STATE OF MAINE
DEPARTMENT OF CONSERVATION
93 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

June 23, 2009

Emily Walsh
Stantec Consulting
30 Park Drive
Topsham, Maine

Re: Rare and exemplary botanical features, PN 195600500, Wind Power Development in Eastbrook and T 16 MD, Maine.

Dear Ms. Welsh:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of June19, 2009 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the Town of Eastbrook and the unorganized township of T 16 MD in Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

A portion of this intersects with a landscape analysis site, French's Meadow, identified by our office as having high potential for supporting rare botanical features, and to our knowledge no surveys for rare botanical features have ever been conducted there. Should this landscape analysis site intersect with project development, construction or off-site infrastructure for the project, we recommend that a botanical survey be conducted by a field biologist or consultant with demonstrated experience in identifying rare plants in Maine. We would be glad to discuss this recommendation further should you need guidance in planning a survey.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features

MAINE NATURAL AREAS PROGRAM
MOLLY DOCHERTY, DIRECTOR

PHONE: (207) 287-8044
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with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Sarah Demers

Sarah Demers
Environmental Review Coordinator
Maine Natural Areas Program
207-287-8067

sarah.demers@maine.gov

Enclosures

Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a Four-Mile Radius of the Proposed Wind Power Site in Eastbrook and T16 MD, Maine.

Scientific Name / Common Name	Last Seen	Global Rarity Rank	State Rarity Rank	State Protection Status	Habitat Description
Domed bog ecosystem Domed Bog	2004-04-09	GNR	S3		Raised bogs with concentrically patterned convex surfaces and concentric patterns. Vegetation zonation reflects the nutrient gradient from raised center to edge, with

STATE RARITY RANKS

S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
S3 Rare in Maine (20-100 occurrences).
S4 Apparently secure in Maine.
S5 Demonstrably secure in Maine.
SH Known historically from the state, not verified in the past 20 years.
SX Apparently extirpated from the state, loss of last known occurrence has been documented.
SU Under consideration for assigning rarity status; more information needed on threats or distribution.
S#? Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program.

GLOBAL RARITY RANKS

G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
G3 Globally rare (20-100 occurrences).
G4 Apparently secure globally.
G5 Demonstrably secure globally.
GNR Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
PE Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

Visit our website for more information on rare, threatened, and endangered species!
http://www.maine.gov/doc/nrimc/mnap

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JOHN ELIAS BALDACCI
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

July 22, 2009

Ms. Emily Walsh
Stantec
30 Park Drive
Topsham, ME 04086

Project: MHPC #1113-09 - Blue Sky; Beech Knoll; request for information on historic or archaelogical resources; potential wind facility
Town: Eastbrook & T16 MD, ME

Dear Ms. Walsh:

In response to your recent request, I have reviewed the information received June 22, 2009 to initiate consultation on the above referenced project.

Based on the information provided, I have concluded that the project area contains one or more prehistoric archaeological sites based on our predictive model of archaeological site location. Therefore, Phase I archaeological survey is necessary for this parcel prior to any ground disturbance.

Based on the attached 1881 map, there may be at least one historic archaeological site within the project area. Therefore, a Phase 1 historic archaeological survey is also required.

Lists of qualified historic and prehistoric archaeologists are enclosed along with material explaining the Phase I/II/III approach to archaeological survey. This information can also be found on our website: www.maine.gov/mhpc/project_review This office must approve any proposal for archaeological fieldwork.

Regarding architectural resources, there are no National Register listed or known eligible resources in the project area, but no survey has ever been conducted in this area. In order to determine whether historic above ground resources will be affected by the proposed undertaking, we request that architectural survey be conducted and an assessment made of project impact on any identified historic properties. The architectural survey must be completed according to our "Above Ground Cultural Resource Survey Manual Guidelines for Identification: Architecture and Cultural Landscapes Section 106 Specific" and associated forms, which are both downloadable from our website: www.maine.gov/mhpc/project_review Please find attached our revised photographic policy to be referenced in lieu of the policy in our on-line survey manual. Any computer generated template other than that provided by MHPC must be approved by MHPC prior to submission. No changes to the survey forms are to be made without consulting MHPC. A list of historic preservation consultants is enclosed for your information.

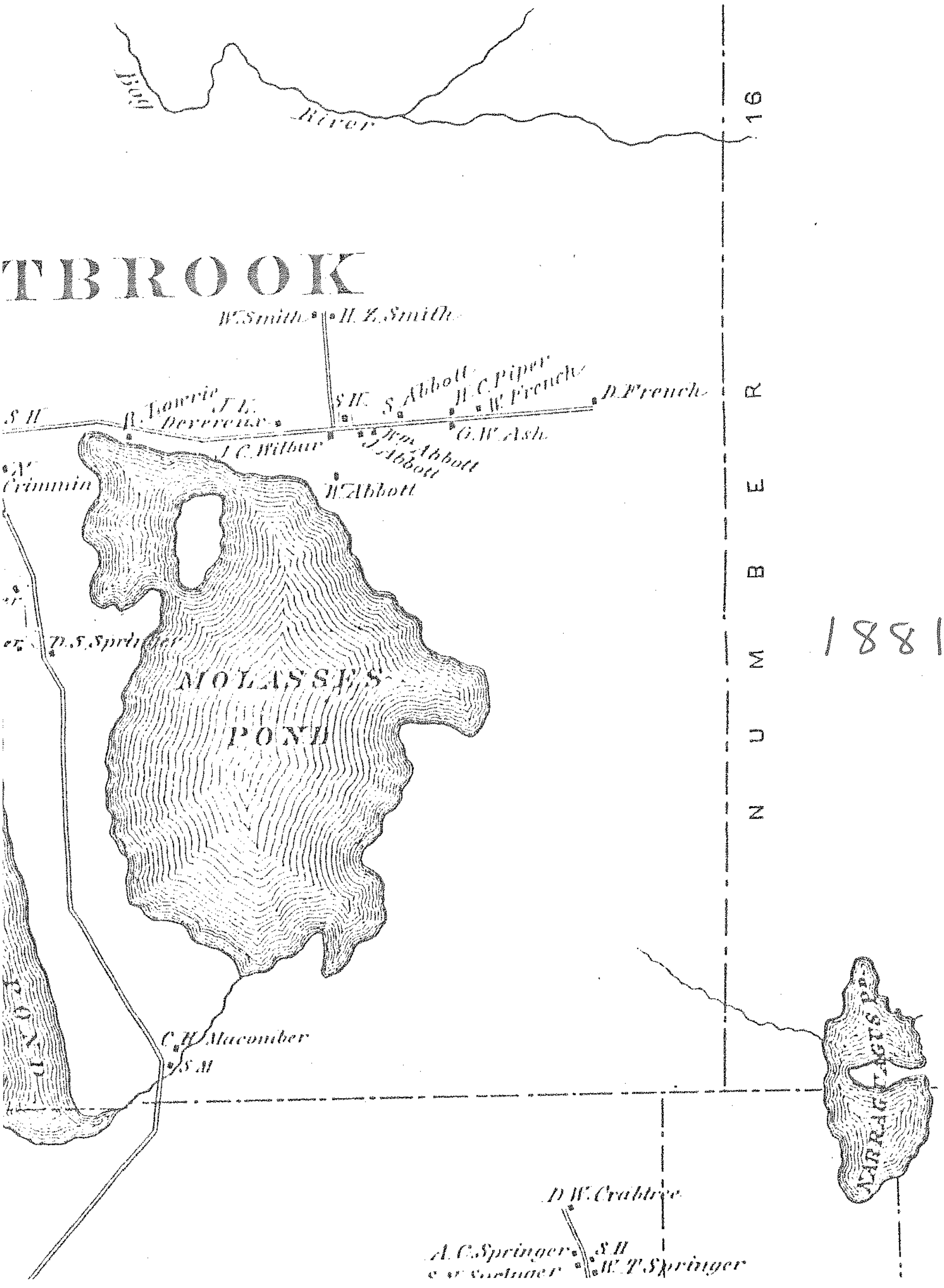
Once this information is received, we will forward a response regarding the results of our evaluation. Please contact Robin Stancampiano of my staff if we can be of further assistance in this matter.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
Deputy State Historic Preservation Office

enc.


River
16
TBROOK
W. Smith
H. Z. Smith
S.H.
R. Lowrie
T. L. Devereux
S.H.
S. Abbott
H. C. Piper
W. French
D. French
J. C. Wilbur
Wm Abbott
J. Abbott
G. W. Ash
W. Abbott
Crimmin
D. S. Springer
MOLASSES POND
NUMBER
C. H. Macomber
S.M
D. W. Crabtree
A. C. Springer
S.H
W. T. Springer

1881

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05/18/09

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ANGUS S. KING, JR.
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

CONTRACT ARCHAEOLOGY GUIDELINES

June 10, 2002

This document is provided as background information to agencies, corporations, professional consultants or individuals needing contract archaeological services (also known as Cultural Resources Management archaeology) in Maine. These guidelines are based on state rules (94-089 Chapter 812).

Finding an Archaeologist

At the time that MHPC issues a letter requiring archaeological survey work, MHPC will also supply one (or more) lists of archaeologists (Levels 1 and/or 2, historic or prehistoric) appropriate to the type of work (Phase I, II, III, historic or prehistoric). **Archaeologists on the Level 2 Approved Lists can do projects of any level, including Phase I archaeological survey projects.** Level 1 archaeologists are restricted to doing Phase I surveys, and certain planning projects for municipal governments.

MHPC maintains lists of archaeologists interested in working in different geographic areas of Maine, and those who are qualified in different types of work. The archaeologists themselves indicate their availability (except for short-term absence) to MHPC on a periodic basis, so archaeologists on the list can be expected to respond to inquiries. The applicant should solicit proposals or bids for work from archaeologists whose names appear on the list supplied by MHPC.

These archaeologists' names are taken from lists of archaeologists approved for work in Maine by MHPC under a set of rules establishing minimal qualifications, such as previous supervisory experience in northern New England, and an appropriate graduate degree. *However, the inclusion of an archaeologist on one of these lists should not be interpreted as an endorsement by the MHPC beyond these limited qualification criteria. Moreover, the MHPC cannot recommend the services of an individual archaeologist.*

Project Types

The vast majority of contract archaeology survey work falls into one of three categories. **Phase I** surveys are designed to determine whether or not archaeological sites exist on a particular piece of land. Such work involves checking records of previous archaeology in the area, walking over the landscape to inspect land forms and look for surface exposures of soil and possible archaeological material, and the excavation of shovel test pits in areas of high probability.

Phase II surveys are designed to focus on one or more sites that are already known to exist, find site limits by digging test pits, and determine site content and preservation. Information from Phase II survey work is used by the Maine Historic Preservation Commission (MHPC) to determine site significance (eligibility for listing in the National Register of Historic Places). **Phase III** archaeological work, often called data recovery, is careful excavation of a significant archaeological site to recover the artifacts and information it contains in advance of construction or other disturbance.

PHONE: (207) 287-2132

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FAX: (207) 287-2335

Archaeological sites are further divided into two broad categories of culture, **prehistoric** (or Native American), and **historic** (or European-American). Different archaeological specialists are usually needed for prehistoric or historic sites because the nature of content and preservation and site locations are quite different.

Scope of Work

In responding to a project submission, the MHPC may issue a letter specifying which type of archaeological survey is needed (prehistoric, historic or both) and at what level (Phase I, II, or III). Often the response letter contains further information, such as the suspected presence of an historic site of a certain age, or a statement that only a portion of the project parcel in question is sensitive for prehistoric sites and only that portion needs archaeological survey.

Once the project applicant has one or more scopes of work (proposals) from appropriate archaeologists (see below), the applicant should submit their preferred proposal *(without attached financial information or bid total)* to the MHPC for approval. MHPC will not comment upon cost, but will comment on the appropriateness of the scale and scope of the work. An approval from MHPC of the scope of work is the applicant's guarantee that, if the field and laboratory work are done according to the scope, and appropriately described in writing, the results will be accepted by MHPC.

The final written report on the project must also be submitted to MHPC for review and comment.

Project Final Report

Whatever the archaeological survey result, a final report on the project should be submitted by the applicant to the MHPC. The MHPC will review the report, and issue further guidance or issue a "clearance" letter for the project.

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DIRECTOR

Historic Preservation Consultants

The following list includes architectural and landscape historians, historians, and preservation planners who appear to meet the minimum National Park Service professional qualification standards in 36 CFR 61. Inclusion on this list does not represent an endorsement by the Maine Historic Preservation Commission.

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EARLE G. SHETTLEWORTH, JR.
DIRECTOR

July 22, 2009

Ms. Emily Walsh
Stantec
30 Park Drive
Topsham, ME 04086

Project: MHPC #1112-09 - Blue Sky; Bull Hill; request for information on historic or archaelogical resources; potential wind facility
Town: Eastbrook & T16 MD, ME

Dear Ms. Walsh:

In response to your recent request, I have reviewed the information received June 22, 2009 to initiate consultation on the above referenced project.

Based on the information provided, I have concluded that the project area contains one or more prehistoric archaeological sites based on our predictive model of archaeological site location. Therefore, Phase I archaeological survey is necessary for this parcel prior to any ground disturbance. A list of qualified prehistoric archaeologists is enclosed along with material explaining the Phase I/II/III approach to archaeological survey. This information can also be found on our website: www.maine.gov/mhpc/project_review This office must approve any proposal for archaeological fieldwork.

Regarding architectural resources, there are no National Register listed or known eligible resources in the project area, but no survey has ever been conducted in this area. In order to determine whether historic above ground resources will be affected by the proposed undertaking, we request that architectural survey be conducted and an assessment made of project impact on any identified historic properties. The architectural survey must be completed according to our "Above Ground Cultural Resource Survey Manual Guidelines for Identification: Architecture and Cultural Landscapes Section 106 Specific" and associated forms, which are both downloadable from our website: www.maine.gov/mhpc/project_review Please find attached our revised photographic policy to be referenced in lieu of the policy in our on-line survey manual. Any computer generated template other than that provided by MHPC must be approved by MHPC prior to submission. No changes to the survey forms are to be made without consulting MHPC. A list of historic preservation consultants is enclosed for your information.

Once this information is received, we will forward a response regarding the results of our evaluation. Please contact Robin Stancampiano of my staff if we can be of further assistance in this matter.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
Deputy State Historic Preservation Office

enc.

PRINTED ON RECYCLED PAPER

PHONE: (207) 287-2132 FAX: (207) 287-2335

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

Prehistoric Archaeologists Approved List: Review and Compliance Consulting/Contracting (Active)

JOHN ELIAS BALDACCI
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

LEVEL 1

Ms Edna Feighner (603-228-8091)
5 Thomas Street, Apt 3.
Concord NH 03301
Edna.Feighner@dcr.nh.gov

Richard P Corey (207-778-7012)
PO Box 68
E Wilton ME 04234-0068
rcorey@maine.edu

Ms. Sarah Haugh (207-879-9496 x238)
Tetra Tech
451 Presumpscot St
Portland ME 04103
sarah.haugh@tetratech.com

James A Clark (207-667-4055)
TRC/Northeast Cultural Resources
71 Oak St
Ellsworth ME 04605
clark.ja@gmail.com

Edward Kitson (207-778-7012)
Archaeology Research Center
University of Maine at Farmington
139 Quebec St
Farmington ME 04938
kitson@maine.edu

Mr. Michael Brigham
P. O. Box 274
New Vineyard, ME 04956
brigham@maine.edu

Mr Brian Valimont (207-251-9467)
New England Archaeology Co LLC
79 Pond St.
Newton, NH 03858-3416
newarch1@myfairpoint.net

Mark Penney (518-432-9545)
The Louis Berger Group Inc.
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Albany, NY 12211-2370
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LEVEL 2

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FAX: 207-667-0485
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Dr Stuart Eldridge (207-879-9496)
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Portland ME 04103
stuart.eldridge@tetratech.com

Dr Ellen Cowie (207-778-7012)
Northeast Archaeology Research Center
139 Quebec St
Farmington ME 04938-1507
cowie@nearchaeology.com

Robert N Bartone
Archaeology Research Center
University of Maine at Farmington
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Farmington ME 04938
b_bartone@maine.edu

Dr Victoria Bunker (603-776-4306)
PO Box 16
New Durham NH 03809-0016
vbi@worldpath.net

Dr Bruce J Bourque (207-287-3909)
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83 State House Station
Augusta ME 04333-0083
bbourque@abacus.bates.edu

Dr Leslie Shaw (207-725-3815)
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Brunswick ME 04011
e-mail: lshaw@bowdoin.edu

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47 Hilltop Rd
Chapman ME 04757
putnamd@umpi.edu

Dr Nathan Hamilton (207-780-5324)
Dept of Geography & Anthropology
University of Southern Maine
Gorham ME 04038

Dr William R Belcher
US Army CILHI
310 Worchester Ave Bldg 45
Hickam AFB HI 96853-5530
wbelcher@msn.com

Dr Steven L Cox (207-348-6859)
P. O. Box 97
Little Deer Isle, ME 04650
steven@juniperlodge.us

Geraldine Baldwin (914-271-0897)
John Milner Associates Inc
1 Croton Point Ave Ste B
Croton-on-Hudson NY 10520
FAX: 914-271-0898
GeraldineBaldwin@aol.com

Dr. Robert Goodby (603-446-2366)
Monadnock Archaeological Consulting
16 Fox Hill Rd
Stoddard NH 03464
MonadArch@surfglobal.net

Edward Moore
TRC/Northeast Cultural Resources
71 Oak St
Ellsworth ME 04605
FAX: 207-667-0485

05/18/09

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
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AUGUSTA, MAINE
04333

ANGUS S. KING, JR.
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

CONTRACT ARCHAEOLOGY GUIDELINES

June 10, 2002

This document is provided as background information to agencies, corporations, professional consultants or individuals needing contract archaeological services (also known as Cultural Resources Management archaeology) in Maine. These guidelines are based on state rules (94-089 Chapter 812).

Project Types

The vast majority of contract archaeology survey work falls into one of three categories. **Phase I** surveys are designed to determine whether or not archaeological sites exist on a particular piece of land. Such work involves checking records of previous archaeology in the area, walking over the landscape to inspect land forms and look for surface exposures of soil and possible archaeological material, and the excavation of shovel test pits in areas of high probability.
Phase II surveys are designed to focus on one or more sites that are already known to exist, find site limits by digging test pits, and determine site content and preservation. Information from Phase II survey work is used by the Maine Historic Preservation Commission (MHPC) to determine site significance (eligibility for listing in the National Register of Historic Places). **Phase III** archaeological work, often called data recovery, is careful excavation of a significant archaeological site to recover the artifacts and information it contains in advance of construction or other disturbance.

Archaeological sites are further divided into two broad categories of culture, **prehistoric** (or Native American), and **historic** (or European-American). Different archaeological specialists are usually needed for prehistoric or historic sites because the nature of content and preservation and site locations are quite different.

Scope of Work

In responding to a project submission, the MHPC may issue a letter specifying which type of archaeological survey is needed (prehistoric, historic or both) and at what level (Phase I, II, or III). Often the response letter contains further information, such as the suspected presence of an historic site of a certain age, or a statement that only a portion of the project parcel in question is sensitive for prehistoric sites and only that portion needs archaeological survey.

Once the project applicant has one or more scopes of work (proposals) from appropriate archaeologists (see below), the applicant should submit their preferred proposal *(without attached financial information or bid total)* to the MHPC for approval. MHPC will not comment upon cost, but will comment on the appropriateness of the scale and scope of the work. An approval from MHPC of the scope of work is the applicant's guarantee that, if the field and laboratory work are done according to the scope, and appropriately described in writing, the results will be accepted by MHPC.

The final written report on the project must also be submitted to MHPC for review and comment.

Finding an Archaeologist

At the time that MHPC issues a letter requiring archaeological survey work, MHPC will also supply one (or more) lists of archaeologists (Levels 1 and/or 2, historic or prehistoric) appropriate to the type of work (Phase I, II, III, historic or prehistoric). Archaeologists on the Level 2 Approved Lists can do projects of any level, including Phase I archaeological survey projects. Level 1 archaeologists are restricted to doing Phase I surveys, and certain planning projects for municipal governments.

MHPC maintains lists of archaeologists interested in working in different geographic areas of Maine, and those who are qualified in different types of work. The archaeologists themselves indicate their availability (except for short-term absence) to MHPC on a periodic basis, so archaeologists on the list can be expected to respond to inquiries. The applicant should solicit proposals or bids for work from archaeologists whose names appear on the list supplied by MHPC.

These archaeologists' names are taken from lists of archaeologists approved for work in Maine by MHPC under a set of rules establishing minimal qualifications, such as previous supervisory experience in northern New England, and an appropriate graduate degree. *However, the inclusion of an archaeologist on one of these lists should not be interpreted as an endorsement by the MHPC beyond these limited qualification criteria. Moreover, the MHPC cannot recommend the services of an individual archaeologist.*

Project Final Report

Whatever the archaeological survey result, a final report on the project should be submitted by the applicant to the MHPC. The MHPC will review the report, and issue further guidance or issue a "clearance" letter for the project.

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

JOHN ELIAS BALDACCI
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

Historic Preservation Consultants

The following list includes architectural and landscape historians, historians, and preservation planners who appear to meet the minimum National Park Service professional qualification standards in 36 CFR 61. Inclusion on this list does not represent an endorsement by the Maine Historic Preservation Commission.

