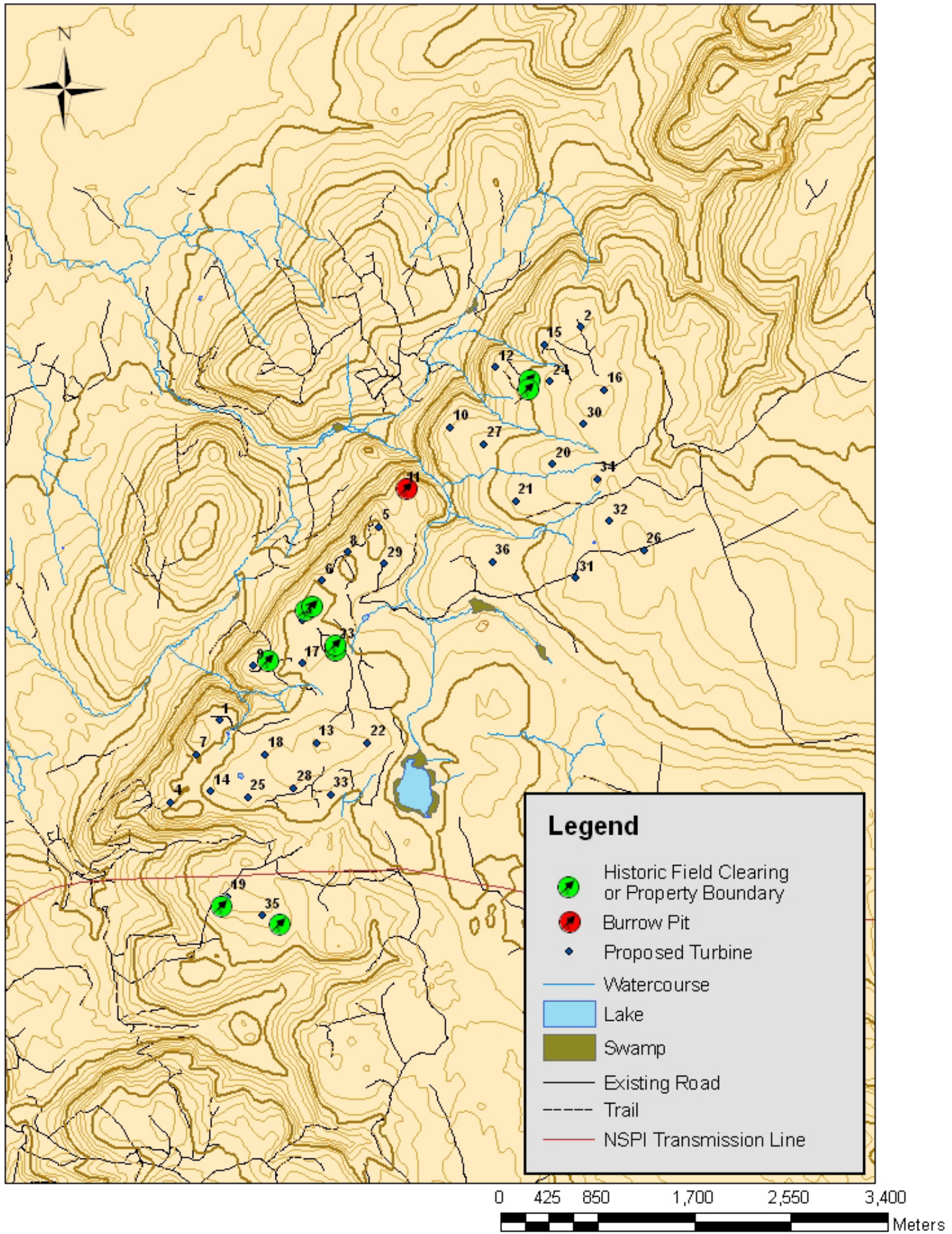


Figure 4.0-1: Locations of archaeological resources in relation to proposed development sites.

5.0 RESOURCE EVALUATION

Each of the cultural activity areas are evaluated according to their archaeological significance. Evaluation of site significance is based on consideration of the site's integrity, cultural and/or historical sensitivity, historical knowledge (or lack thereof), uniqueness, potential to produce associated archaeological resources, and existing or future impact (both natural and cultural). The process of determining site significance is somewhat subjective.

The field clearing sites do not hold a great amount of cultural significance, as they serve at this point only to show where agricultural activities may have taken place. They are also useful in confirming property boundaries indicated on historical maps but the potential to yield additional archaeological information from the features themselves is negligible. Therefore, the several field clearing stone piles and the burrow pit near T11 are considered to be of low archaeological significance and no associated archaeological features were encountered around any of the field clearings or the burrow pit.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Avoidance is the preferred method of mitigation in all instances where archaeological resources are present. No significant archaeological resources were discovered within the impact areas and, therefore, no active mitigation plan is recommended for these features.

Should the current development plan change, it is recommended that an archaeological assessment be conducted to determine the potential for archaeological resources in those areas not surveyed for the current proposed development. Finally, in the unlikely event that archaeological resources are encountered during ground disturbance activities, it is recommended that all ground disturbance cease and the Manager of Special Places, Mr. Robert Ogilvie (902-424-6475) be contacted immediately regarding mitigation measures.

7.0 REFERENCES

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PLATES



Plate 1: Logged area east of turbine T9, looking northwest.



Plate 2: Field clearing near turbine T3, looking southeast.



Plate 3: Linear field clearing near T23, looking northeast.



Plate 4: Linear field clearing near T23, looking south along the feature.



Plate 5: Field clearing along the old road towards turbine T12, looking west-southwest.



Plate 6: Linear stone field clearing near T19.



Plate 7: Possible burrow pit, looking north.

**APPENDIX A:
HERITAGE RESEARCH PERMIT**



Special Places Protection Act, R.S.N.S. 1989

Application for Heritage Research Permit (Archaeology)

Permit No. A2008NS41

(Original becomes Permit when approved by the Executive Director of the Heritage Division)

The undersigned April MacIntyre of c/o 6519 Oak Street, Halifax, NS B3L 1H6 representing (institution) Davis Archaeological Consultants Limited

hereby applies for a permit under Section 8 of the Special Places Protection Act to carry out archaeological investigations during the period:

from 20 May 2008 to 31 August 2008

at Glen Dhu Wind Farm

general location Barney's River Station, Pictou County

specific location(s) (cite Borden numbers and UTM designations where appropriate)

and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format.

I certify that I am familiar with the provisions of the Special Places Protection Act of Nova Scotia, and that I will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the category (check one).

- Category A - Archaeological Reconnaissance
Category B - Archaeological Research
Category C - Archaeological Resource Impact Assessment

Signature of applicant [Signature] Date 15 April 2008

Approved: [Signature] Executive Director Date May 6/08