Nicholas C Avery
2326 East Main Rd
Portsmouth RI 02871
401-683-2122
hortus@avery-design.net

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119 Princess Point Rd
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anneball@maine.rr.com

Rose-Marie Ballard
PO Box 1209
Damariscotta ME 04543
207-563-2925

Rochelle L Bohm
644 Hammond St
Bangor ME 04401
207-990-3585

Deirdre A Brotherson
16 K St
Concord NH 03301
603-225-7204

Richard M Candee
6 Scituate Rd
York ME 03909
207-363-6635

Erik Carson
56 Ryder Rd
Yarmouth ME 04096
207-846-3536

Christopher W Closs & Co
PO Box 530
Hopkinton NH 03229-0530
603-513-1763

Martha B Deprez
17 West St
Portland ME 04102
207-772-4312 or
774-5561

Pamela Griffin
(Landscape History)
291 Mere Point Rd
Brunswick ME 04011
Work: 207-871-0003
Home: 207-729-3018

Edward L Hawes PhD
PO Box 787
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46 Edwards St
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207-442-7301

Charlton Hudson
PO Box 22
Lincolnville ME 04849-0022
207-338-1638

Thomas B. Johnson
184 Portland St
South Beriwck ME 03908
(603) 783-9511 ext. 206

Kari Ann Laprey
5 Groundnut Hill Rd
Cape Neddick ME 03902
207-361-2601

Carolyn Lockwood
773 High St
Bath ME 04530
207-443-6605
olops@gwi.net

Rosalind Magnuson
14 Sea Garden Circle
Kennebunk ME 04043
207-967-3543

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28 My Ln
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207-727-5059
ivyland@sacoriver.net

Ann Morris
(Historian)
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Rockland ME 04841
207-594-4601

Woodward D Openo
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Somersworth NH 03878-0618
603-692-6057

Roger G Reed
19 Terrace Ave
Newton MA 02161
617-739-7542
Fax: 617-964-1672

Janet Roberts
40 Weymouth St
Brunswick ME 04011
207-729-8967

Deborah Thompson
117 Norfolk St
Bangor ME 04401
207-947-8016

Wick York
PO Box 334
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wyork@portone.com

Gregory Farmer
Agricola Corporation
(Documentation/Planning)
PO Box 861
Chicopee MA 01014-0861
413-592-3875

Henry Amick
Amick Cultural Resource Dev
3003 Washtenaw Ave Ste 1-E
Ann Arbor MI 48104
734-994-1004
henry@henryamick.com

PHONE: (207) 287-2132 FAX: (207) 287-2335

Barba & Wheelock
Architecture Preservation & Design
500 Congress St
Portland ME 04101-3403
207-772-2722

Circa, Inc
PO Box 28365
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919-834-4757
Fax: 919-834-4756
www.circa-inc.com

EBI Consulting
21 B St
Burlington MA 01803
781-273-2500
Fax: 781-273-3311

Douglas J Kelleher
Epsilon Associates Inc
3 Clock Tower Pl Ste 205
Maynard MA 01754
978-897-7100
dkelleher@epsilonassociates.com

Hardlines Design Company
4608 Indianola Ave
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Cindy Hamilton
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Historic Documentation Company Inc
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401-683-3483
Fax: 401-683-4217

History Matters
1502 21st St NW 2nd Fl
Washington DC 20036
202-223-8845
www.historymatters.net

Bruce G Harvey
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225 Greenfield Pkwy Ste 115
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315-463-5013
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New England Preservation Collaborative Inc
PO Box 132
Montpelier VT 05601
802-999-7928
Fax: 802-846-7544
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211 North 13th St Ste 500
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603-778-1799

Roxanne Eflin
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Public Archaeology Lab
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Matt Bivens
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St Charles MO 63301
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mbivens@sciengineering.com

Henry Wyatt
Southport Historical & Architectural Consulting
PO Box 312
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southarch@aol.com

Rita Walsh
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Christine Beard
Leslie Donovan
Tremont Preservation Services, LLC
21 Market Street
Suite 250
Ipswich MA 01938
978-356-0322
978-356-0811 (fax)

ttl- Architects LLC
28 Danforth Street, Suite 213
Portland ME 04101-4596
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ttlarch@aol.com

Lisa Mausolf
Preservation Consultant
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781-944-5958
lisa@lmpreservation.com

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

JOHN ELIAS BALDACCI
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

January 5, 2011

Brooke E. Barnes
Stantec Consulting
30 Park Drive
Topsham, ME 04086

Project: MHPC #1112-09 – Bull Hill Wind Project, Pre-contact, Euro American, and historic architectural surveys
Town: T16 MD, Hancock County, ME

Dear Mr. Barnes:

In response to your recent request, I have reviewed the information received December 21, 2010 to continue consultation on the above referenced project pursuant to the requirements of the Maine Land Use Regulation Commission and Maine law 35-A MRSA §3451 and §3452. Concurrently, and based on past experience with projects of this nature, we have reviewed the proposed undertaking in accordance with Section 106 of the National Historic Preservation Act, as amended.

Identification of Historic Properties

The Commission agrees with the conclusion of the Architectural Survey Report that the following resources are either listed in or appear to be eligible for listing in the National Register of Historic Places:

- Eastbrook Baptist Church, Eastbrook Road, Survey Map No. 12 (NR listed)
- Eastbrook Town House, Eastbrook Road, Survey Map No. 13 (NR listed)
- 917 Sugar Hill Road, Eastbrook, Survey Map No. 10
- Greenwood Grange #363, 917 Sugar Hill Road, Eastbrook, Survey Map No. 11
- 660 Sugar Hill Road (former Schoolhouse?), Eastbrook, Survey Map No. 68

Properties in the above list that have been found eligible represent new findings of eligibility.

We do not agree that the farmstead located at 118 Eastbrook Road, Eastbrook (Survey Map Nos. 32-36) is eligible for listing in the Register. Substantial alterations to the house have significantly diminished the architectural integrity of this connected complex, and there appears to be limited integrity of the historic agricultural landscape associated with the farmstead.

The Commission concurs with the survey report that no other above ground historic properties in the APE are eligible for listing in the Register, and we agree with the archaeological reports that there are no National Register eligible archaeological sites in the APE.

Finding of Effect

Based on the information provided to us, the Commission concludes that the proposed project will not, in accordance with Maine LURC regulations and 35-A MRSA §3452, cause unreasonable adverse effects on historic properties. Likewise, we conclude that there will be no historic properties [architectural or archaeological] adversely affected by the proposed undertaking pursuant to Section 106 regulations.

If you have any questions regarding our comments, please do not hesitate to contact me.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
Deputy State Historic Preservation Officer

Cc: LeeAnn Neal, US Army Corps of Engineers

PENOBSCOT NATION

TRIBAL ADMINISTRATION

COMMUNITY CENTER
INDIAN ISLAND, MAINE 04468
TEL.: 207/827-7776

Bonnie Newsom, THPO
Penobscot Indian Nation
12 Wabanaki Way
Indian Island, ME 04468
Phone No.: (207) 817-7332
Fax No.: (207) 817-7463

FAX SHEET

DATE: 6-29-09

FAX NO.: 729-2715
No. of Page(s) 2

TO: Emily F. Walsh

FROM: Bonnie Newsom

SUBJECT: Eastbrook, ME

MESSAGE:

Please find attached a no objection letter from Bonnie Newsom, THPO for the Penobscot Nation.

If you have any questions, please do not hesitate to contact her.

Thank You!

Cathe Lewey
Office Manager

PENOBSCOT INDIAN NATION
BONNIE NEWSOM - ARCHAEOLOGY DEPARTMENT
12 WABANAKI WAY, INDIAN ISLAND, ME 04468
E-MAIL: bnewsom@penobscotnation.org Fax: 207-817-7463

NAME	Emily F. Walsh
ADDRESS	Stantec Consulting 30 Park Drive Topsham, ME
OWNER'S NAME	Confidential
TELEPHONE	(207) 729-1199
FAX	(207) 729-2715
EMAIL	
PROJECT NAME	Potential wind facility
PROJECT SITE	Eastbrook, ME
DATE OF REQUEST	June 19, 2009
DATE REVIEWED	June 29, 2009

Thank you for the opportunity to comment on the above referenced project. This project appears to have no impact on a structure or site of historic, architectural or archaeological significance to the Penobscot Nation as defined by the National Historic Preservation Act of 1966, and subsequent updates.

Also, if Native American cultural materials are encountered during the course of the project, please contact me at (207) 817-7332. Thank you.

BONNIE NEWSOM, THPO
Penobscot Nation

Haider, Jessica

From: Walsh, Emily
Sent: Tuesday, August 18, 2009 5:22 PM
To: Haider, Jessica
Subject: FW: T16 wind power comments

From: soctomah@ainop.com [mailto:soctomah@ainop.com]
Sent: Tue 8/18/2009 9:31 AM
To: Walsh, Emily
Subject: T16 wind power comments

Tribal Historic Preservation Office

Passamaquoddy Tribe

PO Box 159 Princeton, Me. 04668

207-796-2301

Stantec
30 Park Dr
Topsham, ME
Emily.walsh@stantec.com

August 3, 2009

Re: T16MD- Wind Facility

Dear Emily Walsh;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The above listed proposed project will not have any impact on cultural and historical concerns of the Tribe.

Sincerely;
Donald Soctomah
Soctomah@ainop.com
THPO
Passamaquoddy Tribe

---- Msg sent via the Aroostook Internet Webmail System - http://www.ainop.com

From: Walsh, Emily
Sent: Tuesday, August 04, 2009 8:09 PM
To: Haider, Jessica
Subject: FW: T16MD - Wind Project

From: soctomah@ainop.com [mailto:soctomah@ainop.com]
Sent: Tue 8/4/2009 4:15 PM
To: Walsh, Emily
Subject: T16MD - Wind Project

Tribal Historic Preservation Office

Passamaquoddy Tribe
PO Box 159 Princeton, Me. 04668
207-796-2301

Stantec
30 Park Dr
Topsham, ME
Emily.walsh@stantec.com

August 3, 2009

Re: T16MD- Wind Facility

Dear Emily Walsh;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The above listed proposed project will not have any impact on cultural and historical concerns of the Tribe.

Sincerely;
Donald Soctomah
Soctomah@ainop.com
THPO
Passamaquoddy Tribe

---- Msg sent via the Aroostook Internet Webmail System - http://www.ainop.com

Architectural Survey Report

Bull Hill Wind Historic Architectural Reconnaissance Survey
T16 MD, Hancock County
MHPC# 1112-09

Carey L. Jones
PAL
210 Lonsdale Avenue
Pawtucket, RI 02860
CJones@palinc.com
(401) 728.8780

Prepared for:

Sponsoring agency or entity
Blue Sky East, LLC

Dates:

Provide the dates from when the project was started up through when the report was written and/or revised and submitted.
The reconnaissance survey for the Bull Hill Wind Project started on April 26, 2010. The original report was submitted on November 18, 2010 to the Maine Historic Preservation Commission (MHPC). On November 29, 2010 the MHPC provided comments on the report. This revised report to address these comments was submitted on December 7, 2010.

Level:

Reconnaissance or Intensive
Reconnaissance

Name of surveyors:

(If different from author, provide contact information for each surveyor.)
PAL

Continuing project?

If so, please summarize previous efforts.
No

I. EXECUTIVE SUMMARY

Blue Sky East, LLC is proposing to construct a 19-turbine wind power project (Bull Hill Wind) on Bull Hill and Heifer Hill ridges in T16 MD, Hancock County. Power from each turbine will be collected in an underground 34.5 kilovolt (kV) collection system and flow to a new substation and Operations and Maintenance (O&M) facility located centrally in the Project area. The Project requires a permit from the Maine Land Use Regulation Commission (LURC).

PAL (The Public Archaeology Laboratory Inc.) completed a historic architectural reconnaissance survey for the Bull Hill Wind Project located in T16 MD, Hancock County, Maine. The proposed Project was determined by MHPC to have the potential to cause both direct and indirect effects. The indirect Area of Potential Effect (APE) includes the turbine, substation, and O&M facility locations as well as any access roads and construction laydown areas. The indirect APE includes all locations where effects might be caused by noise resulting from the turbines and locations within 8 miles of the Project where the turbines might be visible.

PAL conducted research and fieldwork to identify resources listed in or

determined eligible for listing in the National Register of Historic Places (National Register) and potentially significant properties that have not been previously recorded. The survey resulted in the identification of one property (with two buildings) that is listed in the National Register and one property that was previously included in the Maine Historic Preservation Commission inventory. PAL identified an additional 74 individual resources that met the survey criteria and evaluated three of them as potentially eligible for listing in the National Register.

There are no historic buildings or structures in the direct APE. Three of the four identified historic properties in the indirect APE will have no view of the Project. The former schoolhouse will have limited distant views that will not alter the characteristics of significance or integrity that make the property potentially eligible for listing in the National Register. Based on the findings of the survey and the design of the project, PAL recommends that the Bull Hill Wind Project will have no adverse effects on historic properties.

II. RESEARCH DESIGN AND BACKGROUND RESEARCH

A. Basis:

Describe the purpose of this survey. Identify the Federal or State regulations mandating this survey, or any Programmatic Agreements associated with this project.

This report presents the results of a historic architectural reconnaissance survey conducted for the proposed Bull Hill Wind Project located in T16 MD, Hancock County, Maine. The purpose of the survey was to identify historic architectural properties within the Project's APE and to provide information to the Maine Historic Preservation Commission (MHPC) regarding the potential direct or indirect effects on historic architectural properties. This report was prepared in support of Blue Sky East, LLC's, environmental permit application to LURC.

B. Project Description / Scope of Work:

Describe the underlying project, specifically citing the type of project and duration of project. Summarize planned or anticipated alterations to landscapes, buildings, structures, districts, objects or sites.

The Bull Hill Wind Project includes the construction of a 19 wind turbines on Bull Hill and Heifer Hill ridges in T16 MD, Hancock County (Figure 1). The entire Township of T16 MD is designated as an area for expedited permitting. The proposed turbines are Vestas V100 machines with a 1.8 megawatt (MW) rated power. The turbines consist of a 312-foot tower and a rotor 328 feet in diameter. The total height with blades fully extended would be approximately 476 feet. The Project will also include up to three 276-foot lattice type permanent meteorological towers. Power from each turbine will be collected in an underground 34.5 kilovolt (kV) collection system and flow to a new substation and Operations and Maintenance (O&M) facility located centrally in the Project area. The substation will "step up" the power to 115 kV and transmit it directly to Bangor Hydro Electric's Line 66. By locating the substation directly adjacent to Line 66, no 115 kV transmission line will be necessary for the project. The Project area is low elevation commercial forest, with a substantial road system. Ridge elevations are between 450 and 675 feet above sea level.

The Project area is owned by one landowner. The applicant has leased the parcels necessary for the siting of the Project, and acquired other property interests as necessary to meet sound and setback standards. There is a network of existing haul roads and several gravel pits used for previous road construction. Existing roads will be utilized to the greatest extent possible and on-site gravel pits will not exceed 5 acres. The 16-foot access roads and 36-foot wide crane path would be maintained by the applicant. Roads outside of the Project area, and therefore under the control of the landowner, would continue to be maintained by the landowner.

The only existing structures within the leased area are three seasonal camps and two temporary meteorological towers. The camp owners have leases with the landowner. Two of the camps will be removed, the other will remain in its current location. The temporary meteorological towers will be removed within one year of turbine construction.

C. Area of Potential Effect:

1. On a USGS topographic map draw the outermost boundary of the area of potential effect in red. Label this line "Project APE". If necessary, additional topographic maps or overlays may be submitted showing the limits of each specific APE if more than one potential effect is present within the project area.

2. List all the potential effects associated with the above cited scope of work. Distinguish between direct and indirect effects when applicable.

The APE is defined in regulations governing Section 106 of the National Historic Preservation Act as the "geographic area or areas within which an undertaking may directly or indirectly cause changes in the character of or use of historic properties, if any such properties exist" (36 CFR 800.1(d)). The Project has the potential to cause both direct and indirect effects. Direct effects for this Project could be caused by either a physical taking, alteration, or removal of a property from its physical location. Indirect effects could be caused by the change of the character of the property's use or of physical features within the property's setting that contribute to its significance, and/or the introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features (36 CFR 800.5 (2)).

3. Provide a narrative of how the geographical limit of each potential effect within the project area was established.

The direct APE for the Project is an approximately 1156-acre area that includes the proposed wind turbine complex, construction laydown areas, and the location of the proposed substation and O&M facility (Figure 2).

The indirect APE includes all locations where the turbines might be visible. In order to determine the locations where the constructed Project might be visible, PAL drove all accessible roads within an 8-mile radius of the turbine locations. PAL indicated on the survey base map which roads did and did not have views of the Project site. Based on field observations, the indirect effects APE was determined to be an irregularly shaped area, approximately 78,956 acres in size, extending at least 5 miles and up to 8 miles from the turbine locations (see Figure 2). Excluded areas between 5 and 8 miles are those that have no potential view of the Project due to visual obstructions caused by intervening topography or vegetation.

D. Survey Boundaries:

1. Draw the boundaries of the survey on the topographic map in blue or black and label this line "Survey Boundaries." The boundaries of a survey map include portions of a property that lie outside the APE.

2. Describe the limits of the surveyed area. The survey boundary may be larger then the APE. Make reference to geographic landmarks, addresses or political boundaries. Utilize reasonable demarcations – tree lines, back lots.

The Bull Hill Wind Project survey area included an 8-mile (168,124-acres) radius surrounding the proposed summit development. This 8-mile area was based on the Maine Wind Energy Act (35-A MRSA § 3401) and its specific regulations, which provides that determinations of effect on scenic resources, including historic properties, of national or state significance, shall consider whether the wind project will cause unreasonable adverse effects. During the fieldwork for the architectural reconnaissance survey, PAL drove the entire 8-mile survey area and determined that many locations within the 8-mile area would be blocked by existing topography. These field observations and current USGS maps were used to refine the limits of the study area and to develop the indirect APE. The 8-mile survey boundary is indicated on Figure 2.

E. Survey Methodology:

1. Describe background research method.

Prior to beginning the survey fieldwork, PAL conducted research to identify properties within 8 miles of the Project that are listed or eligible for listing in the National Register or have been recorded as part of the MHPC's Maine State Survey Program. PAL initiated this search by using the National Register Information System (NRIS), an on-line database maintained by the National Park Service (NPS). Following the NRIS search, PAL conducted a visit on April 26, 2010 to the MHPC to review and obtain copies of the National Register forms, relevant town files, and inventory forms for the properties. The National Register eligibility status of each surveyed property was noted if the property had been previously evaluated for listing in the National Register.

2. Describe field research method.

The methodology for the reconnaissance survey was designed to identify all aboveground historic properties, including districts, buildings, structures, objects, and sites within the APE for the Project that are listed, eligible, or potentially eligible for listing in the National Register of Historic Places. The survey was conducted in accordance with the standards and guidelines established in the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation, as amended (48 FR 44716), the MHPC's Above Ground Cultural Resources Survey Manual, Guidelines for Identification: Architecture and Cultural Landscapes, Section 106 Specific (MHPC 2010), the NPS's National Register Bulletin No. 24, Guidelines for Local Survey: A Basis for Preservation Planning (NPS 1985), and the NPS's National Register Bulletin No. 15, How to Apply the National Register Criteria for Evaluation (NPS 1997).

Fieldwork for the reconnaissance survey was conducted by two PAL architectural historians from August 30 to September 3, 2010. The fieldwork involved the identification of all properties within the APE that were at least 50 years old or included in previous inventories. Information regarding the viewsheds from recorded properties toward the Project area was noted during the fieldwork. Each identified property was photographed with black-and-white film using a 35mm SLR camera and a high-resolution digital camera. Data regarding the current condition and significant characteristics of each resource was recorded, and the information on the inventory forms for previously surveyed properties was verified. In compliance with the MHPC's survey methodology, unique sets of information were collected for individual buildings, barns, and farmsteads. All identified properties were mapped in the field on USGS base maps or detailed aerial images. Site plans depicting farmsteads or other complexes with multiple resources were hand drawn on survey forms.

PAL drove all accessible public roads within the study area, including unmarked, navigable gravel/dirt trails. All properties that met the criteria for inclusion in the survey and were visible from public rights-of-way were recorded. To ensure that no properties were overlooked, PAL made notes on the base maps during the survey, indicating which roads had been covered and which buildings were less than 50 years old. For roads that were gated or otherwise clearly marked as private, topographic maps and aerial images were used to verify the presence or absence of existing structures. Historical topographic maps and atlases were then used to determine whether any of these inaccessible properties contained resources at least 50 years old.

3. Did you undertake a file search at MHPC for NR or previously recorded properties?

PAL conducted a file search at the MHPC on April 26, 2010 to review all relevant files.

III. SURVEY FINDINGS

A. Acres:

Provide the total number of acres within the survey boundaries.

The entire survey boundary is 168,124 acres in size (see Figure 2).

B. Setting:

Provide a general overview of the setting, including topography, development, and landscape.

The Bull Hill Wind Project is located in T16 MD, Hancock County, Maine on the Bull Hill and Heifer Hill mountains ranges. The area surrounding the Project includes the towns of Deblois, Franklin, and Eastbrook and is composed of a primarily rural landscape defined by large expanses of dense deciduous forest, winding rivers, freshwater lakes, and an undulating rocky terrain formed by clusters of mountains. Important topographical features to the north of the Project site include Spectacle Pond and Schoppe Ridge. Schoppe Ridge is comprised of three mountains ranging in elevations of 400 to 500 feet. The east branch of the Union River also runs through the area north of the Project site. East of the Project site, the topography is relatively flat and this area is primarily defined by bogs, heaths, and some areas of dense vegetation. To the south the major topographic feature is Tunk Mountain, which reaches elevations of more than 1,000 feet. Other features include Hardwood Hill (600 feet), Little Hardwood Hill (400 feet), Myrick Ridge (500 feet), and Martin Ridge (500 feet). Major water bodies in the area include Narraguagus Lake, Spring River, and Tunk Lake. The area to the west is primarily defined by Sugar Hill (500 feet), Sparrow Hill (400 feet), Birch Hill (400 feet), Little Bull Hill (500 feet) and some unnamed mountains. Molasses Pond, Scammon Pond, Abrams Pond, and Webb Pond are the major waterbodies. A large portion of the area in the eastern section of the study area comprises the Lyle Frost Wildlife Management Area.

Development in the area is primarily concentrated southwest of the Project site in the towns of Eastbrook and Franklin and on Molasses Pond. The primary road network consists of State Routes 200, 182, and 193. State Route 200 runs north-south and connects Franklin and Eastbrook. State

Route 182 runs east-west and connects Franklin and Cherryfield. State Route 193 also runs north-south and connects Cherryfield with Deblois and Bennington. There are also numerous secondary roads and unpaved, jeep trails.

C. Number of Resources Recorded:

Count each individually recorded building, structure, object, or site. Do not include continuation sheets in this count.

PAL identified 74 new resources including 13 farmsteads, 25 houses, 23 barns/outbuildings, 3 cemeteries, 3 community buildings, 3 camps, 2 agricultural properties, 1 dam, and 1 military airstrip (Figure 2).

D. Previously Inventoried Properties:

Address whether any of the resources had been previously surveyed. If so, how many, and how were these properties represented and evaluated within the current project?

Within the boundaries of the APE there are two previously identified properties: the Eastbrook Baptist Church and Eastbrook Town House (one property, Survey Map Nos. 12 and 13) and the Mill School on Route 200 in Eastbrook (no MHPC No.). The Eastbrook Baptist Church and Eastbrook Town House are listed in the National Register (see below). The Mill School has been demolished.

E. Types of Properties:

1. Summarize general trends within the project area: commercial, residential, urban, rural, etc.

Development in the area is sparse and is closely tied to the natural landscape. The majority of the development is limited to small, lakefront cottages and recreational camps along narrow dirt roads and trails. Most of these were not publicly accessible and not visible through the dense vegetation. Those that were accessible appeared to be recently constructed of modern, pre-fabricated materials.

Residential and agricultural development is primarily located on Eastbrook Road/Route 200. The residential properties in the area are a mix of early- to mid-nineteenth-century farmhouses and recently constructed, often temporary, buildings. Most of the residential properties had modern garages or other outbuildings. Eastbrook is the only area of concentrated development in the area, with a mix of historic and contemporary houses, social and religious buildings, and a modern school. The only commercial area is found in Franklin, located in the survey area, but outside of the APE. The western section of the study area is predominately agricultural in use, with the cultivation and processing of blueberries being the main activity. Jasper Wyman and Sons, a large producer and distributer of canned blueberries owns a substantial portion of the land in the area as well as a large processing facility (located outside the survey area). Lumbering and sand mining are the only other major industrial/commercial activities in the area and the landscape is dotted with areas of cleared vegetation and deep gravel pits.

2. Summarize the age, style, and condition of the resources within the project area.

Located in close proximity to the turbines and proposed substation location are three recreational/seasonal camps. The camps are one-story, gable-front buildings constructed of a combination of untreated lumber or other locally available materials and modern, pre-fabricated materials (Photographs 1-3). Historical maps indicate the presence of camps on Bull Hill and Heifer Hill since at least 1957, however no organized camps or recreational areas are noted (USGS 1942, 1957). The majority of the seasonal/recreational camps are primarily concentrated on the west side of Molasses Pond. Historical USGS maps indicate the presence of camps in this area, however they were blocked by gated and/or private drives.

The majority of the resources recorded during the survey are vernacular, residential or agricultural buildings and outbuildings. Residential structures included primarily modest-size single-family homes constructed between the early nineteenth to the early twentieth century. Most of these are vernacular houses with minimal exterior details and for the most part they are in fair to good condition. Agricultural resources include several farmsteads, with large and modest barns, workshops, and other outbuildings. Additional resource types surveyed include three small, nineteenth-century family cemeteries, two agricultural properties/blueberry fields, a grange hall and associated building, a concrete dam, and a military flight strip.

3. Describe in detail any eligible individual properties or historic districts.

There is one property in the APE that is listed in the National Register: the Eastbrook Baptist Church and Town House (Survey Map Nos. 12 and 13) that was listed under one nomination form in December 1978 (Figure 3). The Eastbrook Baptist Church, built in 1860, is a one-story, wood-frame building, two bays wide and two bays deep (Photograph 4). It has a large, asphalt-shingle, gable-front roof with a deep-set pediment and a simple entablature. There are two entrance doors on the facade, each is a replacement door set in a wood frame and topped with a transom window. Simple pilasters are placed on the corners and support the cornice line. On the ridgeline of the roof is a square tower with a flat roof and small windows on all four sides. Since the Church was listed in the National Register it has been covered in modern siding. Further the doors have been replaced as have some of the windows.

The Eastbrook Townhouse, built in 1880-1881, was constructed to be architecturally harmonious with Church (Photograph 5). It is one-story in height, three bays wide, and two bays deep with an asphalt-shingle front-gable roof. The building retains its original clapboard cladding, as well as the wood doors and decorative surrounds.

PAL surveyed and evaluated three previously unrecorded resources as potentially eligible for listing in the National Register: the Greenwood Grange #363 and related building at 917 Route 220, Eastbrook (Survey Map Nos. 10 and 11), the farmstead at 118 Eastbrook Road/Route 200 (Survey Map No. 32) and a former school at 660 Sugar Hill Road (Survey Map No. 68) (see Figure 3).

The Greenwood Grange # 363 and associated building are vernacular buildings, constructed ca. 1911, with similar architectural details that provide a cohesive appearance (Photographs 6 and 7). The grange hall building is two stories in height, three bays wide and five bays deep. It has a front-gable, asphalt-shingle roof, clapboard siding, and a granite foundation. The main entrance is located on the center bay of the facade; it has paneled double doors set in an undecorated surround with a simple moulding. The fenestration is regular and features windows set in wood frames that mimic the central door. Some of the windows are two-over-two, double-hung, while others are modern replacements. On the north elevation an attached, covered, exterior stairway provides access to the upper story of the building.

The associated building, located to the south, is one-story in height, three bays wide, and one bay deep with a side-gable roof, a clapboard and wood shingle exterior, and a granite foundation. The facade is covered with clapboards, while the side elevations (north and south) are covered in wood shingles. The entrance is located on the northernmost bay of the facade and mirrors the main building with paired, paneled doors set in an undecorated surround with a simple moulding. The intact windows are two-over-two, double-hung set in wood frames with the same moulding.

The farmstead at 118 Eastbrook Road/Route 200, Eastbrook (Photograph 8) is comprised of a house (Survey Map No. 33) with two attached barns (Survey Map Nos. 34 and 35), and an agricultural outbuilding (Survey Map No. 36). The house is a one-and-one-half story Gothic-Revival-style building constructed ca. 1880, with an asphalt shingled, front gable roof, and wood shingle cladding (Photograph 9). The facade is three bays wide with an off-center door. The roof has wide, overhanging eaves with a pointed gable on the west slope, a dormer on the east slope, and a brick chimney on the ridgeline. The fenestration consists of evenly spaced replacement windows on the facade and east elevation, grouped windows on the half-story of the facade, and a bay window on the first floor of the west elevation. Gothic Revival elements, most notably steeply pitched, pointed gables, are present on the house and connecting barn.

A small side ell on the west elevation links the house to a small barn. This barn is one-and-one-half stories in height, three bays wide, with an asphalt shingle cross-gabled roof and wood shingle cladding (Photograph 10). A large sliding wood board door is present on the facade. The second attached barn, while still one-and-one-half stories in height, is significantly larger (Photograph 11). It is three bays wide, with an asphalt shingle gambrel roof, and clapboard siding. The facade has a sliding wood board door as well as two, small, square fixed windows. The gambrel roof is gently sloping, with wide cornice returns and carved wood detailing under the cornice line. The fourth structure on the property is a small outbuilding located behind the residence. It is one story in height, with a front gabled, asphalt shingle roof and wood shingle siding (Photograph 12). The building has a wood board sliding door and a modern door on the facade, and a square window in the gable above. The roof has wide, overhanging eaves and a brick chimney on the ridgeline at the rear of the building.

The former school at 660 Sugar Hill Road (Survey Map No. 68) was constructed ca. 1880 as a one-story, rectangular in plan, and three bays wide by three bays deep (Photograph 13). It is topped with an asphalt-shingle, gable-front roof with deep overhanging eaves and is clad in clapboards. Above the central door is a multi-light transom. It is set in a simple wood surround. Fenestration includes one, two-over-two double-hung, wood sash window on the east bay of the facade and three of the same window on the west elevation. A small window is placed below the roof gable. A covered chimney sits at the rear of the roof ridge. There are no known alterations; however there are replacement boards on the west bay of the facade indicating the removal of a window.

F. NR Eligibility:

1. Address resource integrity, NR criteria, area of significance and period of significance.

National Register Listed Properties:

The Eastbrook Baptist Church and Town House (Survey Map Nos. 12 and 13) were listed in the National Register under Criterion C in the area of architecture as representative examples of Greek Revival architecture as applied to a religious building and a municipal building. Despite the alterations to the Church (described above), these two buildings retain their integrity as late-Greek Revival religious and municipal buildings. Constructed after the heyday for this style of architecture, they represent the persistence of this style in the more rural areas of Maine (Beard 1978; McAlester and McAlester 1984).

Properties Recommended Eligible for Listing in the National Register:

The Greenwood Grange #363 (Survey Map No. 11) and related building (Survey Map No. 10) are recommended potentially eligible for listing in the National Register at the local level under Criterion A in the areas of social history and entertainment/recreation. The Greenwood Grange #363 was organized on October 27, 1900 in Eastbrook; it is unknown when the building was constructed but it appears on a 1911 USGS map. The Greenwood Grange #363 is one of many granges built in the post-Civil War "to meet the economic, social and educational needs of a class of Americans – the small farmer – whose day to day lives were being irrevocably transformed in the post-Civil War period" (Brown 1922 quoted in Mitchell 2006). Many grange halls served as public meeting space for the entire community, where social, political and educational activities occurred. Also on the property is a small associated building. The original use of the building is unknown, but it was possibly built as a juvenile hall. Juvenile halls were constructed specifically to house functions aimed at teenagers to interest them in the activities of the grange. These buildings were often built in close proximity to the parent grange and the architectural cohesion between the two clearly speaks to their related uses (Gardner 1949:365; Howe 1994; USGS 1911).

The Greenwood Grange and related building retain their historic integrity as two buildings associated with the social history and entertainment/recreation history of Eastbrook. It appears that the two buildings are still in use. There are few known alterations to these buildings and they retain their integrity of location, design, setting, materials, workmanship, feeling and association with the early-twentieth-century grange movement in rural Maine. The period of significance is ca. 1911 to 1960, the current 50-year cut-off point.

The farmstead at 118 Eastbrook Road/Route 200 (Survey Map No. 32) is recommended potentially eligible for listing in the National Register at the local level under Criterion C in the area of architecture as a representative example of a relatively intact, mid- to late-nineteenth-century connected farmstead. The connected farmstead is a form indigenous to New England that started in the early 1800s and continued through the post-Civil War era. In a typical arrangement, the house and barn on an agricultural property are joined, sometimes with smaller support buildings, to form a continuous complex that allows for weather protection and the consolidation of agricultural and home-industry activities (Hubka 1984:13). Though the house has been altered with modern windows and changes in the fenestration, the property retains integrity of location, design, setting, feeling and association as a mid- to late-nineteenth-century connected farmstead in rural Hancock County. The period of significance is ca. 1880 to 1960, the current 50-year cut-off point.

The former school at 660 Sugar Hill Road (Survey Map No. 68) is recommended eligible for listing in the National Register at the local level under Criteria A and C. Under Criterion A it is potentially eligible in the area of education as one of four schoolhouses built in Eastbrook during the mid- to late nineteenth century (Halfpenny and Stuart 1881; Varney 1886). Under Criterion C it is potentially eligible in the area of architecture as a relatively rare intact example of a one-room schoolhouse constructed in rural areas across the country throughout the nineteenth century. Of the four schoolhouses built in Eastbrook, two have been demolished. The status of the other one is unknown.

There are no known alterations to the school, though it appears a window on the facade has been removed. Despite this it retains its integrity of location, design, materials, workmanship, feeling, and association as a one-room schoolhouse in rural Hancock County. Integrity of setting is undermined by the presence of a mobile home on the property and the introduction of contemporary houses on the surrounding properties. The period of significance is ca. 1880 until ca. 1920 when, according to the Federal Census, there was only one teacher in Eastbrook.

2. For a historic district provide a topographic map showing the limits of the proposed district illustrating street or landscape views and all non-historic or non-contributing resources.

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V. FINDING OF EFFECTS

The Bull Hill Wind Project is located in an area designated by the state for expedited permitting and is therefore subject to review under the Maine Legislature's recently enacted standards specific to wind power projects located within the expedited permitting area. The law provides that determinations of effect on scenic resources, including historic properties, of national or state significance, shall consider whether the wind project will cause unreasonable adverse effects (35-A MRSA §3452). In assessing whether an unreasonable adverse effect on scenic values may be caused by a project, the law requires that the siting authority consider:

A. The significance of the potentially affected scenic resource of state or national significance;

B. The existing character of the surrounding area;

C. The expectations of the typical viewer;

D. The project purpose and the context of the proposed activity;

E. The extent, nature and duration of potentially affected public uses of the scenic resource of state or national significance and the potential effect of the generating facilities' presence on the public's continued use and enjoyment of the scenic resource of state or national significance; and

F. The scope and scale of the potential effect of views of the generating facilities on the scenic resource of state or national significance, including but not limited to issues related to the number and extent of turbines visible from the scenic resource of state or national significance, the distance from the scenic resource of state or national significance, and the effect of prominent features of the development on the landscape.

The framework used for assessing the effects of the Bull Hill Wind Project on historic properties was that established by the regulations governing Section 106 of the National Historic Preservation Act. In conducting the assessment, the criteria of adverse effect was applied to each of the properties identified in the survey as listed or eligible for listing in the National Register. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)(1)).

Direct Effects

The direct effects APE was established to encompass all Project-related construction activities, including land and building acquisition, the area where the turbines and collector lines will be located, the access roads, and the substation/O&M facility (see Figure 1). The two seasonal camps (Survey

Map Nos. 75 and 76) in the lease area that will be removed have lost their historic integrity due to alterations and the use of modern replacement materials (see attached Survey Matrix). As there are no historic properties within the direct impact APE, the Project will have no direct effects to historic properties.

Indirect Effects

In order to assess whether the views to the Project would have an unreasonable adverse effect, the magnitude, distance, and duration of the potential view, along with the qualities of significance that make the properties eligible for listing in the National Register was taken into account. In assessing the potential effects of the Project on historic properties, PAL utilized observations made during the reconnaissance survey, the current USGS map, on the concept of distance zones, which is based on the USDA Forest Service visual analysis criteria for forested landscapes, and on the amount of detail that an observer can differentiate at varying distances. The distance zones are defined as the following:

• Foreground: 0 to 1/2 mile in distance. Within the foreground, the observer would be able to detect surface textures, details, and a full spectrum of color. For example, the details of the turbines (blades, nacelles, support towers) would be readily apparent.

• Midground: 1/2 mile to 4 miles in distance. The midground is a critical part of the natural landscape. Within this zone the details found in the landscape become subordinate to the whole: individual trees lose their identities and become forests; buildings are seen as simple geometric forms; roads and rivers become lines. Edges define patterns on the ground and hillsides. Development patterns are readily apparent, especially where there is noticeable contrast in scale, form, texture, or line. Colors of structures become somewhat muted and the details become subordinate to the whole. This effect is intensified in hazy weather conditions, which tend to mute colors and de-sharpen outlines even further. In panoramic views, the midground landscape is the most important element in determining visual impact.

• Background: greater than 4 miles. Background distances provide the setting for panoramic views that give the observer the greatest sense of the larger landscape. However, the effects of distance and haze will obliterate the surface textures, detailing, and form of project components. Objects seen at this distance will be highly visible if they present a noticeable contrast in form or line and weather conditions are favorable.

There are four properties in the indirect APE that are listed or recommended as eligible for listing in the National Register (see Figure 3). One property is located in the midground distance: the former school at 660 Sugar Hill Road (Survey Map No. 68), located approximately 2.25 miles west of the closest turbine. The remaining three properties are located in the background distance; the Eastbrook Baptist Church and Town House (Survey Map Nos. 12 and 13), the Greenwood Grange #363 and associated building (Survey Map Nos. 10 and 11), are located in Eastbrook center, approximately 5 miles west of the closest turbine and the farmstead at 118 Eastbrook Road/Road

200, Eastbrook (Survey Map No. 32), located approximately 5.8 miles west of the closest turbine.

The former school at 660 Sugar Hill Road (Survey Map No. 68) does not maintain its integrity of setting due to the presence of a modern mobile home on the property and the construction of contemporay residences in the surrounding area. Any views of the constructed Project would be screened by existing vegetation that lines the road and would not alter its qualities of significance, namely its association with the early educational system in Eastbrook and its architectural design as a rural, one-room schoolhouse.

Due to distance between the remaining three properties and the Project site, the areas of increased elevation located between them, including Neck Ridge and Sugar Hill, and the dense vegetation that exists in the area, the constructed Project would not be visible from these resources. The setting of these resources and the qualities of significance that make them eligible for listing in the National Register will not be altered with the Project. Therefore there will be no visual effects to historic properties with the Bull Hill Wind Project.

Photographs of the viewshed from Eastbrook center and the farmstead at 118 Eastbrook Road/Road 200 are attached to this report to illustrate the existing view (Photographs 13-15).

Sound levels produced during construction and operation of a project are regulated by federal, state, and local noise standards. The applicable noise regulation, Chapter 375.10, Control of Noise, was enacted in November 1989 to protect certain land uses from excessive sound levels generated by new or expanded developments and facilities.

The Bull Hill Wind Project Noise Level Assessment sets forth the predicted “worst case” sounds to be produced by the Project in its final design and configuration. The Assessment relies on a sophisticated model to predict the sound levels from the Project. To generate a “worst-case scenario” a number of conservative assumptions were input in the model. Among these conservative assumptions were the following:

- All turbines are operating at full sound power at all times;
- Downwind conditions in all directions simultaneously;
- No foliage attenuation;
- “Hard ground” conditions throughout the project area.

Applicable uncertainty factors were added to the turbine manufacturer’s turbine specification guarantee level. The modeling for the Project indicates that the noise from the Project at all properties listed in or potentially eligible for listing in the National Register will be below the regulatory “quiet limits” of 45 dBA. Therefore, there will be no noise effects to properties that are listed in or recommended eligible for listing in the National Register with the Project.

Bull Hill Wind Architectural Reconnaissance Survey
MHPC #1112-09
August 31, 2010-September 3, 2010
PAL (The Public Archaeology Laboratory, Inc.)
210 Lonsdale Avenue
Pawtucket, RI 02860
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Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
1	West Side of Route 193, Deblois	Washington	No	No	N/A	These barrens do not contain any significant features or elements of historic blueberry cultivation. Building foundations and paths are located throughout the barrens.	Blueberry Barrens
2	Beddington Road, Route 193, north side of street, approx. 3800 feet south of the intersection with Lane Road, Deblois	Washington	No	No	N/A	This resource does not meet Criteria Consideration D as it applies to cemeteries.	Cemetery
3	West Side of Beddington Road, Route 193, Deblois	Washington	No	No	N/A	These barrens do not contain any significant features or elements of historic blueberry cultivation.	Blueberry Barrens
4	Beddington Road, Route 193, south side of street, approx. 1.25 miles south of the intersection with Lane Road, Deblois	Washington	No	No	N/A	Appears that buildings and other features associated with this resource have been removed. Property is not publically accessible, so overall integrity could not be assessed.	Military Airstrip
5	168 Martin's Ridge Road, Franklin	Hancock	No	No	N/A	This farmstead does not retain integrity as a mid-to late-nineteenth century rural agricultural property. Alterations to the buildings detract from its integrity and the setting lacks farm fields, paths and other historic features.	Farmstead

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
6	168 Martin's Ridge Road, Franklin	Hancock	No	No	N/A	This house does not retain integrity of design, materials, workmanship, setting, and feeling. Alterations include modern roofing material, replacement windows, and the apparent removal of a side ell.	House
7	168 Martin's Ridge Road, Franklin	Hancock	No	No	N/A	Overall integrity is intact; however this is not a distinct or unusual building for this area.	Barn
8	168 Martin's Ridge Road, Franklin	Hancock	No	No	N/A	This workshop is not a distinct or unusual building for this area. Integrity of design, setting, workmanship and feeling are undermined by the insertion of dormers into the roof slope and lack of farm fields, paths and other historic features.	Workshop
9	851 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This building is not a distinct or unusual type for this area and lacks integrity of design, setting, materials, and workmanship. Alterations include the addition of an enclosed porch and a attached garage.	House
10	917 Sugar Hill Road, Eastbrook	Hancock	Yes	No	A: Social History/Recreation	This building appears to be associated with the Greenwood Grange #363 (see below). Alterations appear to be minimal and it retains all aspects of integrity.	Hall associated with #11
11	917 Sugar Hill Road, Eastbrook	Hancock	Yes	No	A: Social History/Recreation	Alterations appear to be minimal and include replacement roof materials and windows. This building retains all aspects of integrity.	Grange hall
12	Eastbrook Road/Route 200, at the split with Sugar Hill Road, Eastbrook	Hancock	Yes	No	C: Architecture	Retains integrity of location, design, setting, workmanship, feeling and association. Integrity of materials is compromised by the use of vinyl siding on the exterior.	Church
13	Eastbrook Road/Route 200, at the split with Sugar Hill Road, Eastbrook	Hancock	Yes	No	C: Architecture	No visible alterations. Retains all aspects of integrity.	Community building
14	Sugar Hill Road, at the split with Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This building is not a distinct or unusual type for this area and lacks integrity of design, materials, and workmanship. Alterations include the use of modern exterior materials, and the addition of dormers, a porch and a rear ell.	House

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
15	492 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This property is not a distinct or unusual type for this area. It lacks farm fields, roads or other historic features and does not retain integrity as a nineteenth-century rural farmstead.	Farmstead
16	492 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This building lacks integrity of design, materials, and workmanship. Alterations include modern materials, such as roofing and replacement windows.	House
17	492 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This building lacks integrity of design, materials, and workmanship. Alterations include the use of modern exterior materials.	Attached Barn
18	19 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This building is not a distinct or unusual type for this area. Alterations include the use of modern exterior materials.	House
19	19 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Detached garage
20	19 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Shed
21	28 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This building lacks integrity of design, materials, workmanship and feeling. Alterations include replacement windows and a side addition.	House
22	23 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	Due to numerous alterations this building does not retain integrity as a nineteenth-century residence.	House
23	23 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. It has been covered in vinyl siding and does not retain its historic integrity.	Workshop
24	1150 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity due the altered and deteriorated condition of the buildings and the lack of farm fields, roads and other historic elements.	Farmstead
25	1150 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This vernacular building lacks integrity of design, materials, workmanship and feeling. Alterations include the use of modern materials, replacement windows and the addition of dormers.	House
26	1150 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	Due to its deteriorated condition this large barn does not retain its historic integrity of design, workmanship, materials, and feeling.	Barn

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
27	1150 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	Due to its deteriorated condition this barn does not retain its historic integrity of workmanship, materials, setting, and feeling.	Milk House
28	1176 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity due the altered condition of the buildings and the lack of farm fields, roads and other historic elements.	Farmstead
29	1176 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Alterations include modern exterior materials and the addition of side porch and deck. Overall it lacks integrity of materials, workmanship, setting, feeling, and design.	House
30	1176 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area and lacks integrity of materials, workmanship, setting, feeling, and design.	Barn
31	1176 Eastbrook Road/Route 200, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Barn
32	118 Eastbrook Road/Route 200, Eastbrook	Hancock	Yes	No	C: Architecture	This farmstead retains its historic integrity of location, setting, design, and feeling as a mid- to late-nineteenth century rural connected farmstead.	Farmstead
33	118 Eastbrook Road/Route 200, Eastbrook	Hancock	Yes	No	C: Architecture	The house retains integrity as one of several buildings that comprise this connected farmstead. Integrity of materials, workmanship and design is undermined by changes in the fenestration, and the use of modern replacement materials.	House
34	118 Eastbrook Road/Route 200, Eastbrook	Hancock	Yes	No	C: Architecture	This barn retains integrity as one of several buildings that comprise this connected farmstead. The attached barn retains integrity of location, design, materials, workmanship, and feeling as part of this complex.	Attached barn
35	118 Eastbrook Road/Route 200, Eastbrook	Hancock	Yes	No	C: Architecture	This large barn retains integrity as one of several buildings that comprise this connected farmstead. The attached barn retains integrity of location, design, workmanship, and feeling as part of this complex.	Attached barn

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
36	118 Eastbrook Road/Route 200, Eastbrook	Hancock	Yes	No	C: Architecture	This barn retains integrity of one of several buildings that comprise this farmstead. The barn retains integrity of location, design, workmanship, and feeling as part of this complex.	Detached barn
37	1262 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This farmstead does not maintain its overall integrity due the altered condition of the buildings and the lack of farm fields, roads and other historic elements.	Farmstead
38	1262 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by alterations including modern materials, windows, siding, and roofing.	House
39	1262 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Detached barn
40	East Side of Eastbrook Road/Route 200, approx. 1.6 miles west of the split the Sugar Hill Road split, Waltham	Hancock	No	No	N/A	This resource does not meet Criteria Consideration D as it applies to cemeteries.	Cemetery
41	534 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This farmstead does not maintain integrity due the altered condition of the buildings and the lack of farm fields, roads and other historic elements.	Farmstead
42	534 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This building is not a distinct or unusual type for this area. Overall integrity is undermined by alterations including new siding, roofing, windows, and the addition of an attached garage.	House
43	534 Eastbrook Road/Route 200, Waltham	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by the use of replacement materials and changes to the setting.	Detached barn

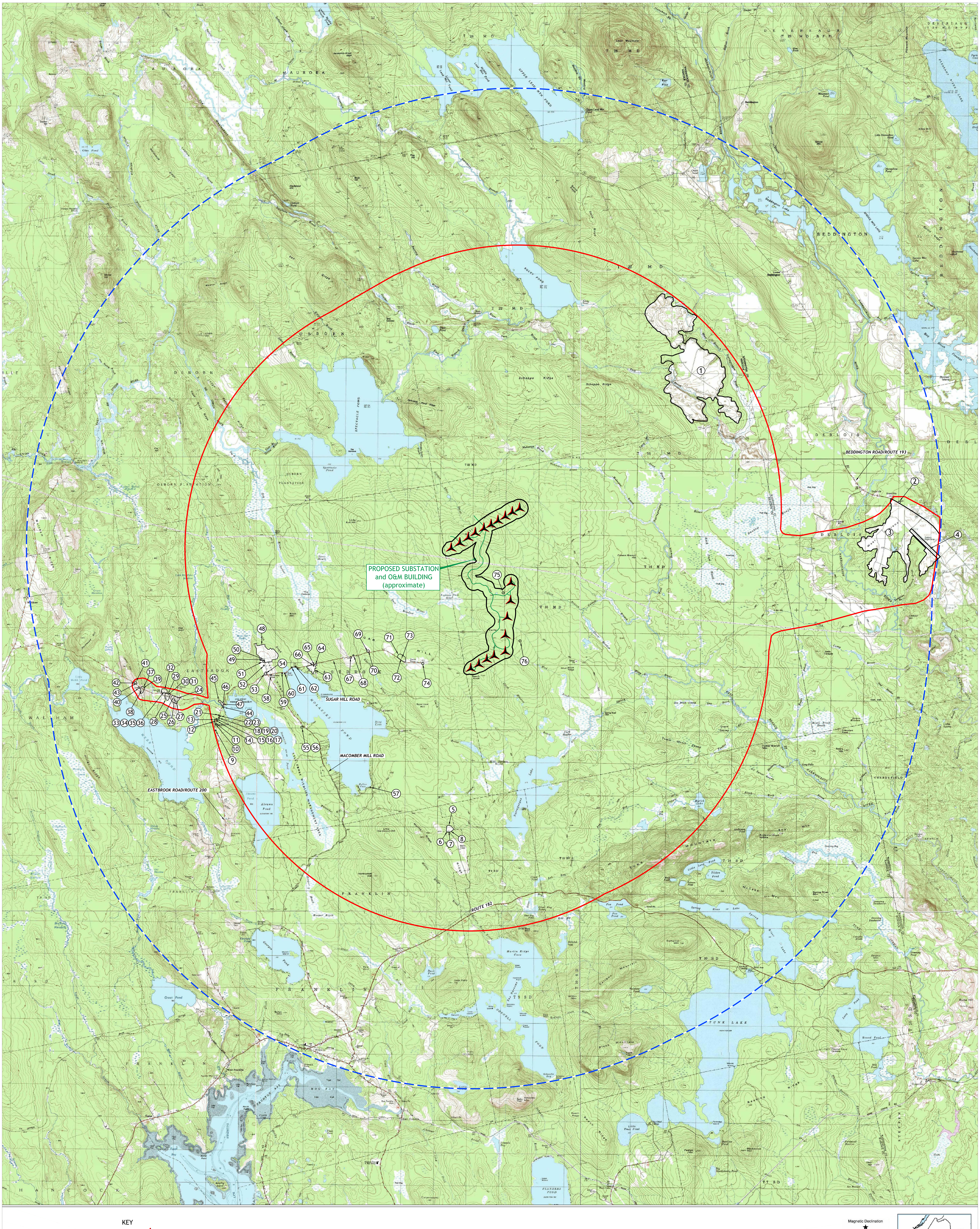
Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
44	Scammon Pond, East side of Sugar Hill Road, approx. 1680 feet north from the split with Eastbrook Road, Eastbrook	Hancock	No	No	N/A	This dam does not possess distinctive characteristics of a particular type, method of construction, period or represent any technological advances.	Dam
45	72 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity of design, materials, workmanship and feeling due the altered condition of the buildings and the lack of farm fields, roads and other historic elements.	Farmstead
46	72 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This building is not a distinct or unusual type for this area. Overall integrity is undermined by alterations including the use of modern materials and replacement windows.	House
47	72 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Alterations include modern materials and change in use from a barn to attached garage.	Attached barn
48	66 Abbott Road, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity due the altered condition of the buildings, the construction of modern buildings on the property and the lack of farm fields, roads and other historic elements.	Farmstead
49	66 Abbott Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area and overall integrity of design, materials, workmanship and feeling is undermined by alterations including new windows and doors and additions.	House
50	66 Abbott Road, Eastbrook	Hancock	No	No	N/A	This attached barn is not visible from the road so overall integrity could not be assessed.	Attached barn
51	54 Abbott Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Integrity of design, materials, workmanship and feeling is undermined by alterations including new windows, an enclosed porch and the insertion of a larger dormer window.	House

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
52	38 Abbott Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by alterations including the addition of a front porch.	House
53	8 Abbott Road, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity due the demolition of the historic agricultural-related buildings, the alterations to the house, and the construction of modern buildings on the property.	Farmstead
54	8 Abbott Road, Eastbrook	Hancock	No	No	N/A	This house has been highly altered with the use of modern materials, the partial enclosure of the porch, changes in the fenestration and the removal of historic fabric.	House
55	1128 Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by a general lack of maintenance.	House
56	1128 Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by a general lack of maintenance.	Attached agricultural building
57	Fire Lane 15 E 2, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Recreational camp
58	Near the southeast corner of the intersection of Sugar Hill Road and Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	This resource does not meet Criteria Consideration D as it applies to cemeteries.	Cemetery
59	377 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building does not maintain its overall integrity due to alterations including the use of modern materials, changes to the front porch, and construction of modern outbuildings on the property.	House
60	379 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular does not maintain integrity due to alterations including the use of modern materials.	House

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
61	North Side of Sugar Hill Road, on the west side of the intersection with Stone Dam Road, Eastbrook	Hancock	No	No	N/A	While overall integrity is mostly intact, this vernacular building is not a distinct or unusual type for this area.	Recreational cottage
62	544 Molasses Pond Road, Eastbrook	Hancock	No	No	N/A	This building lacks integrity of design, setting, materials, workmanship and feeling. Alterations include the use of modern materials, the construction of several additions and other contemporary buildings on the property.	Inn
63	South Side of Molasses Pond Road, approx. 4800 feet east of the intersection with Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity of design, materials, workmanship and feeling due alterations to the house, the construction of modern buildings on the property, and the lack of any historic features associated with the farm such as cultivated fields and farm roads.	Farmstead
64	South Side of Molasses Pond Road, approx. 4800 feet east of the intersection with Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area and has been altered by the use of modern materials and several additions.	House
65	South Side of Molasses Pond Road, approx. 4800 feet east of the intersection with Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	Overall integrity of this vernacular building is compromised by the use of modern materials and the insertion of garage doors.	Attached barn

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
66	South Side of Molasses Pond Road, approx. 4800 feet east of the intersection with Macomber Mill Road, Eastbrook	Hancock	No	No	N/A	While overall integrity is intact, this vernacular building is not a distinct or unusual type for this area.	Detached barn
67	663 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building does not maintain its overall integrity due to alterations including the use of modern materials, an addition to the front of the house, and modern outbuildings on the site.	House
68	660 Sugar Hill Road, Eastbrook	Hancock	Yes	No	A: Education C: Architecture	There are no known alterations to the school, though it appears a window on the facade has been removed. Despite this it retains its integrity of location, design, materials, workmanship, feeling, and association as a one-room schoolhouse in rural Hancock County. Integrity of setting is undermined by the presence of a mobile home on the property and the construction of contemporary houses on the surrounding properties.	School house
69	746 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity of design, materials, workmanship and feeling due the demolition of the historic farmhouse, alterations to the remaining barn, the construction of modern buildings and roads on the property, and the lack of any associated historic features.	Farmstead
70	746 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This highly altered barn does not maintain integrity due to the use of replacement materials, the insertion of a modern garage door, and a general lack of maintenance.	Barn
71	North Side of Sugar Hill Road, approx. 2.5 miles east of Abbott Lane, Eastbrook	Hancock	No	No	N/A	This farmstead does not maintain integrity of design, setting, materials, workmanship and feeling due to alterations to the house and barn, the construction of modern buildings on the property, and the lack of any historic features associated with the farm such as cultivated fields and farm roads.	Farmstead

Survey Map No.	Address	County	NR Ind.	NR Dist.	Criteria	Integrity	Notes
72	North Side of Sugar Hill Road, approx. 2.5 miles east of Abbott Lane, Eastbrook	Hancock	No	No	N/A	This vernacular building does not maintain its overall integrity due to alterations including the use of modern materials and windows.	House
73	North Side of Sugar Hill Road, approx. 2.5 miles east of Abbott Lane, Eastbrook	Hancock	No	No	N/A	This vernacular building does not maintain its overall integrity due to alterations including the insertion of dormer windows.	Attached barn
74	963 Sugar Hill Road, Eastbrook	Hancock	No	No	N/A	This vernacular building does not maintain its overall integrity due to alterations including the use of modern materials, the construction of several additions and the modern outbuildings on the property.	House
75	Near the summit of Heifer Hill, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area.	Recreational camp
76	Approx. 2280 feet south of Colson Branch Creek, Eastbrook	Hancock	No	No	N/A	This vernacular building is not a distinct or unusual type for this area. Overall integrity is undermined by alterations including the use of modern materials and an addition onto the front of the building.	Recreational camp



KEY

Turbine Locations

Survey Map Number

Direct Area of Potential Effect (APE)

Indirect Direct Area of Potential Effect (APE)

Survey Boundary

0 1 2 3 miles

0 1 2 3 4 kilometers

Magnetic Declination

18° W

QC NB ME VT NH

Figure 2. Bull Hill Wind (MHPC# 1112-09) Survey base map.

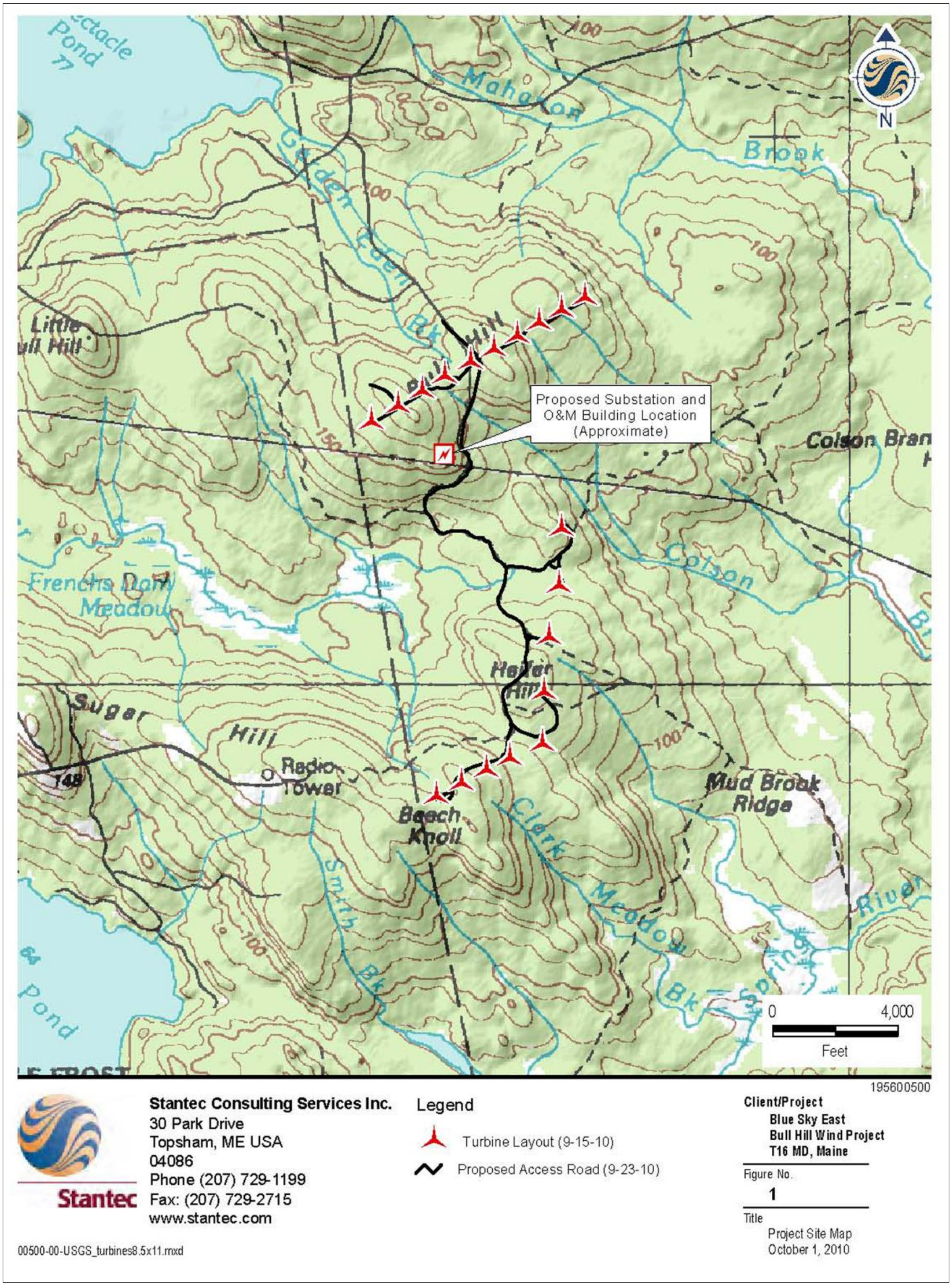


Figure 1. Bull Hill Wind Project Site Map.

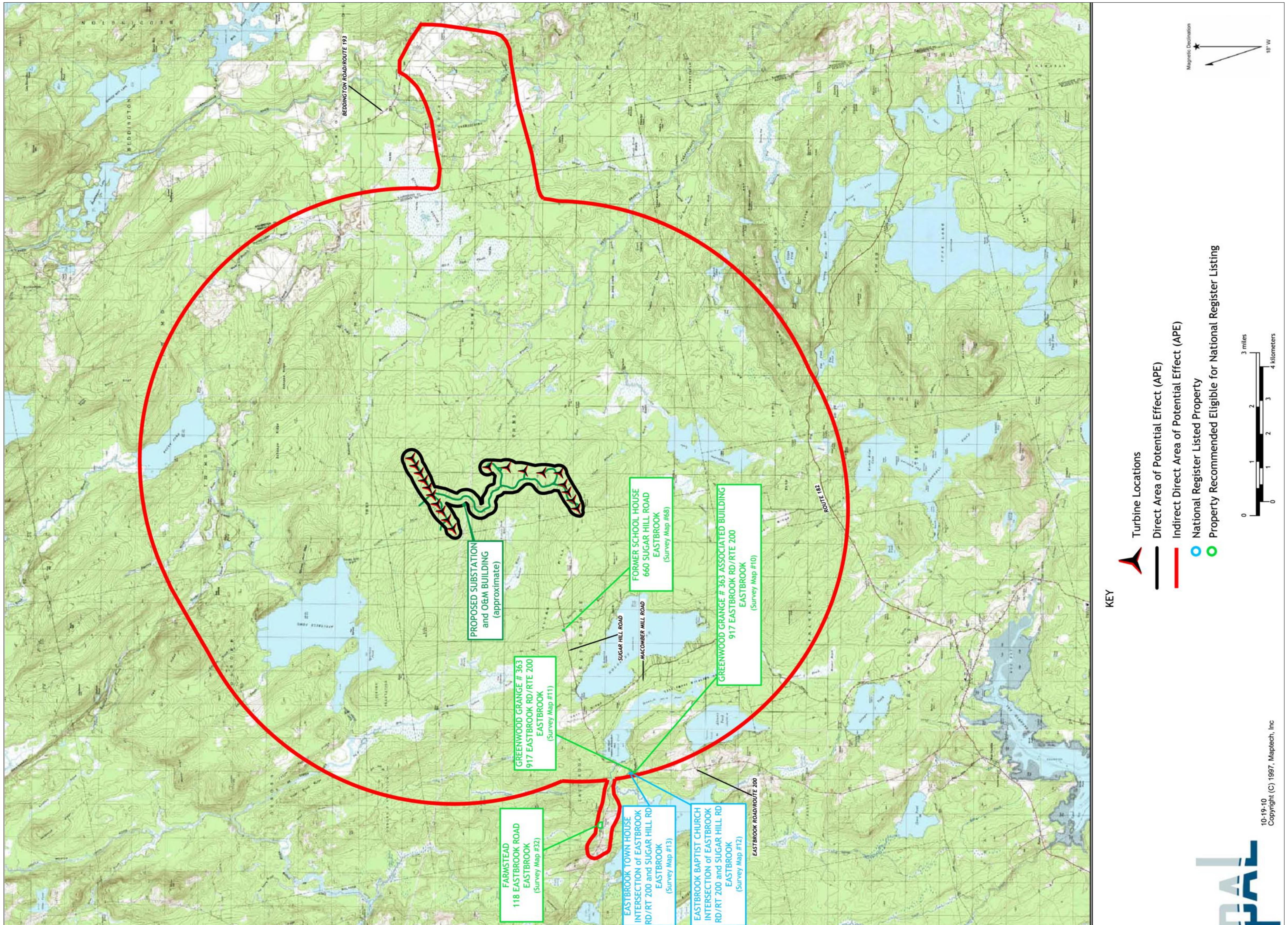


Figure 3. Properties Listed or Recommended Eligible for Listing in the National Register in the Bull Hill Wind Project Areas of Potential Effect.

Photograph 1. Bull Hill Camp, this contemporary camp building is located within one-mile of the turbine locations and will remain in this location.

Photograph 2. This ca. 1957 camp building is located within one-mile of the turbine locations and will be removed from this location.

Photograph 3. This ca. 1957 camp building is located within one-mile of the turbine locations and will be removed from this location.

Photograph 4. Eastbrook Baptist Church (Survey Map No. 12), Eastbrook Road/Route 200, Eastbrook.

Photograph 5. Eastbrook Town House (Survey Map No. 13), Eastbrook Road/Route 200, Eastbrook.

Photograph 6. Greenwood Grange #363 (Survey Map No. 11), 917 Eastbrook Road/Route 200, Eastbrook.

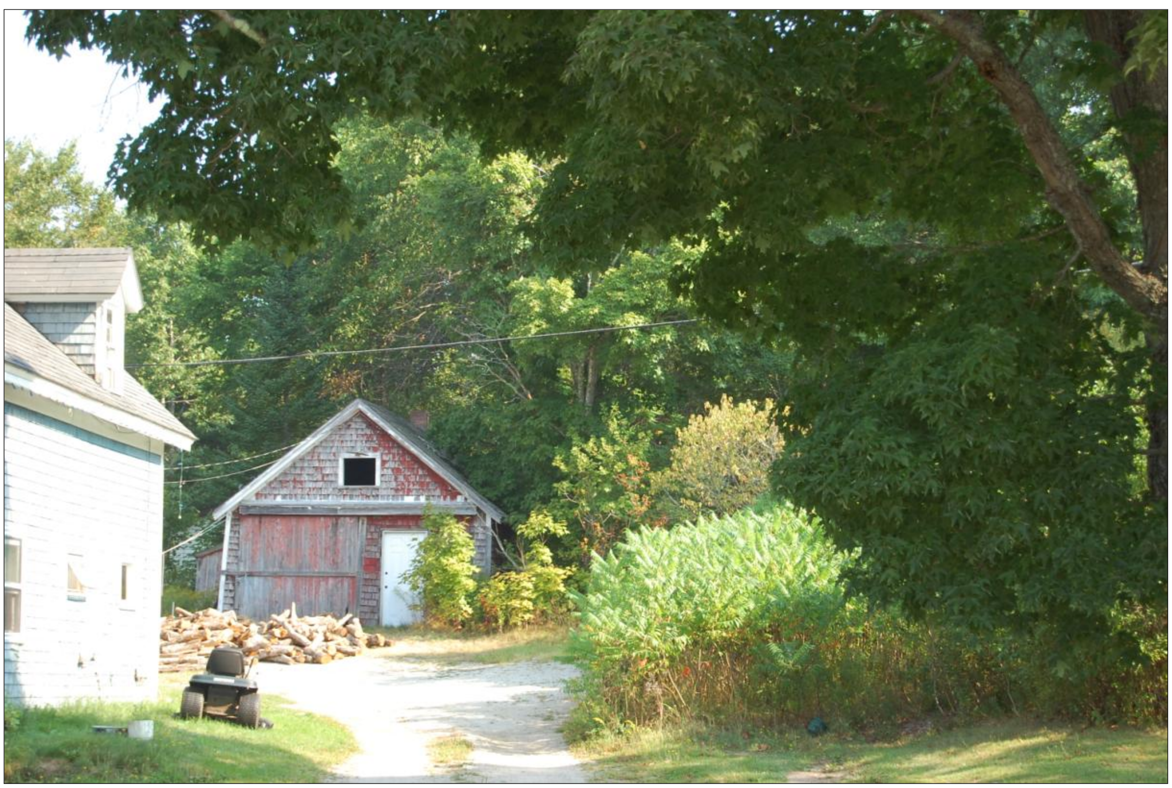
Photograph 7. Greenwood Grange #363 Associated Building (Survey Map No. 10), 917 Eastbrook Road/Route 200, Eastbrook.

Photograph 8. Connected farmstead, 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 32).

Photograph 9. House, 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 33).

Photograph 10. Barn, 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 34).

Photograph 11. Barn, 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 35).



Photograph 12. Shed, 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 36).

Photograph 13. Former School, 660 Sugar Hill Road, Eastbrook (Survey Map No. 68).

Photograph 14. View east from the Eastbrook Baptist Church and Town House, Eastbrook Center. The constructed Project would not be visible from this location.

Photograph 15. View east from the Greenwood Grange #363. The constructed Project would not be visible from this location.

Photograph 16. View east from the farmstead, at 118 Eastbrook Road/Route 200, Eastbrook (Survey Map No. 32). The constructed Project would not be visible from this location.

Phase 0 Archaeological Survey:
Bull Hill Wind Project
T16 MD, Hancock County, Maine

Submitted to
Stantec Consulting Services, Inc.
30 Park Ave.
Topsham, Maine 04086

Kathleen Wheeler, Ph. D., Principal Investigator

Prepared by
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97 Morning Street
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October 16, 2010

This Report Contains Confidential Information

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INTRODUCTION

Independent Archaeological Consulting, LLC (IAC) of Portsmouth, New Hampshire, has completed a Phase 0 reconnaissance survey for the proposed Bull Hill Wind Project located in T16 MD, Hancock County, Maine, on behalf of Stantec Consulting Services, Inc., of Topsham, Maine. The Bull Hill Wind Project is a 19-turbine wind power project proposed by Blue Sky East, LLC (the applicant) for Bull Hill and Heifer Hill ridges in T16 MD, Hancock County (Figure 1). The proposed turbines are Vestas V100 machines with a 1.8 megawatt (MW) rated power, a 95 meter tower and 100 meter rotor diameter. Total height with blades fully extended would be approximately 145 meters (476 feet). The project will also include two 80-meter lattice type permanent meteorological towers.

Power from each turbine will be collected in an underground 34.5 kilovolt (kV) collection system and flow to a new substation and Operations and Maintenance (O&M) facility located centrally in the project area. The substation will "step up" the power to 115 kV and transmit it directly to Bangor Hydro Electric's Line 66. By locating the substation directly adjacent to Line 66, no 115 kV transmission line will be necessary for the project.

The entire Township of T16 MD is designated as expedited for permitting. The project area is low elevation commercial forest, with ridge elevations between 137 and 206 meters (450 and 675 feet) above sea level. The project area is owned by one landowner. The applicant has leased the parcels necessary for the siting of the project, and acquired other property interests as necessary to meet sound and setback standards. An existing network of haul roads will be utilized to the greatest extent possible, and several gravel pits used for previous road construction will not exceed five acres. The 5-m (16-foot) access roads and 11-m (36-foot) wide crane path would be maintained by the applicant. Roads outside of the project area and therefore under the control of the landowner would continue to be maintained by the landowner.

The only existing structures within the lease area are two seasonal camps and two temporary meteorological towers. The camp owners have leases with the underlying landowner, and have agreed to move their camp locations outside of the project area. The existing camps will be removed or abandoned. Both temporary meteorological towers will be removed within one year of turbine construction.

Scope and Authority

The Bull Hill Wind Project may require approvals and permits from both federal and state entities. The State of Maine will review the project for historical resources. If necessary, the Project may be reviewed under Section 106 of the National Historic Preservation Act (NHPA) (16 US §470f). The Section 106 process is coordinated at the state level by the State Historic Preservation Officer (SHPO), represented in Maine by the Maine Historic Preservation Commission (MHPC). The issuance of agency certificate or approvals will depend, in part, on obtaining comments from the Maine SHPO. Dr. Kathleen Wheeler served as Principal Investigator, and is a certified Level-2 Historical Archaeologist in Maine. She also exceeds the qualifications for professional archaeologist set forth by the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716, September 29, 1993) and 36 CFR Part 61.

Figure 1. Bull Hill Wind Project in T16 MD, Maine.

CULTURAL RESOURCE ASSESSMENT AND SURVEY METHODS

Predicting the location of Euroamerican archaeological resources is built primarily from cartographic evidence from nineteenth- and twentieth-century maps (e. g., Halfpenny & Stuart 1881; and United States Geological Survey topographical maps). These cartographic resources pinpoint the location of dwellings, schools, mills, churches, and cemeteries, providing the archaeologist with a ready point of comparison between past and present landscapes. In this, the sensitivity assessment differs greatly from those conducted for pre-Contact-period archaeological resources. Historical archaeologists can also review secondary sources such as town histories, genealogies, photographs, and newspapers to provide a larger historical context for a project area. The sensitivity assessment also includes a site file search for known archaeological sites within the project area, or sites that might serve as analogs for the project area. Using known site types and distributions, historical archaeologists develop settlement models to make predictive statements about where to anticipate finding sites.

High archaeological sensitivity for Euroamerican resources is associated with the following variables:

- documented existence of sites (e. g., homesteads, farmsteads, schools, churches, town halls, cemeteries) through primary, secondary, or cartographic resources
- presence of known sites (whether extant, aboveground representations of early architecture, or documented archaeological site)
- proximity to transportation systems (roads, railroads, major rivers and streams) and potable water sources
- linkage to other resources (such as stone for quarrying, clay sources for brick or ceramics, or metal ores)
- High sensitivity is defined as lying ***within 100 m (330 ft)*** of documented or known sites, transportation systems, or sources of potential hydropower

Moderate sensitivity was assigned to areas between 100 m to 200 m (330 ft to 650 ft) of an historic road, standing architectural feature, or potable water source, in areas with minimal to moderate disturbance. Low sensitivity areas are those more than 200 m (650 ft) from documented sites, roadways, natural resources, or water sources. Low sensitivity is also assigned to areas with excessive ground disturbance, such as along railroad grades, where extensive cutting and filling are typically involved in the creation of the railroad bed. Table 1 summarizes the fundamental criteria for ranking sensitivity for Euroamerican archaeological resources.

Table 1. Summary of criteria for evaluating Euroamerican archaeological sensitivity.

Sensitivity	Criteria
High	within 100 m of transportation systems and/or sites known from maps
Moderate	within 100-200 m (330-650 ft) of roads or known sites
Low	more than 200 m from roads or known sites; or excessive disturbance

Euroamerican archaeological resources typically exist along transportation corridors, specifically roads and rivers. Environmental conditions, such as water power and land suitable for agriculture, also affect site location. Nineteenth- and twentieth-century maps of the project area confirm that most buildings and structures were located along roads, which followed streams, rivers, or ponds, because these areas were the most level and easiest to access. Euroamerican archaeological resources are commonly found where former buildings or structures stood, where people lived and have left a trace of their lives in the form of artifacts and features.

As noted above, our site prediction model anticipates that most resources will be found within 100 m (330 ft) of transportation corridors. In applying this model to the siting of turbines for the Bull Hill Wind Project, we note the relative absence of historic roads in the APE; the present road system is one primarily developed after 1957, presumably for haul roads for logging activities.

While the single most important tool in reconstructing Euroamerican settlement is the study of cartographic resources (especially nineteenth-century maps), historical archaeologists are aware of the flaw of relying too heavily on this single source of evidence. In the 1850s and 1870s, wall maps and atlases were published for most Maine Counties (e. g., Walling 1860; Colby 1881). These atlases provide data on settlement patterns of the second half of the nineteenth century but do not include abandoned sites from earlier periods of occupation, especially those of seventeenth-century forts and trading posts, as described in Brain (1995, 1997), Camp (1975), Cranmer (1990); Faulkner and Faulkner (1987, 1994) or the farmsteads, schools, and mills from the eighteenth century, abandoned by the time the nineteenth-century maps were drafted. Ultimately, the very earliest of Maine's Euroamerican archaeological resources may not appear on the nineteenth-century maps consulted for the project. Even using archival data, archaeologists cannot always predict the location of Euroamerican sites without conducting walkover surveys to ground-truth the presence or absence of resources.

In addition to maps, secondary sources were reviewed for pertinent information on early settlement, major industries, potential for hydropower development and the local economic base (e. g., Varney 1881; Wells 1869). Landscape characteristics, including soil types, topography, and slope, can also indicate whether Euroamerican sites may be present or absent. Frontier settlement in rural Maine depended on subsistence farming, so early sites are typically associated with arable land. The converse of this is that swamp or marshlands will probably not be selected for settlement; the disclaimer, however, is that archaeologists must be certain that wetlands are a feature of long standing and that they have not been created recently. Multiple wetlands were created during the construction of railroads in the nineteenth century, and our modern highways continue to create "stranded" wetlands. Sources of potable water are critical components of Euroamerican settlement (as they were for pre-Contact times), and sites may be located near wells, springs, or fresh water rivers.

Likewise, early Euroamerican industries were water-powered, so natural features such as waterfalls were regarded as important landscape features. Land deed research of New England towns will often demonstrate that the first pieces of land bought, sold, and contested were lots with water rights. Water has powered sawmills, gristmills, and other industries in Maine from the 1640s to the present day. Where the project area intersects sources of hydropower (as compiled by Wells 1869), IAC inspected the area to see if millworks were present.

Background Research/Information Sources

The initial phase of archaeological investigation (Phase 0 sensitivity assessment) provides the information required to stratify the project into ranked zones of Euroamerican archaeological sensitivity. This sensitivity is defined as the likelihood for Euroamerican cultural resources to be present within project area boundaries based on different categories of information. The following methodology was utilized to complete the archaeological resources assessment:

- identification of known Euroamerican sites through background research and MHPC site file searches; data pertaining to the known sites, including their locational, functional, and temporal characteristics, were reviewed where applicable;
- review of recent cultural resource management (CRM) surveys performed in the towns and townships where the transmission corridor traverses and
- review of primary and secondary historic information (e.g., maps, atlases, town histories) to learn of areas where sites were potentially located.

Assessing the potential for the presence of cultural resources begins with the examination of primary and secondary documentary sources: written and cartographic documents relating both to past and present environmental conditions and to Euroamerican resources in or close to the project area. This background data assists in the formulation of predictive models or statements about the project area and is an integral part of any assessment. Variables within each category of background data are used to define the overall archaeological and historical context of the project area.

MHPC maintains an archaeological site file database recording the location and relevant information of each recorded Euroamerican site. Persons who are historic archaeologists certified by the State of Maine have access to this database. Dr. Wheeler checked the site file records for the project area and found no sites recorded for the township T16 MD.

Included in the MHPC files are CRM reports from CRM projects and Maine municipalities under the Maine SHPO Certified Local Government program. Based on the principal investigator's experience on similar projects in Maine, Dr. Wheeler checks CRM survey reports that might be germane to the research goals and needs of this project.

In addition to identifying known sites within a project APE, the sensitivity assessment seeks to predict the location of sites not currently known. For the Euroamerican time period, written records, maps, and photographs are valuable research tools in assessing where sites may have once been in a project area. Using maps, town histories, oral history, photographs, the historic archaeologist attempts to reconstruct settlement patterns for times past. These settlement patterns are compared with present-day layouts of roads, houses, schools, and farms, to see which of the past resources are absent from the present landscape. If resources appear to absent from the present landscape, then these might be as yet undiscovered archaeological resources.

The MHPC curates a complete collection of mid-nineteenth century wall maps for each Maine County in existence at that time. These maps, as well as the county atlas from 1881 (Halfpenny and Stuart 1881), were consulted to predict the possible location of resources (e. g., homesteads, farmsteads, and mills) in the project area. Secondary sources at the Maine State Library and Maine State Archives provided background context for each town.

Walkover Survey/Site Inspection

Using the results of archival research, the archaeologists compiled a list of locations where nineteenth-century maps and atlases indicate dwellings, farms, or other Euroamerican resources. This list forms the basis for walkover survey strategy and was the primary guide for archaeological inspection.

Since Euroamerican sensitivity can be briefly described as all areas along roadways or other transportation corridors, Dr. Wheeler drove the network of dirt roads in the project area. In areas of former settlement, she stopped the vehicle and examined the road frontage for the presence of stone walls, cellarholes, stone-lined wells, or surface artifacts. None was detected during the walkover survey conducted by Wheeler on May 25, 2010.

EUROAMERICAN CULTURAL CONTEXT

The settlement history of the township of T16 MD in Hancock County is fairly unremarkable. Although the town was laid out in lots (Figure 2), development did not come until the second quarter of the twentieth century (Figure 3). The first settlement was in the second half of the twentieth century, and these were small, isolated homesteads (Figure 4). Two such homesteads are shown along the access road for the Bull Hill Wind Project, but these were not identified in the field. With the width of the access road constrained to 5 m (16 ft), it is unlikely that if cellarholes are along the access road, they will not be affected.

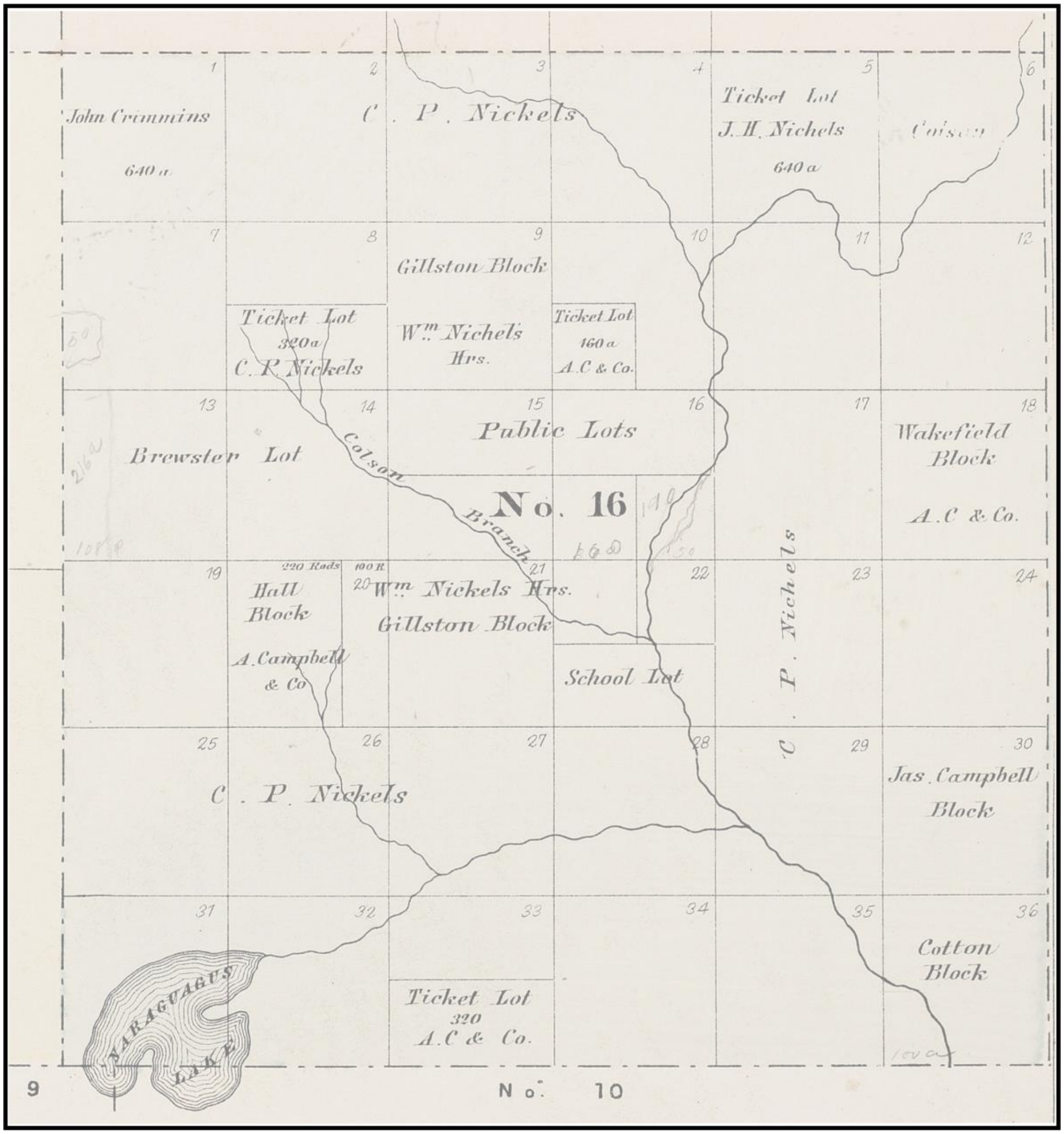

Figure 2. T16 MD in 1881, with no roads or settlement (after Colby 1881).

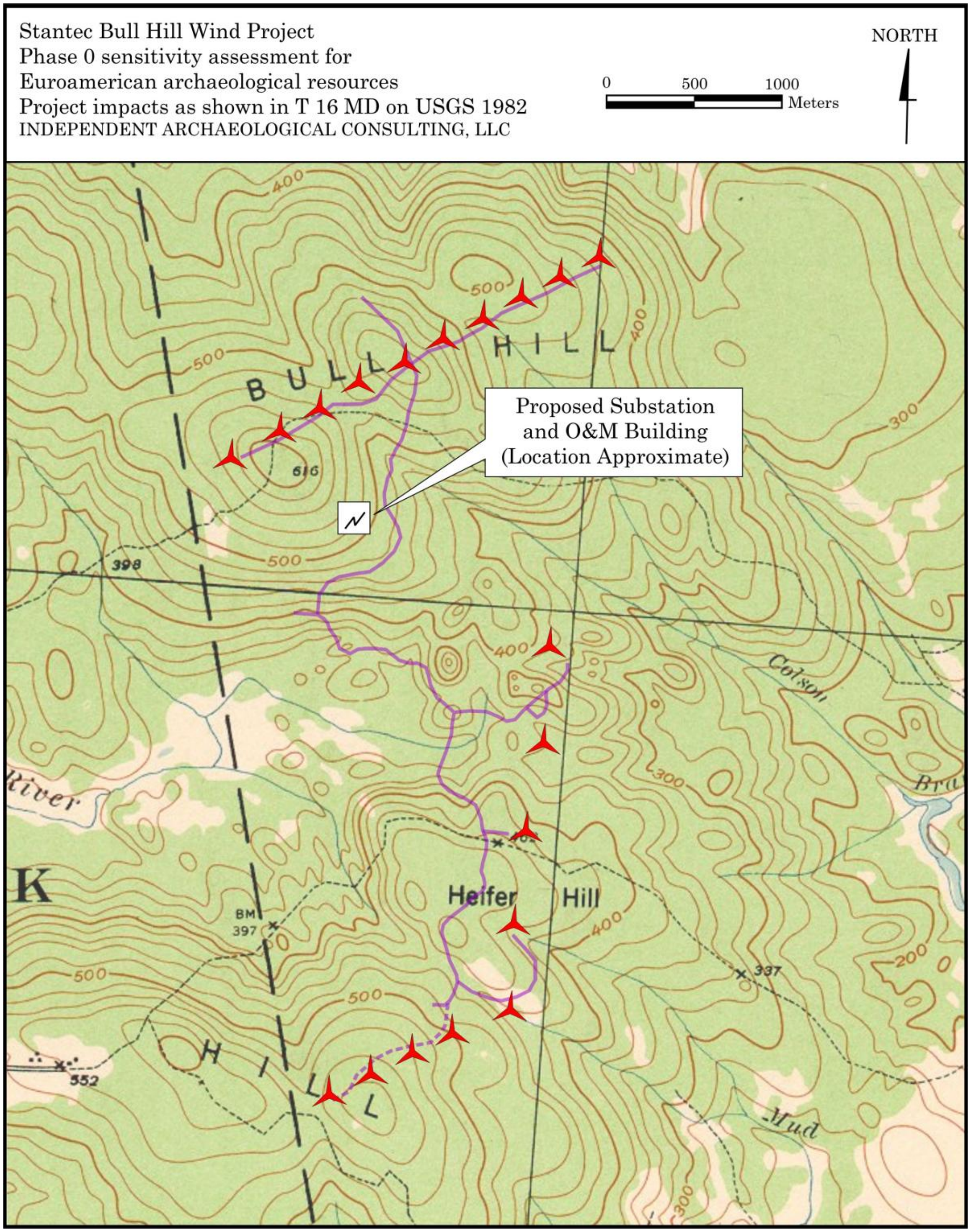

Figure 3. Project impacts shown on 1942 USGS map, which shows roads but no occupation.

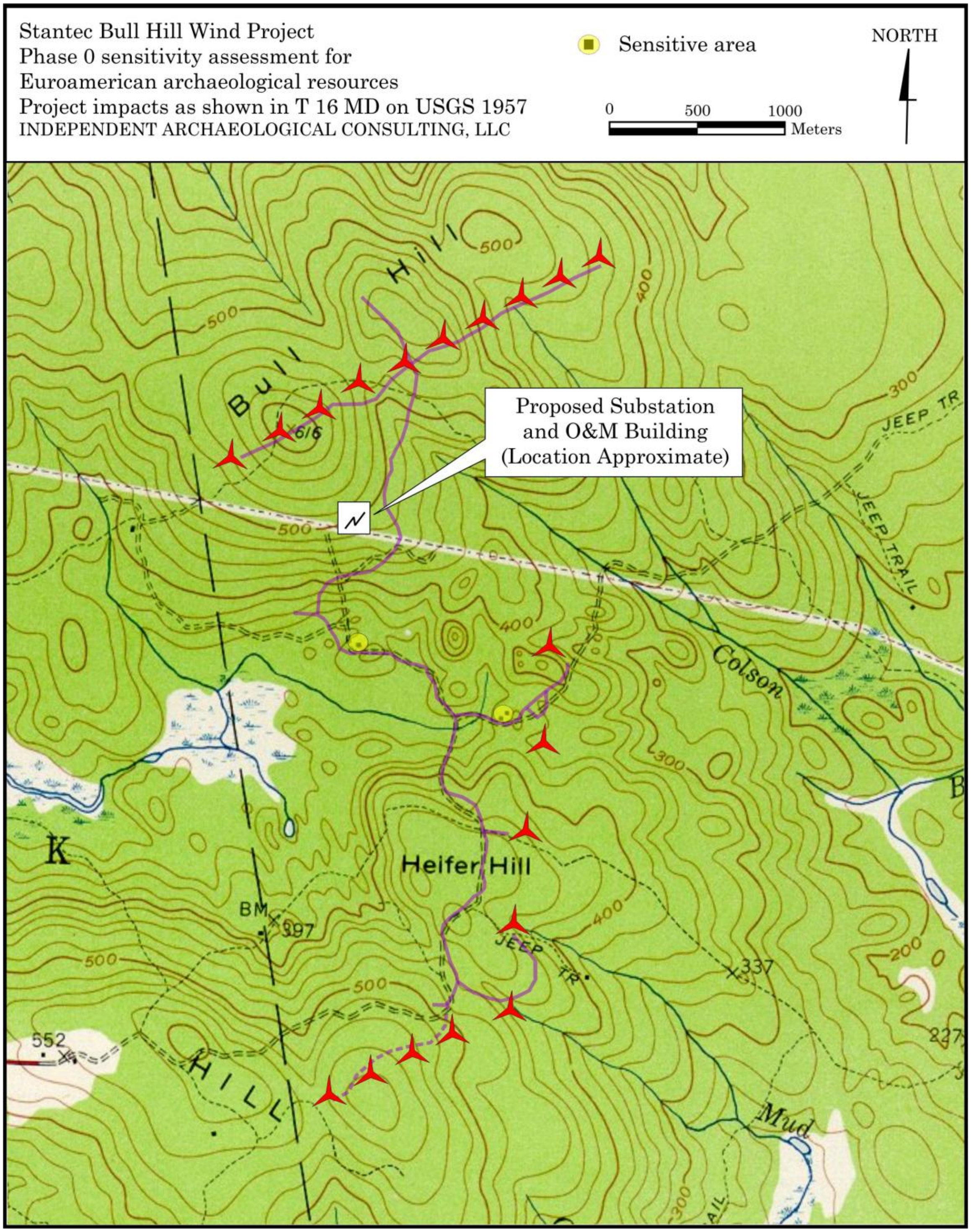

Figure 4. Project impacts shown on 1957 USGS map, which shows sparse occupation.

RECOMMENDATIONS FOR FURTHER ARCHAEOLOGICAL SURVEY FOR BULL HILL WIND PROJECT

IAC found no evidence of historic Euroamerican occupation within the APE for the Bull Hill Wind Project. Site locations were predicted through the use of nineteenth- and early-twentieth-century map resources and through walkover survey of existing and former roads, as portrayed on the 1957 and 1982 USGS maps. The site predictive model and pedestrian survey resulted in the discovery of no new sites in T16, primarily because the township was developed only in the early twentieth century, and settlement remains sparse following its onset during the second half of the twentieth century. Because no Euroamerican resources were identified through the archival research and site inspection, we recommend no further archaeological survey for the Bull Hill Wind Project.

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Results of Phase IA Precontact Archaeological Survey of Proposed Bull Hill Wind Project, Hancock County, Maine

Prepared by

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TRC Environmental Corporation
71 Oak Street
Ellsworth, Maine

October 18, 2010

Introduction

The Bull Hill Wind Project is a 19 turbine wind power project proposed by Blue Sky East, LLC for Bull Hill and Heifer Hill ridges in T16 MD, Hancock County (Figures 1 and 2). The proposed turbines are Vestas V100 machines with a 1.8 megawatt (MW) rated power, a 95m tower and 100m rotor diameter. Total height with blades fully extended would be approximately 145m. The Project will also include two 80m lattice type permanent meteorological towers.

Power from each turbine will be collected in an underground 34.5 kilovolt (kV) collection system and flow to a new substation and Operations and Maintenance (O&M) facility located centrally in the project area. The substation will “step up” the power to 115 kV and transmit it directly to Bangor Hydro Electric’s Line 66. By locating the substation directly adjacent to Line 66, no 115 kV transmission line will be necessary for the project.

The entire Township of T16 MD is designated as expedited for permitting. The project area is low elevation commercial forest, with a substantial road system that the Project will utilize to the extent practicable. Ridge elevations are between 137 and 206 m above sea level.

The project area is owned by one landowner. There is a network of existing haul roads and several gravel pits used for previous road construction. Existing roads will be utilized to the greatest extent possible and on-site gravel pits will not exceed five acres.

Methods for Precontact Period Review

Archaeological study is dependent on information regarding placement of Project features and it is a cumulative activity for which each step or phase is dependent on completion of the prior task. The Phase IA study for this Project involved: review of various maps including topographic, geologic, soil, and 20th-century USGS maps; review of archaeological information (including archaeological reports) relevant to the project area that is maintained at the Maine Historic Preservation Commission in Augusta, Maine; assessment of Precontact period archaeological sensitivity of the Project; and determination whether and where additional field work involving subsurface excavation with small hand-tools may be necessary to identify known sites or test for other sites that may be present in sensitive areas. A review of the Precontact period environmental and cultural history is presented first based on a review of the pertinent literature for the area. This is followed by a more site-specific review based on a field visit and review of site-specific map data. The final section makes recommendations concerning the need for additional field study.

Environmental and Cultural History

Locations of Precontact archaeological sites in Maine and elsewhere are predicted on the basis of natural and cultural historical models that incorporate a variety of types of information from several disciplines including anthropology, biology, natural history, and geology. In addition, Maine archaeologists depend to great degree on historical experience to guide assessments of where to look for the archaeological remains of past inhabitants.

Several inter-related types of information inform the initial search for archaeological sites. Because Maine’s Precontact hunting and gathering peoples were dependent on natural resources available for exploitation, information that seeks to characterize the type and distribution of natural resources within a project area is important to an understanding of site location. Choices related to mobility and settlement also were to a great degree influenced by the nature of the environment. For these reasons, archaeologists look to environmental conditions, both as they exist today and as they are thought to have existed in the past, in an attempt to predict archaeological potential for a project area. Finally, data on previous archaeological discoveries in Maine reveal patterns of Precontact site location and distribution. This information is used to help predict the setting and type of sites that have a potential to exist in the project area.

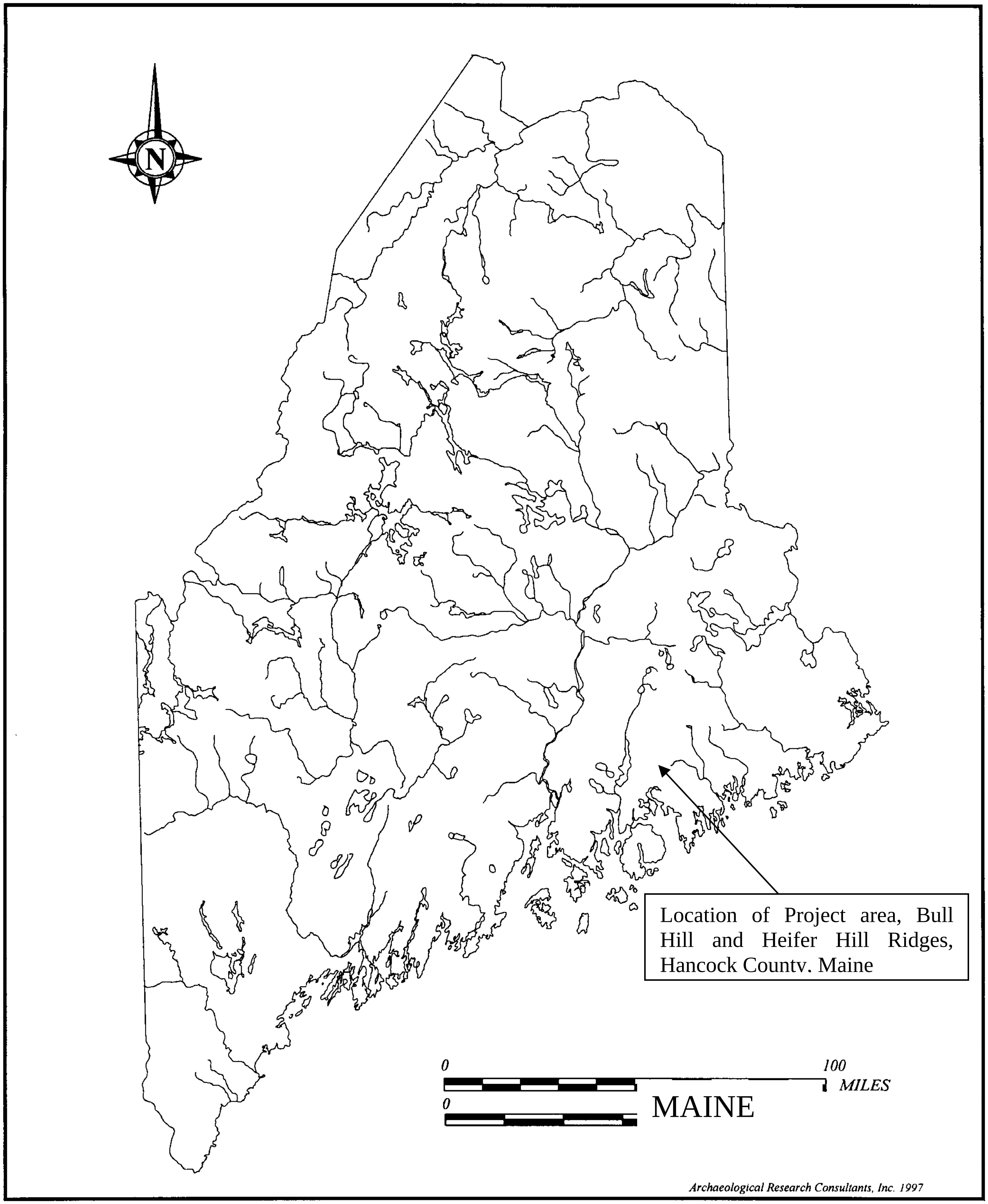

Figure 1. Location of Project, Hancock County, Maine.

Figure 2. Project Showing Project Features.

Environmental Overview

The environmental context of the project area is essentially that of "Downeast" Maine. Variations exist in topography, surficial materials, ground cover, as well as historical cultural development. The maximum elevation of the Project is around 206 m amsl. Surficial features and topography of the area reflect events associated with the Wisconsinan glaciation, the last major glacial advance in the Northeast, and the land surface varies between irregular boulder and cobble-strewn terrain composed of angular till to water-laid features and sediments produced by glacial run-off and meltwater drainage.

Bedrock Geology. Bedrock in the project area owes its origins to events leading up to and during the Acadian Orogeny between 400-360 million years ago. This mountain building period stems from the convergence and subsequent collision of the North American plate with a crustal block of the Eurasian Plate known as Avalonia. The collision caused widespread metamorphism and resulted in large slabs of crust being subducted into the mantle, forming plutons that later intruded into overlying metamorphosed rock. Some of these plutons are exposed on the surface today and can occasionally be noted in Hancock and Washington Counties.

Certain types of bedrock were particularly well suited for use by Native people for the manufacture of stone implements. In Maine, fine-grained, aphanitic rocks of meta-sedimentary and volcanic origin—cherts, felsite, and quartz predominantly—because of their flaking qualities, were used to make flaked stone tools such as projectile points and scraping/processing tools. Another class of tools, manufactured through a combination of flaking, pecking, and grinding, were typically manufactured from other rock types, including basalt, slate, and phyllite. Little Bull Hill, Bull Hill, Heifer Hill, and Beech Knoll do not have exposed rock outcrops, but are all underlain by Devonian Pelite (Osberg et. al. 1985). This semi metamorphosed sedimentary rock was observed in places along the roadside during a field visit to the project area, but none of it could have been used for making stone tools.

Surficial Geology. During the last glaciation of the Pleistocene, the Laurentian Ice Sheet (LIS) flowed south-southeast across the present coastline to reach a terminal position in the Gulf of Maine at Georges Bank some 18,000 to 20,000 years B.P. (Hughes et al. 1985). At that time, the project area was depressed under an enormous weight of ice. As the ice retreated across the landscape, marine waters followed it into the interior of present-day Maine as far north as the town of Lincoln. Fine silt flowing from the ice margin settled as it met calmer marine waters, blanketing coarser glacial deposits in lower elevations and river valleys. These deposits were named the "Presumpscot Formation" by Bloom (1963), and their internal characteristics, fossil assemblages, and chronological relationships with other surficial materials have greatly enhanced understanding of the evolution of the present landscape. Deposits associated with this marine transgression are encountered in the Penobscot River valley and eastward to the coast. Moving east, the silty deposits related to the Presumpscot Formation diminish and till-based silts and outwash sands and gravel predominate. The project area is mapped as till (Borns and Anderson 1982) and this was easily confirmed in road cuts throughout the project area.

Vegetation. Since the retreat of the LIS and subsequent regression of marine waters, vegetation in the project area has undergone a series of changes throughout the Holocene Epoch leading up to and continuing to the present day. These changes occurred as successive, location-specific responses of individual species to changes in the physical environment. These changes, which are described on a regional rather than local scale, are derived primarily from pollen core studies undertaken in the 1980s (Davis and Jacobson [1985]) and are briefly summarized here.

The initial vegetation to colonize the landscape left bare by the LIS consisted of tundra and open woodland species of poplar, spruce, and paper birch. By 12,000 years ago, a closed spruce forest began to form over southern Maine and progressively moved northward. During the early Holocene Epoch (ca. 10,000-7,000 years B.P.), spruce declined dramatically and was replaced predominately by species of pine, as well as oak and birch. Between 8,000-5,000 years ago, pine declined considerably, birch and oak less so, with the emergence of hemlock. With the exception of a short period of decline in hemlock as well as the emergence of beech between 5,000-4,000 years B.P., forests remained relatively unchanged until about 1,500-1,000 years B.P. when spruce and fir show slight increases, perhaps related to a cooling trend.

By the arrival of Europeans in the 17'h century, many of these tree species were already beginning to show decline, particularly hemlock. By the end of the 19th century, vegetation had been significantly modified by human disturbances. These disturbances resulted from numerous activities, namely logging and agriculture. Due to the extensive history of logging in the project area, the character of vegetation today may not well reflect the forest resources that were available to Precontact period people. In general, vegetation in the project area contains a mix of pine, maple, beech, birch, spruce, and fir in variable composition.

Soils. Soil development in the project area is the result of a long, continuous process involving the interaction of a variety of dynamic natural forces. The variability of these forces in the project area is ultimately reflected in the variable types of soils observed. Factors influencing the development are inevitably related to climate, parent material, relief, organic activity, time, and disturbance. Some broad generalizations of soil characteristics observed in the project area are directly related to parent materials and disturbance.

Better drained sediments such as sand, gravel, and some till show typical northern forest soil sequences that display a surface organic mat, overlying albic (leached) and spodic (enriched with sesquioxides) horizons. These horizons are diagnostic of a soil type referred to as "spodosols." Poorer drained materials such as silts, clay, and some till show very little alteration of the parent material and fit a category of soil types known as "entisols."

Precontact Period Archaeological Overview

The Precontact archaeological record of Maine is long and complex dating back more than 11,000 years. The following is an overview of the three major periods that archaeologists use as a framework for identification of Precontact cultural resources discovered in Maine. These three periods are known as the Paleoindian, Archaic, and Ceramic cultural periods (Table 1). Further subdivisions within these periods are based on similarities in artifact forms and cultural adaptations over broad regions (Spiess 1990).

Table 1. Comprehensive planning archaeological study units.

Time Period	Study Unit
11,500 - 10,000 RCYPB	Fluted Point Paleoindian Tradition
10,200 - 9,500 RCYBP	Late Paleoindian Tradition
10,000- 6,000 RCYBP	Early and Middle Archaic Traditions
6,000 - 4,200 RCYBP	Late Archaic: Laurentian Tradition
6,000 - 4,000 RCYBP	Late Archaic: Small-stemmed Point Tradition
4,500 - 3,700 RCYBP	Late Archaic: Moorehead Phase
3,900 - 3,000 RCYBP	Late Archaic: Susquehanna Tradition
3,000 RCYBP – AD 1500	Ceramic Period
AD 1500 – AD 1675	Early Contact
AD 1675 – AD 1760	Late Contact
AD 1760 – AD 1940	Integration with Euro-American Life

Note: RCYBC equals radiocarbon years before present; AD equals calendar years. All dates are estimates. Sources: Spiess (1990:104) and Spiess (pers. comm. 1999).

Paleoindian Period (ca. 11,500-9,500 years ago). The earliest Precontact inhabitants in the region, and throughout North America, are referred to as Paleoindians. Paleoindians are believed to be the first people to migrate into North America and, in their pursuit of large game, rapidly colonized the continent (Martin 1973). The hallmark of Paleoindian peoples is the fluted spear point, which was presumably used to hunt large game species, some of which are now extinct. These spear points are lanceolate in shape and possess a long, groove-like flake scar struck from their base on both faces. In Maine, the Paleoindian period dates from approximately 11,500 to 9,500 years ago when much of the landscape was still vegetated in tundra and/or woodlands. Paleoindian peoples living in the region are characterized as highly mobile hunter and gatherers reliant mainly on caribou that presumably were abundant in the environment of that time (Spiess, Wilson, and Bradley 1998). They crafted their tools out of very fine-grained, colorful rocks obtained from a limited number of sources in the region, and they camped in locations typically removed from present day water bodies (Spiess, Wilson, and Bradley 1998). These locations were rarely occupied during later cultural periods and are often strategically located above some form of low-lying terrain that may have been suitable habitat for caribou and other game animals. Their campsites are typically indicative of short-term habitations by small groups, perhaps in some cases by even a single, extended family.

The end of the Paleoindian period, and subsequent transition into the Early Archaic period, is poorly understood. Some evidence indicates that during the later Paleoindian period, fluted spear points became less desirable and were replaced by smaller, unfluted points. Other point styles also emerge in the region, most notable of which are long, slender, lanceolate points with a distinctive parallel flaking technology (Doyle et al. 1985; Cox and Petersen 1997; Will and Moore 2002). These cultural changes coincide with the transformation of the forests from more open, woodland environments to closed forests. By the Early Archaic period, the archaeological record contains a dramatically different material culture than recovered from sites dating to the preceding Paleoindian period.

Archaic Period (ca. 9,500-3,000 years ago). The Archaic period represents the longest cultural period in the region, spanning around 6,500 years. This time frame is indicative of persistent cultural adaptations, as inferred from artifact assemblages, which lasted over several millennia. Although Early and Middle Archaic populations probably continued a nomadic hunter and gatherer lifestyle, their subsistence and settlement patterns were different than those of the Paleoindians. This is suggested by the location of most Early and Middle Archaic sites along present day water bodies, and the presence of food remains of aquatic species, particularly beaver, muskrat, and fish.

Archaeological assemblages dating to the Early and Middle Archaic periods in Maine are different than their Paleoindian predecessors, and somewhat unique to the Maine region, particularly with respect to the Early Archaic. Tools were typically made from local stone, often collected in cobble form, and assemblages lack the finely crafted, chipped stone spear points of the Paleoindian period. Rather, flakes and crudely fashioned unifacial tools dominate the assemblages. In addition, a new technology using pecking and grinding techniques appears for the first time in the archaeological record (Robinson 1992). This new technology produced a suite of groundstone tools that became more elaborate through time. By the Middle Archaic, chipped stone spear points become increasingly more abundant and the first cemetery sites occur. These cemetery sites reveal mortuary practices that included the sprinkling of graves with red ochre, and the offering of grave goods, such as wood working gouges, slate spear points, and stone rods (Moorehead 1922; Robinson 1992). This component, commonly referred to as the "Red Paint People," sites dating to their tradition are best know from Maine east of the Kennebec River.

The close of the Late Archaic period is characterized by another archaeological tradition known as the Susquehanna tradition (Sanger 1979; Borstal 1982; Bourque 1995). It is widespread in Maine and New England. The people of the Susquehanna Tradition appear to have been more focused on a terrestrial economy than a marine economy. They largely abandoned the use of red ochre in their graves, and often cremated their corpses rather than buried them intact. Diagnostic tool forms include large, broad-bladed chipped stone spear points.

The relationships between the perceived Late Archaic cultural groups continue to be a source of debate among Maine archaeologists. At the root of the argument is whether the various archaeological assemblages of the Late Archaic reflect local, long-term cultural adaptation or movement of people into the region, bringing with them a different culture and way of life. Whatever the origins of the cultural changes observed, they again roughly coincide with increasing changes in the environment that provided more favorable habitat for deer populations, and possibly other more modern species as well.

Ceramic Period (ca. 3,000-450 years ago). The introduction of pottery manufacture and use in Maine defines the onset of what Maine archaeologists call the Ceramic period (Sanger 1979). In other parts of the Northeast, this cultural period is referred to as the Woodland period. The differences between these two terms is mainly that hunting and gathering for food remained the primary means of subsistence throughout much of Maine and the Maritimes, while a reliance on horticulture and a tendency toward larger, more permanent settlements developed in other regions during the same time period. Ceramics first appear in the archaeological record of Maine around 3,000 years ago and they persist until contact with Europeans when clay pots were replaced in favor of iron and copper kettles that were traded for beaver pelts and other animal furs.

Ceramic period sites are abundant in Maine, along both the coast and in the Maine interior (Sanger 1979). Along the coast, they are most visible in the form of shell middens, which have attracted the attention of professional and amateur archaeologists since the late 19th century (e.g., Mercer 1897). Shell midden sites are found all along the Maine coast and contain discarded shells of clams, oysters, mussels, and quahogs, bones of both terrestrial and marine animals, as well as broken pottery sherds and discarded stone and bone tools. Sites in the interior are most common along waterways, ponds, and lakes (Sanger 1979). Assemblages from the interior differ from coastal sites in that the bone assemblages are poorly represented due to differences in preservation. The picture that emerges from Ceramic period sites is one showing a long-standing cultural adaptation to the diversified use of local resources. In addition, the nature of artifact forms present and certain types of stone recovered from Ceramic period sites indicate trade and communication with peoples to the far north, south, and west. By the end of the period, historical and archaeological evidence suggests horticulture was practiced in southern Maine. The Ceramic period ends with European contact around 450 years ago. At this time, most of the artifacts attributable to Precontact inhabitants of Maine disappear from the archaeological record so that tracing specific cultural connections between present-day Maine Indians and their Precontact ancestors is not possible.

Summary. Maine has a rich and varied cultural history dating back more than 11,000 years ago. Although archaeology can only provide glimpses into the past, sites dating to the Paleoindian, Archaic, and Ceramic periods document that people lived in a wide variety of environments through time and were very successful in adapting to environmental change as it has occurred throughout the Holocene Epoch. Our knowledge of Main's past people using archaeology is further complicated by the fact that survey coverage for the state is very uneven. Some places, like the coast of Maine, have received archaeological attention for more that 150 years, while interior areas have received the majority of attention during the last 30 years as a consequence of cultural resources management studies. A review of the Precontact period archaeological site files at the Maine Historic Preservation Commission in Augusta shows that there are no known sites in the project area or nearby.

Field Inspection

The project area was visited by Richard Will on October 11, 2010. It was accessed off the Molasses Pond Road, which terminates into a network of gravel roads. This road network permitted access to most of the project features including the proposed substation and O&M building location, and turbine locations. Although the project area is near several small brooks (e.g., Garden Eden Brook, Colson Brook, and Clark Meadow Brook), none of these is considered archaeological sensitive for Precontact period sites based on the observations that they are too small for canoe transport and they do not have level banks on which people could have camped. Other aspects of the desktop review were also confirmed, such as the presence of till, the types of vegetation, and the general topographic setting. As previously mentioned, some pieces of rock were collected and worked to determine their suitability for making stone tools. None of them produced a conchoidal fracture pattern when struck, and none of them would have been suitable for stone tool production based on Richard Will's experience making chipped and groundstone implements.

Archaeological Assessment and Conclusion

Information presented above was gathered from a variety of sources including review of relevant literature and maps, search of state archaeological site files, and fieldwork. It suggests several conclusions. First, water proximity is a key variable for predicting site locations. In fact, 95% of all Precontact period sites in Maine are located adjacent to water (Spiess 1994). Although there are some very small streams and brooks in the project area, none is navigable by canoe and none has banks with level surfaces that could have been used for camping. Second, although we cannot predict with any degree of accuracy what types of organic resources may have been available in the project area in the past (i.e., plant foods, animal food, medicinal plants), it is possible to check for highly valued inorganic materials, such as suitable stone for tool making. None is available in the project area. Third, although the proximity of other sites is not necessarily a good predictor of the presence of other sites, their presence oftentimes indicates that valuable resources must have been nearby. There are no reported sites from the area. In addition, Richard Will knows many of the artifact collectors in the greater Ellsworth, Maine area, and none has ever reported to him collecting artifacts from the Eastbrook area.

Based on review of these variables, water proximity, resource availability, and archaeological site proximity, the conclusion is drawn that the proposed Bull Hill Wind Farm Project has low sensitivity for Precontact period archaeological resources. No additional Precontact period archaeological review of this Project is recommended.

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Memo

To:	Brooke Barnes	From:	George Kendrick Certified Professional Geologist
	Stantec Consulting		Stantec Consulting
File:	195600500	Date:	November 11, 2010

Reference: Acid Rock Drainage Assessment
Bull Hill Wind Project, Hancock County, Maine

A desktop analysis of the potential for acid rock drainage was completed for the project. Based on available information in the literature review and from Maine State Geological Survey bedrock geology maps of the area, it was determined that the entire Project area is underlain by Devonian granite associated with the Deblois Pluton Complex (DPC) (Hussey 1967; Osberg 1985; Riley 2004). The DPC occupies an area comprising approximately 120 square miles, and consists of a series of granite plutons that are overlain by extensive glacial deposits (Locke 2000). Few bedrock outcrops are found in the Project area. However, during Stantec field surveys, several extensive boulder fields were observed, particularly along heights of land in the project area. These boulder fields exhibit large weathered granite boulders and subcrop suggestive of the underlying bedrock (Figure 1).

Several granite sub-types have been identified within the DPC (Riley 2004), all of which consist of quartz, potassium feldspar, plagioclase, and biotite, with accessory muscovite and garnet. No sulfide minerals (e.g., pyrite, arsenopyrite) have been reported from any of the granites in the DPC. The various granites differ primarily in mineral grain size and relative proportions of the mineral assemblage, but are otherwise very similar in character. According to Riley (2004), weathering of several of the granite types produces a gray outcrop with rusty-orange patches that are derived from weathered biotite, but no leaching of metals or significant iron staining is reported in the literature within the granite. The mineral assemblages in all of the granites are nonreactive, stable, relatively unmetamorphosed, and unlikely to pose any risk of generating any form of acid rock drainage.

Based on the benign nature of the granites throughout the entire DPC, excavation in the Project area is not anticipated to pose any risk of acid rock drainage or metal contamination.

Figure 1: Weathered granite boulders and subcrop at met tower site.

References:

Hussey, A. 1967. Preliminary Bedrock Geology Map of Maine. Maine Geological Survey Publication.

Locke, Daniel B. 2000, Surficial materials of the Molasses Pond quadrangle, Maine; Maine Geological Survey (Department of Conservation), Open-File Map 00-154.

Osberg,P., A. M. Hussey, and G. Boone. 1985. Bedrock Geologic Map of Maine. Maine Geological Survey Publication.

Riley, Dean R. 2004. Granites, Orogeny, and the Deblois Pluton Complex in Eastern Maine, USA. PhD Thesis, Ohio State University, 2004.

Sound Level Assessment
Blue Sky East, LLC
Bull Hill Wind Project
T16 MD, Hancock County, Maine

January 2011

Prepared for:
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1.0 Introduction

Blue Sky East, LLC (Blue Sky) proposes to construct and operate the Bull Hill Wind Project to be located in Hancock County, Maine. Bull Hill Wind will consist of 19 Vestas V100 1.8 megawatt (MW) wind turbines located on Bull Hill and Heifer Hill ridges in Unorganized Township T16 MD, Maine. The total generating capacity of the proposed Wind Project is 34.2 MW. Bodwell EnviroAcoustics LLC (BEA) assessed sound levels expected to result from construction and operation of Bull Hill Wind.

Like other unorganized territories, Township T16 MD falls under the jurisdiction of the Maine Land Use Regulation Commission (LURC), which has established land use standards for certain developments such as wind energy facilities. Bull Hill Wind is located within an "expedited permitting area" as identified by LURC and defined by 35-A M.R.S.A. Chapter 34-A, Expedited Permitting of Grid-Scale Wind Energy Development. In accordance with special provisions established by 12 M.R.S.A. Section 685-B, a wind energy development (facility) located within the expedited permitting area must comply with noise control regulations established by the Board of Environmental Protection. These regulations were promulgated by the Maine Department of Environmental Protection (DEP) under authority of the Site Location of Development Law(38 MRSA Sections 481 – 490) and identified as Maine DEP Chapter 375.10, Control of Noise. As a result, Maine DEP 375.10 applies to Bull Hill Wind in lieu of Section F.1 Noise of LURC Chapter 10 Land Use Districts and Standards.

The main objective of this Sound Level Assessment is to calculate sound levels expected from full and simultaneous operation of all proposed wind turbines at noise sensitive land uses in the vicinity of Bull Hill Wind. These sound level predictions are compared to applicable sound level limits as set forth in Maine DEP Chapter 375.10. This assessment also includes analysis of certain types of sounds (i.e. short duration repetitive and tonal sounds) and specific provisions of the Maine DEP noise regulation related to these types of sounds. In addition, this Sound Level Assessment provides a protocol for sound level testing of the wind turbines within the first year of operations to confirm the sound level predictions and compliance with Maine DEP noise regulations.

2.0 Environmental Acoustics

The study of environmental acoustics relates to the role that sound (or noise) plays in the environment. Geographically, this is an extremely diverse area of study ranging from wilderness to urban settings and from airborne sound to the underwater sound environment of oceans and lakes. Environmental acoustics is most commonly associated with assessing the noise impact of land-based developments such as wind energy projects. The following subsections provide an overview of acoustic terminology and wind turbine noise.

2.1 Sound and Decibels

Sound is produced by many different sources that generate pressure fluctuations in air that the human ear often has the capability to detect as audible. Sound can also travel through other media such as water or structural components of a building. The types of sounds that humans experience every day can generally be divided into two categories, natural and man-made sounds.

There are many types of natural sounds that can be heard by humans. The most common of these are wildlife (e.g. birds, frogs and insects), sounds generated by the forces of wind acting on terrain and vegetation, and sounds generated by water action such as ocean waves, river flow and rain. There are also many man-made sounds generated by industrial, transportation and construction sources as well as sounds generated for the purposes of enjoyment such as music. Residential sounds are also common in many areas and include recreation, yard maintenance, human voices, and amplified music.

The magnitude or loudness of sound waves is measured in units of pressure (pascals) that yield large numbers that are difficult to interpret. For simplicity, the decibel unit or dB was developed to quantify sound pressure levels to reduce the range of numbers. The dB unit represents a ratio of the sound pressure to a standard pressure, usually 20 micropascals. This is a logarithmic ratio similar to the Richter scale for earthquakes so that a small change in sound level expressed in dB represents a larger change in the sound pressure. For example, a 10 dB change in sound level is a tenfold increase in sound pressure. However, this does not mean that the sound is perceived as ten times as loud. A change in sound levels of 3 dB is a doubling of the sound pressure but is considered to be the minimum change that is perceptible to human hearing. A change of 5 dB becomes quite noticeable and an increase of 10 dB is perceived as twice as loud.

The frequency or pitch of sound is expressed in Hertz (Hz) and is the number of sound waves passing a specific point each second, i.e. cycles per second. Frequencies generally considered audible to the human ear range from 20 to 20,000 Hz. Within this range, there are octaves that represent a band of frequencies for purposes of characterizing sound and predicting sound propagation and attenuation. Standard whole octave bands are centered around 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz and 8000 Hz. The center frequency of each octave is double that of the previous octave. Octave bands can be further divided (typically third octaves) and used to determine if a sound source generates an audible pure tone such as a whistle or hum that may be more perceptible than a broad mixture of frequencies. Low frequency sound is generally considered to be at frequencies of 200 Hz and below. Within this range, infrasound has frequencies below 20 Hz and is not usually considered audible to humans except at very high decibel levels.

Sound levels in frequencies ranging from 500 to 2500 Hz are more audible to humans compared with frequencies below 100 Hz. Consequently, the A-weighting scale was developed to measure sound levels in units of dBA to simulate the hearing response of humans. Under this weighting system, the sound pressure level at low frequencies is reduced based on its audibility to humans. The linear (no weighting) and C-weighting scales are often used to determine the relative contribution of low frequency sounds during a sound measurement. These low frequency sounds may not be audible to humans hence the use and wide acceptance of the A-weighting network. Figure 1 provides a graph that shows the reduction by frequency for A- and C-weighting scales.

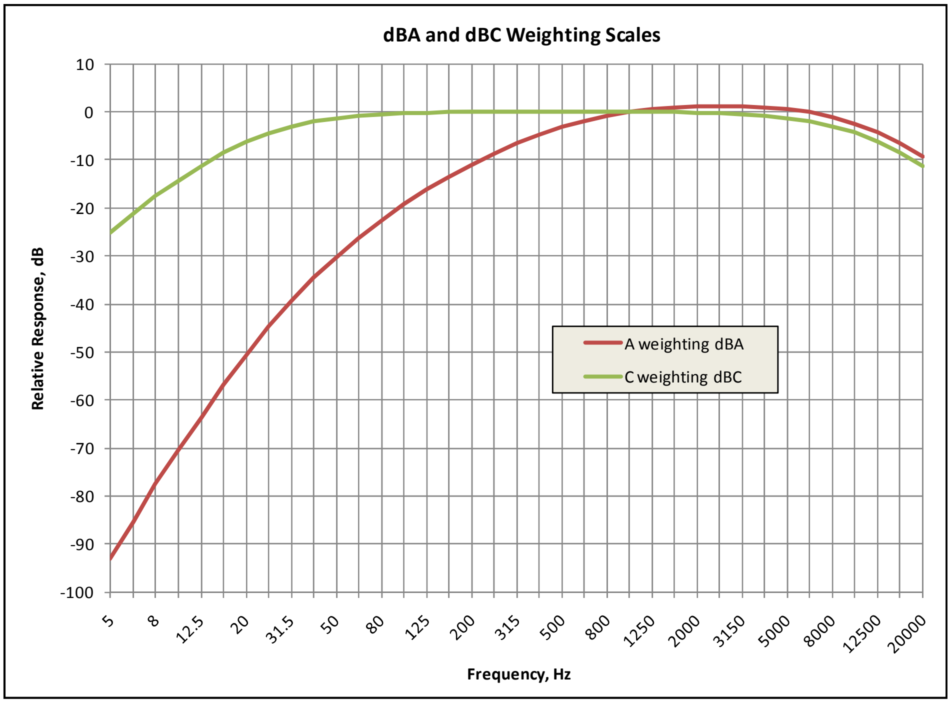


Figure 1. Weighting Curves for dBA and dBC Sound Levels

Sound level measurements are also time-weighted to represent the certain parameters or timeframes of interest or identify short duration events. The most common time weightings are "Fast" and "Slow". Fast-time weighting is based on 1/8-second intervals and is useful for determining rapid changes in sound levels. The slow-time weighting integrates the measured sound levels over a one-second period that reduces the rapid fluctuations for ease of observation.

Similar to size and period of ocean waves, sound waves can vary considerably in amplitude and frequency. When using a fast-time weighting, a sound level meter will measure a sound pressure level every 1/8 of second which results in 480 measurements each minute and 28,800 measurements in an hour. Because it would be nearly impossible to evaluate over 28,000 measurements per hour, numerous statistical parameters have been developed for use in quantifying long-term sound level measurements. The most common is the A-weighted equivalent sound level or LAeq, which represents the time-varying sound level as a single dBA level by effectively spreading the sound energy across the entire measurement period. Other common parameters are percentile levels that represent the percentage of time that a specific sound level was exceeded. For example, the LA10 provides the sound level that was exceeded 10% of the time during the measurement period. This means that 10% of the measured sound levels were higher and 90% were lower than the measured LA10. Other commonly used percentiles include the LA50 or median sound level and the LA90 for which 90% of the measured sound levels are higher. The LA90 is often referred to as the background sound level as it eliminates most fluctuations from short term sound events such as aircraft flights and wind gusts. Figure 2 presents a graph that shows the measured sound pressure levels and the resulting equivalent (LAeq), LA10 and LA90 sound level parameters.

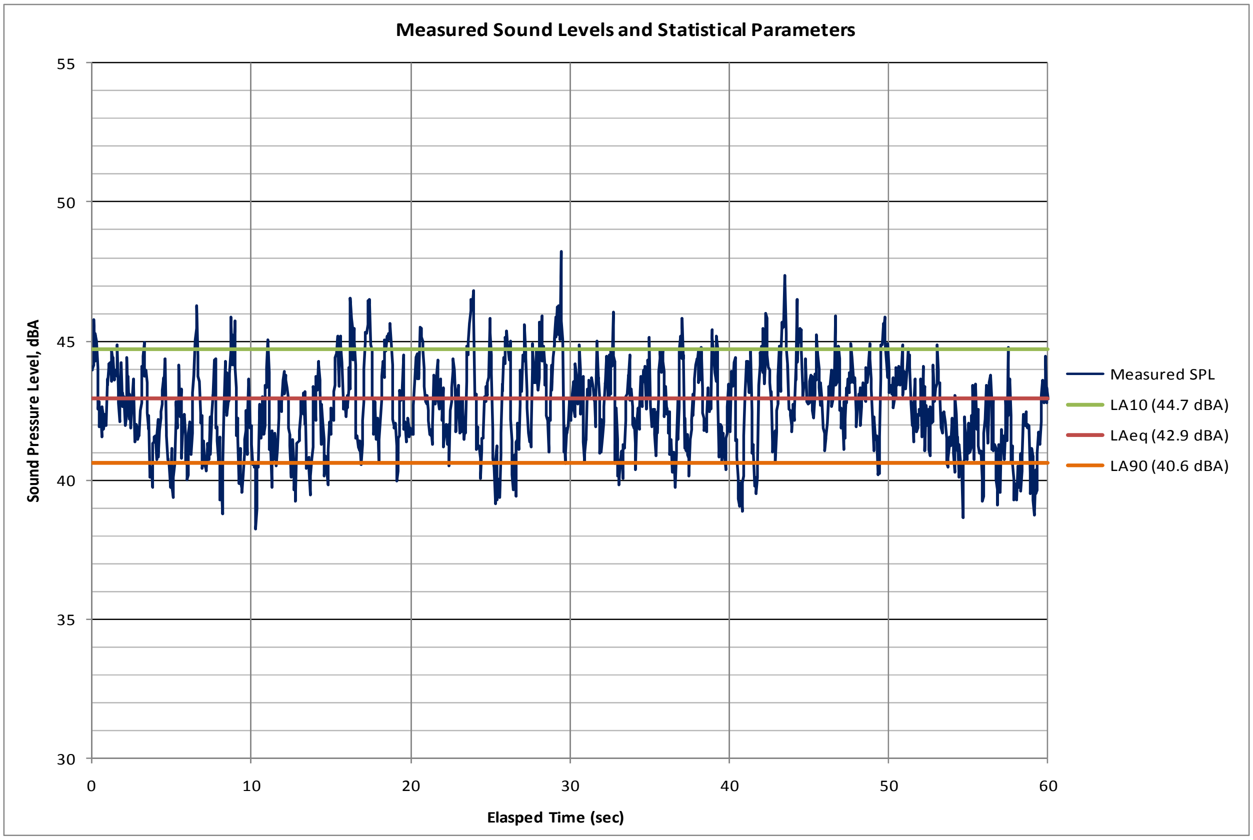


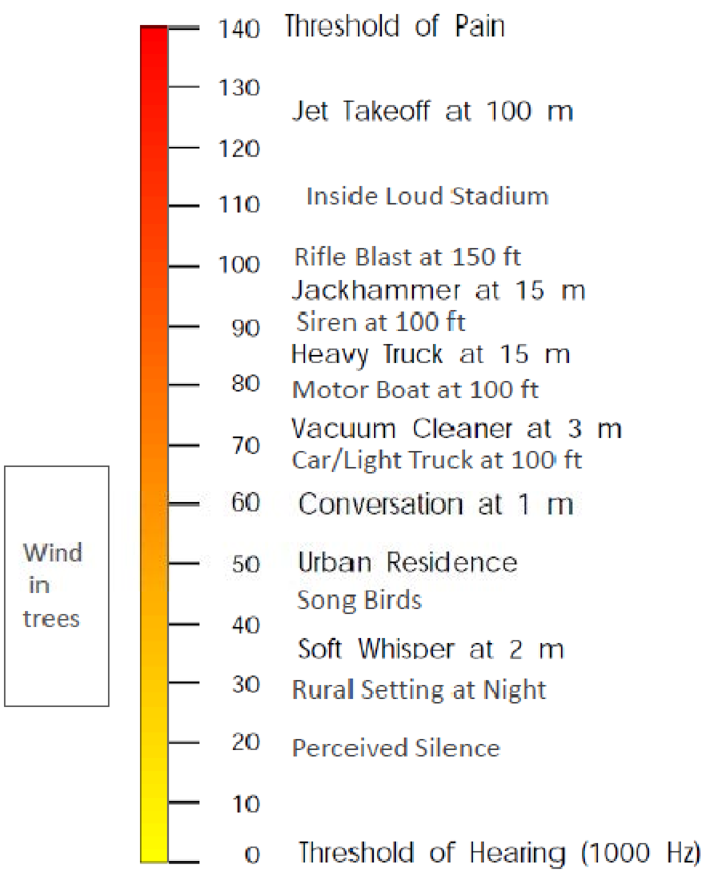
Figure 2. Measured Sound Pressure Levels and Statistical Parameters

For purposes of quantifying industrial and other man-made sound sources, the term “sound power level” is used. The unit of sound power level is watts and the term is commonly expressed as Lw. When applied to sound power, the dB unit represents a logarithmic ratio of the source sound power to a reference sound power (10^{-12} watt). Sound power levels are determined by measuring the sound pressure level from a source at a specific distance and calculating the sound attenuation between the source and measurement location. This provides a mechanism for ranking and quantifying noise sources, such as wind turbines, in a consistent and standardized manner. The sound power level cannot be measured directly and can be a source of confusion to the public in understanding the sound pressure levels that will result at community locations.

The combination of all existing sound sources, natural and man-made, at a specific location or in a community, is known as the ambient sound environment or soundscape. The amplitude and characteristics of the soundscape vary significantly depending on the amount of industrial and residential development, proximity to transportation uses such as highways and airports, and the presence of natural sounds such as wind, flowing water, and wildlife. In general, the more rural or undeveloped an area is, the lower the ambient sound levels will be. Ambient sound levels are usually higher during daytime hours than at night due to more traffic and human activity, higher wind speeds and other natural sounds during the day. At night, these daytime sources typically diminish and sound levels are reduced with the exception of strong winds or rain occurring during the overnight period.

Noise is generally defined as unwanted sound. The perception of noise as an unwanted sound can vary significantly by individual and preferences concerning types of sound. A simple example of this is music. One person may enjoy a certain type of music that another may find extremely annoying. Some individuals find enjoyment and solitude in listening to natural sounds or the nighttime quiet of a rural area while others have little interest in such soundscapes.

The character of sound is determined by its loudness or amplitude and its pitch or frequency. Humans can detect a wide range of sound level amplitudes and frequencies as audible but are more sensitive to a specific range of frequencies. Consequently, the perceived loudness of sound also depends not only on its amplitude but on its frequency characteristics as well. For example, the sound of birds, frogs or flowing water is often perceived as quieter than man-made sounds at the same amplitude. The sound levels associated with some common noise sources and sound environments is presented as Figure 3.



Source:
www.mvn.usace.army.mil/ss/osha600/s600/refer/menu14c.pdf

Revised by Bodwell EnviroAcoustics

Figure 3. Typical A-Weighted Sound Levels

2.2 Outdoor Sound Propagation

Sound travels through air at a speed of approximately 1168 feet per second or 796 miles per hour. Thus it takes just over two seconds for a sound wave to travel a half mile. The number of sound waves that travel past a given point in one second is determined by its frequency or pitch. The sound pressure level decreases or attenuates as sound spreads out and travels over distance through the air. Attenuation results from distance, atmospheric absorption, and terrain effects. The rate of attenuation due to distance or spreading of the sound wave (i.e. divergence) is the same for all frequencies, which is approximately 6 dB per doubling of distance from a simple point source.

For an elevated point source, sound will radiate into a full sphere; a condition known as the free field. Once the sound reaches the ground it will spread in a hemispherical pattern resulting in a sound level that is 3 dB higher at a given distance when compared to spherical spreading. Table 1 provides the sound pressure level at various distances for hemispherical propagation of sound from a point source having a sound power level of 106 dBA. This relationship is shown graphically in Figure 4. The sound level reduction in Table 1 and Figure 4 is due only to distance and does not include attenuation from atmospheric absorption and foliage or reflection from hard surfaces.

Source Sound Power Level (LwA) = 106 dBA	
Distance, Feet	**Sound Pressure Level, dBA**
25	80
50	74
100	68
200	62
400	56
800	50
1600	44
3200	38

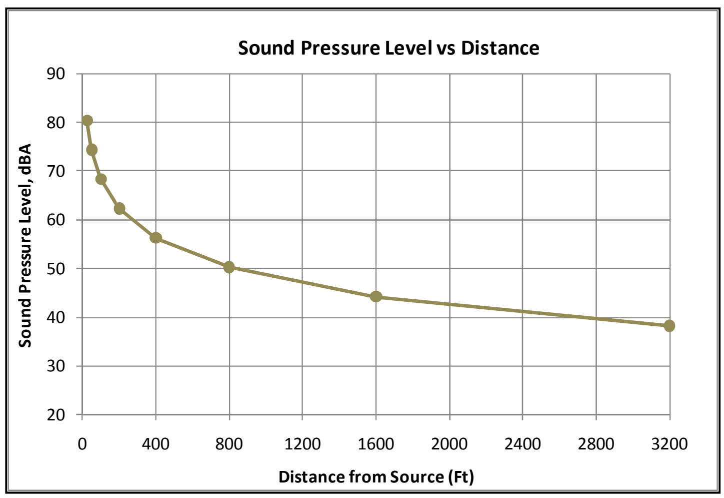


Table 1 & Figure 4. Sound Pressure Levels Resulting from Hemispherical Sound Propagation

Sound energy is absorbed by the atmosphere as it travels through the air. The amount of absorption varies by the frequency of the sound and the temperature and humidity of the air. More sound is absorbed at higher frequencies than at lower frequencies due to the relative wavelengths.

In addition to temperature and humidity, wind speed and direction can affect outdoor sound propagation. When sound travels upwind the sound waves can bend upward creating a "shadow" zone near the ground where sound levels decrease when compared to downwind sound propagation. Wind gradients, temperature inversions and cloud cover can cause refraction or bending of sound waves toward the ground resulting in less sound attenuation from terrain and ground cover over large distances.

Sound attenuation can also result from intervening terrain and certain types of ground cover and vegetation. An example of intervening terrain is a hill or ridge that blocks the horizontal sound path between a sound source and receiver. This same effect can result from buildings and other solid structures such as a sound barrier fence. Sound will also attenuate as it travels over soft ground cover or through vegetation such as trees and shrubs. The amount of ground and foliage attenuation depends on the characteristics of the ground cover and the height and density of vegetation. Conversely, reflective ground or the surface of a water body can cause reflection of sound and less overall attenuation.

When multiple sound sources are present in an area, the sound level contribution from each source must be added to determine of the combined sound level of all sources. Due to logarithmic basis of the dB unit, adding sound levels is different than standard arithmetic. Adding two equal sound sources that each measure 50 dBA at a specific point will result in a combined sound level of 53 dBA. It will then take two more equal sound sources of 50 dBA each, or four total, to cause the sound level to increase by another 3 dBA. Thus, four equal sources at 50 dBA results in a total sound level of 56 dBA.

Specifications for calculating outdoor sound propagation have been developed by international standards organizations as well as individual countries based on empirical data developed over many years. These specifications form the basis for computerized sound level prediction models that allow calculation of outdoor sound propagation through the use of three-dimensional terrain models. The most widely used and accepted standard for calculating outdoor sound propagation is ISO 9613-2 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation. This standard has been applied to accurately calculate the sound levels that result from operation of wind turbines and is the standard applied in this analysis. Further details concerning the sound level prediction model developed for Bull Hill Wind to account for various site and weather conditions can be found in Section 6.2 of this report.

2.3 Wind Turbine Sound

The sources of sound from operation of wind turbines are mechanical noise from gears, motors and cooling equipment in the turbine nacelle and the aerodynamic effects of the rotor blades traveling through the air. When operating at or near full sound output, the primary noise source from a wind turbine is rotation of the rotor blades with more sound energy generated from the outer sections of the blade and blade tip.

An international standard has been developed as IEC 61400-11 *Wind turbine generator systems – Part 11: Acoustic noise measurement techniques* that provides specific and detailed procedures for determining the sound power level from wind turbines. The IEC standard was develop by industry and acoustic experts to establish a consistent and repeatable method with full documentation for determining the sound output of any type of vertical blade wind turbine. Manufacturers of utility-scale wind turbines follow this method to determine the sound output and uncertainty of their turbines for purposes of estimating community sound levels and providing performance guarantees to owners and operators of wind energy facilities.

There has been much advancement in the technology of wind turbines over the last 10 to 20 years. The first generation of utility wind turbines consisted of downwind rotors that were capable of generating significant levels of low frequency sound. Turbines with upwind rotors have replaced the early designs and drastically reduced low frequency sound emissions. Modern wind turbines are known to generate a "whoosh" type sound under certain operating and weather conditions that results from the passage of each blade. A short-term increase in sound levels often occurs on the down-stroke motion of the blade that is referred to as "amplitude modulation" and generally results in sound level fluctuations of 2 to 5 dBA for utility-scale wind turbines with occasional excursions above 6 dBA.[1] Amplitude modulation occurs at a mixture of audible frequencies and should not be confused with low frequency and infrasound.

Sound from wind turbines has been the subject of extensive research, conferences and publications over the past 10 to 15 years. There is considerable technical and other information available that addresses the characteristics, control and impact of sound from wind turbines. There is an abundance of well-researched and informative studies and reports from reputable institutions and individuals.

It is a common assertion that wind turbines generate significant and perhaps harmful levels of infrasound and low frequency sound. In relation to the modern generation of upwind turbines, there is little basis for this claim that can be found in any well-researched and impartial technical studies and literature. In fact, the consensus of the independent research community is that annoyance from wind turbine sound is primarily in the most audible mid to high frequencies and not from infrasound or low frequency sound.[2]

2.4 Noise Impact and Regulation

The noise impact that results from wind turbines depends on several factors, notably the change or increase in ambient or background sound levels that will result from turbine operation. For rural areas where hill or ridge top wind turbines are located, the ambient sound level at lower elevations and community locations varies by time of day and to some degree by season. Sound levels from wind turbines vary based on the wind speed and turbulence at the turbine hub and can range from no sound output during calm winds to full sound output when winds at the turbine hub reach approximately 20 miles per hour. Sound from wind turbines will be most noticeable during stable atmospheric conditions when surface winds are light and the winds aloft (at the turbine hub) remain high enough for full turbine sound output. At other times, when surface winds increase or when wind turbine output diminishes, the sound from operating wind turbines will be less noticeable.

During the planning stages of a wind energy project, considerable effort is made to accurately map land uses and the topography of the entire area potentially impacted by sound from wind turbine operation.

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[1] Observations and analysis of sound level measurements for Mars Hill Wind Farm and Stetson Wind Project, R. S Bodwell, P.E.
G.P. van den Berg, The Sounds of High Winds.

[2] G.P. van den Berg, The Sounds of High Winds.
Danish Electronics, Light and Acoustics (DELTA), Low Frequency Noise from Large Wind Turbines.

Along with wind turbine sound level performance data, this information is used to develop a sound level prediction model for the project. The model inputs and settings are typically adjusted to produce conservative sound level estimates for wind turbine operation. These results are compared to various noise regulations and guidelines to assess the impact of the proposed wind energy project.

The Maine DEP and LURC have adopted separate noise control regulations that may be applied to utility-scale wind energy projects depending on their location and permitting requirements. LURC noise standards are contained in Section F.1 *Noise* of LURC Chapter 10 *Land Use Districts and Standards*. Bull Hill Wind is located within an “expedited permitting area” as identified by LURC. Under Maine statute, a wind energy development within an expedited permitting area is required to meet the requirements of Maine DEP Chapter 375.10 in lieu of LURC noise standards.

The Maine DEP establishes sound level limits for developments as part of its Site Location of Development Law Regulations. The Maine DEP regulation Chapter 375.10 specifies sound level limits based on land use and existing ambient sound levels. For rural areas, the quietest limits of 55 dBA daytime and 45 dBA nighttime for hourly equivalent sound levels (LAeq) usually apply. Maine DEP nighttime limits apply up to 500 feet from a residence on a protected location so that the resulting sound levels at the residence will be below the limit. Beyond 500 feet, the daytime limit applies 24 hours a day. The Maine DEP regulation applies sound level limits on an hourly basis with no averaging over daytime, nighttime or longer periods. There are also special provisions and “penalties” that apply when the sound level generated by a development results in a tonal or short duration repetitive sound. This standard is described in more detail in the remainder of this report.

3.0 Project Description

Bull Hill Wind will consist of 19 wind turbines with ten turbines arranged along Bull Hill Ridge to the north and nine turbines along Heifer Hill Ridge to the south. Ridge elevations are between 450 and 675 feet above sea level. The proposed wind turbines are Vestas Model V100 manufactured by Vestas American Wind Technology, Inc. The Vestas V100 has a rated capacity of 1.8 megawatts (MW), a hub height of 95 meters, and a rotor diameter of 100 meters. The total height with a rotor blade fully extended at the top of the blade rotation is approximately 145 meters (476 feet). Power from each turbine will be collected in an underground 34.5 kilovolt (kV) collection system and flow to a substation and Operations and Maintenance (O&M) facility located centrally in the project area.

The project area is low elevation commercial forest, with a substantial road system that Bull Hill Wind will utilize. Surrounding land uses consist mostly of undeveloped and commercial forestry land with sparse rural residential and seasonal properties. The majority of residential and seasonal properties nearest to the project are located west of the proposed turbines along Sugar Hill Road in the Town of Eastbrook. Figure 5 provides a Project Location Map that shows proposed wind turbines and other facilities in relation to surrounding topography and land uses.

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Legend
Turbine Layout (9-15-10)
Proposed Access Road (9-23-10)

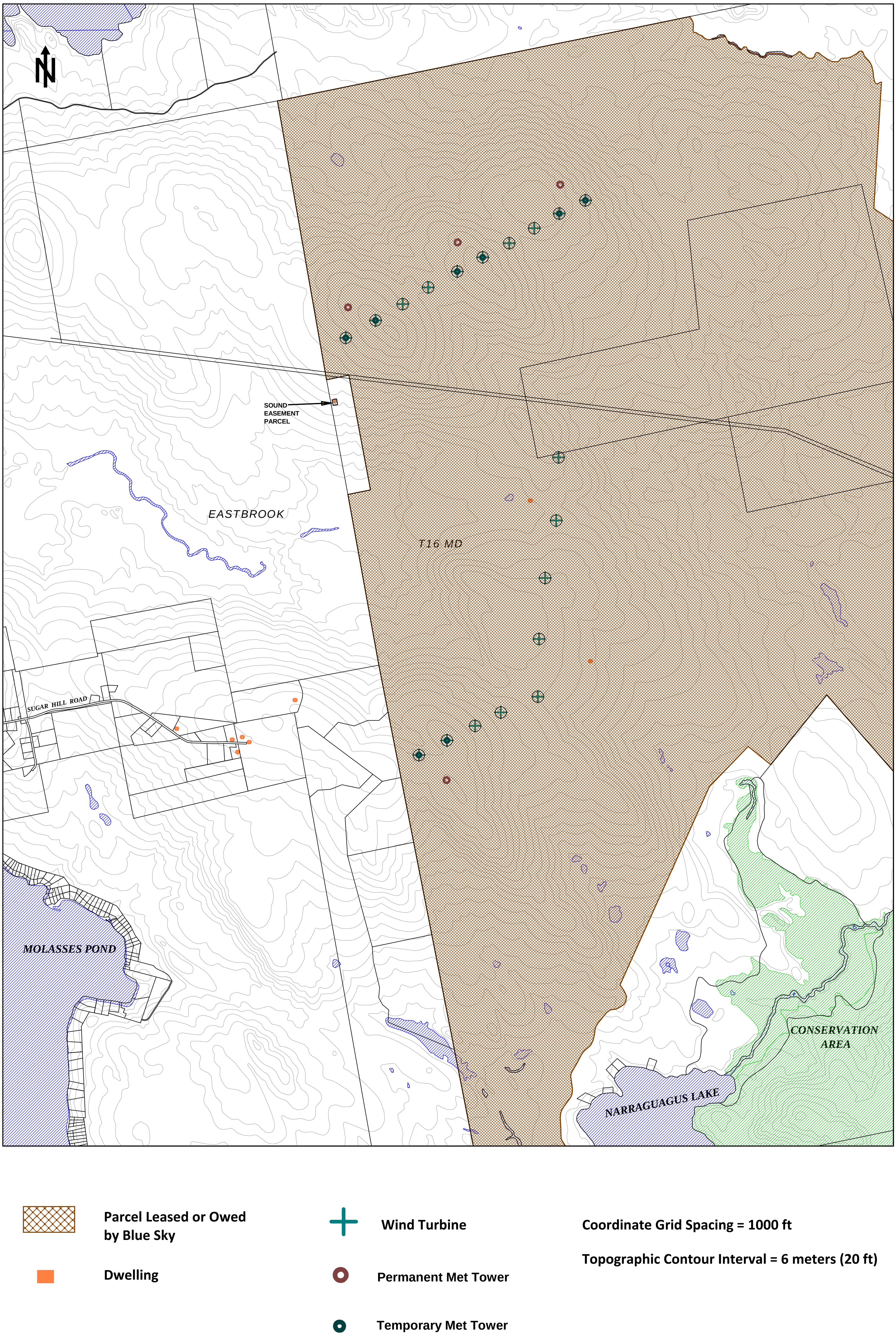
Client/Project
Blue Sky East
Bull Hill Wind Project
T16 MD, Maine

Figure 5
Project Location Map

Blue Sky has obtained leases or other agreements (i.e. sound easement) as necessary with local landowners to install and operate the proposed wind turbines. Excluding properties with a lease or sound easement, there are four dwellings located within one mile of a proposed wind turbine site. These dwellings are all on Sugar Hill Road with the nearest one at a distance of approximately 3,880 feet from the nearest proposed wind turbine. There are several year-round and seasonal dwellings located on Molasses Pond, which at its closest point is approximately 1.9 miles west of the nearest proposed turbine.

Figure 6 provides a map of the proposed wind turbine locations along with parcel and land use information including topographic contours of the study area. Figure 6 depicts the boundary of the area that Blue Sky has leased and also shows a parcel where a required sound easement has been obtained for the proposed turbine operations. As set forth by Maine DEP 375.10, Section C.5.s, a noise (sound) easement exempts the project from Maine DEP noise limits for the specific noise, parcel of land and term covered by the agreement.

Figure 6. Land Uses and Proposed Wind Turbines



4.0 Vestas Wind Turbine Sound Levels

Blue Sky proposes to erect Vestas V100-1.8 MW wind turbines to generate electric power for Bull Hill Wind. The Vestas V100 is a pitch-regulated upwind turbine with a three-blade rotor and a rated capacity of 1.8 megawatts (MW). The turbine operates at variable speeds ranging from 9.3 to 16.6 rpm depending on the wind speed acting on the turbine rotor.

Vestas Wind Systems A/S has provided sound level performance specifications for the proposed wind turbine. The overall sound power levels produced by the V100 range from 94 dBA at low rpm to 105 dBA at full rpm. Table 2 provides octave band sound levels at various wind speeds by octave bands ranging from 16 to 8,000 Hz. The sound power levels are shown graphically in Figure 7.

The sound power levels were derived by Vestas from acoustic testing in accordance with IEC 61400-11 and intended for use in order to calculate the measureable sound pressure levels at nearby community points and protected locations. At full operation the Vestas V100 wind turbine generates a sound power level of 105.0 dBA with an uncertainty of 2.0 dBA.

The values are valid for the following conditions:
Meas. Standard: IEC 61400-11:2002, using amendment procedure above 95% RP
Wind shear:**0.16** Hub Height: **95 m**
Maximum turbulence intensity at 10 meters above ground level: 16%
Inflow angle (vertical): 0 ± 2

Noise Mode 0	Wind Speed @10m [m/s]											
Frequency	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
16Hz [dB(A)]	NaN	46.5	48.5	52.8	56.5	59.2	60.0	61.7	61.7	61.7	61.7	61.7
31.5Hz [dB(A)]	NaN	64.8	67.8	72.2	75.7	76.9	77.4	77.6	77.6	77.6	77.6	77.6
63Hz [dB(A)]	NaN	74.5	77.2	81.7	85.3	86.3	86.7	86.7	86.7	86.7	86.7	86.7
125Hz [dB(A)]	NaN	82.3	86.2	90.9	93.9	94.0	94.1	93.8	93.8	93.8	93.8	93.8
250Hz [dB(A)]	NaN	84.3	87.2	91.7	94.9	95.6	95.9	95.5	95.5	95.5	95.5	95.5
500Hz [dB(A)]	NaN	88.3	91.1	95.5	99.0	99.3	99.5	99.3	99.3	99.3	99.3	99.3
1000Hz [dB(A)]	NaN	88.4	91.4	95.7	99.0	99.4	99.2	99.2	99.2	99.2	99.2	99.2
2000Hz [dB(A)]	NaN	87.4	89.9	93.9	97.1	97.7	97.6	98.1	98.1	98.1	98.1	98.1
4000Hz [dB(A)]	NaN	80.9	83.4	87.4	91.1	92.5	92.1	92.4	92.4	92.4	92.4	92.4
8000Hz [dB(A)]	NaN	65.8	68.6	73.0	75.5	79.4	78.9	79.6	79.6	79.6	79.6	79.6
Spectra Value [dB(A)]	**NaN**	**94**	**96.9**	**101.2**	**104.5**	**105**	**105**	**105**	**105**	**105**	**105**	**105**

Notify: NAN indicates data not available
Disclaimer:
The values are valid for the A-weighted sound power levels
Octave band values must be regarded as informative
Site specific values are not warranted

Table 2. Sound Power Levels for Vestas V100 Wind Turbine

Bodwell EnviroAcoustics LLC
R Scott Bodwell PE

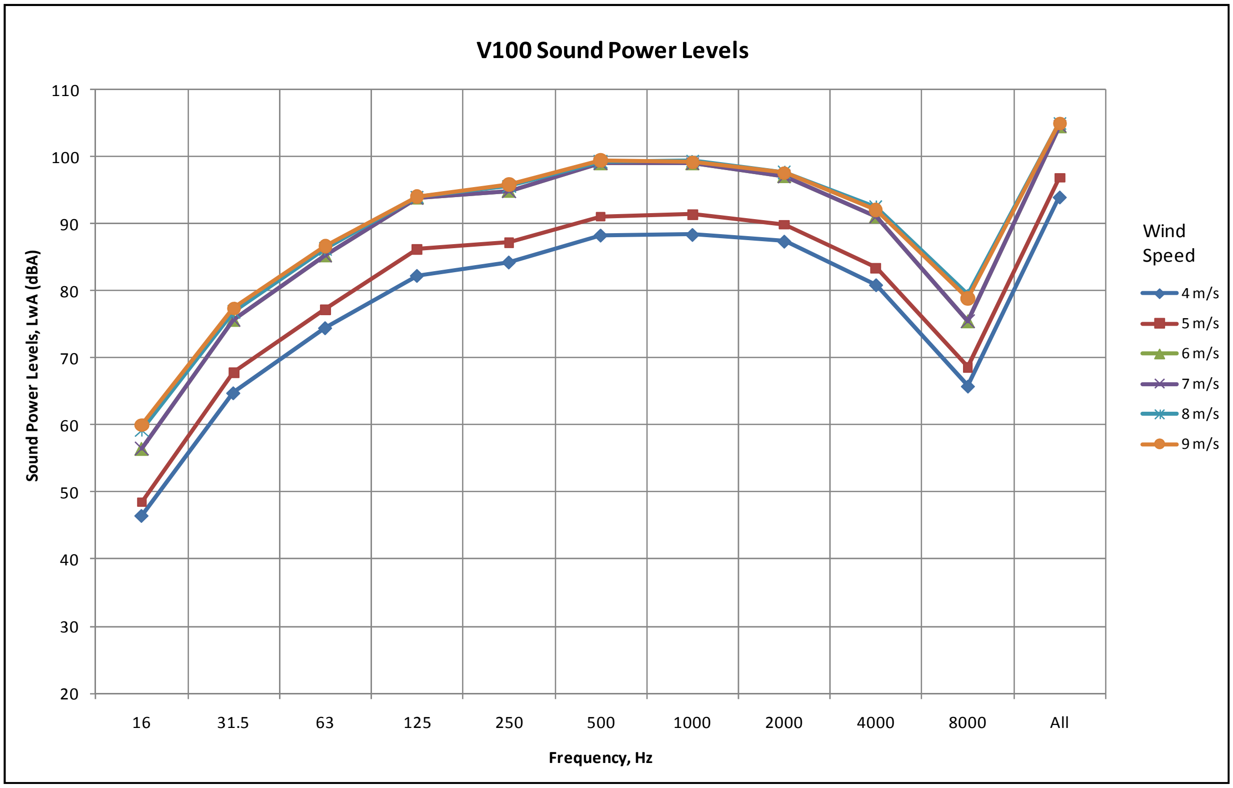


Figure 7. Sound Power Levels for Vestas V100 Wind Turbine for Wind Speeds of 4 to9 meters/second

5.0 Noise Standards and Guidelines

Maine DEP 375.10 establishes hourly sound level limits for wind energy facilities and other developments based on time of day, land use, local zoning and pre-construction sound levels. Although the DEP noise regulation specifies a 75 dBA at the facility property line, the most restrictive limits apply at noise sensitive land uses defined as "protected locations".

A protected location is:

> "any location accessible by foot, on a parcel of land containing a residence or planned residence or approved residential subdivision, house of worship, academic school, college, library, duly licensed hospital or nursing home near the development site at the time a Site Location of Development application is submitted; or any location within a State Park, Baxter State Park, National Park, Historic Area, a nature preserve owned by the Maine or National Audubon Society or the Maine Chapter of the Nature Conservancy, The Appalachian Trail, the Moosehorn National Wildlife Refuge, federally-designated wilderness area, state wilderness area designated by statute (such as the Allagash Wilderness Waterway), or locally-designated passive recreation area; or any location within consolidated public reserve lands designated by rule by the Bureau of Public Lands as a protected location.

> At protected locations more than 500 feet from living and sleeping quarters within the above noted buildings or areas, the daytime hourly sound level limits shall apply regardless of the time of day.
>
> Houses of worship, academic schools, libraries, State and National Parks without camping areas, Historic Areas, nature preserves, the Moosehorn National Wildlife Refuge, federally-designated wilderness areas without camping areas, state wilderness areas designated by statute without camping areas, and locally-designated passive recreation areas without camping areas are considered protected locations only during their regular hours of operation and the daytime hourly sound level limits shall apply regardless of the time of day.
>
> Transient living accommodations are generally not considered protected locations; however, in certain special situations where it is determined by the Board that the health and welfare of the guests and/or the economic viability of the establishment will be unreasonably impacted, the Board may designate certain hotels, motels, campsites and duly licensed campgrounds as protected locations." (ref. MDEP Chapter 375.10 G(16))

Most of the protected locations in areas surrounding proposed turbine sites for Bull Hill Wind are parcels containing a residence. Other protected locations are parcels containing seasonal camps, (including those with sleeping quarters) and conservation land.

Under Maine DEP 375.10, hourly sound level limits at protected locations range from 55 to 70 dBA during daytime hours (7 am to 7 pm) and from 45 to 60 dBA during nighttime hours. The lowest limits of 55 dBA daytime and 45 dBA nighttime apply where existing pre-development sound levels are at or below 45 dBA during the daytime and at or below 35 dBA during the nighttime. Ambient sound level measurements can be taken to demonstrate that existing pre-development sound levels are above these threshold values. In recognition of the rural nature of the project area, Blue Sky has elected to apply the more stringent limits of 55 dBA daytime and 45 dBA nighttime to the Project. The nighttime limit of 45 dBA applies only to those portions of the protected location that are within 500 feet of a residence or other sleeping quarters. At locations greater than 500 feet from the residence or sleeping quarters, the daytime limit applies 24 hours a day. Sound from regular and routine maintenance of the project is subject to the same sound level limits as routine operation.

Maine DEP Chapter 375.10 requires that 5 dBA be added to tonal and short duration repetitive sounds when determining compliance with hourly sound level limits Further details and an assessment of these types of sound for the proposed wind project are presented in Section 6.3 of this report.

Construction during daytime or daylight hours, whichever is longer, is exempt from the Maine DEP sound limits by Maine statute (ref. 38 MRSA 484). Sound from nighttime construction that occurs beyond daytime or daylight hours is subject to the nighttime limits that apply to routine operation. More information concerning construction of the proposed wind project is presented in Section 6.1 of this report.

Sound associated with specific equipment and activities is exempt from Maine DEP noise regulation. Examples that may be associated with the proposed wind project include:

- Registered and inspected vehicles traveling to and from the project
- Forest management, harvesting and transportation
- Snow removal and landscaping
- Emergency maintenance and repairs, warning signals and alarms
- Major concrete pours when started before 3:00 pm
- Sounds from a regulated development received at a protected location when the generator of the sound has been conveyed a noise easement for that location
- A force majeure event and other causes not reasonably within control of the owners or operators of the development

When a development is located in a municipality that has duly enacted a quantifiable noise standard that (1) contains limits that are not higher than the Maine DEP limits by more than five dBA, and (2) limits or addresses the types of sounds regulated by the Maine DEP, the Maine DEP must apply the local standard rather than the Maine DEP standard. When noise produced by a facility is received in another municipality, the Maine DEP will consider the quantifiable noise standards of the other municipality (ref. Maine DEP 375.10.B.1). All of the wind turbines proposed for Bull Hill Wind are located in Township T16 MD, although some sound from construction and operation of Bull Hill Wind will be received in the Town of Eastbrook. Eastbrook has very recently enacted a quantifiable noise standard that by its terms applies to any wind project in the Town of Eastbrook. The applicability of this ordinance to this project in T16 MD is not addressed further in this report.

6.0 Sound Assessment

A sound level prediction model was prepared to calculate the sound levels from operation of the Bull Hill Wind Project. The sound level model for Bull Hill Wind was created using Cadna/A software developed by DataKustik of Germany. Cadna/A provides the platform to construct topographic surface models of area terrain for calculating sound attenuation from multiple sound sources such as wind turbines. Mapping of proposed turbine locations, roads, parcels, land uses and water bodies has been entered into Cadna/A in order to calculate the resulting sound levels at points within the study area. Although substation transformers emit sound, they are not considered to be significant sound sources due to their relatively low sound output and distances from regulated protected locations.

Sound level estimates are calculated in accordance with ISO 9613-2, an international standard for calculating outdoor sound propagation. This method calculates sound levels as if the receiver locations were all simultaneously downwind from the sound sources, which is for calculation purposes and not a physical possibility. According to ISO 9613, the calculation method is also equivalent to sound propagation for a “well-developed moderate ground-based temperature inversion”. The stated accuracy of the ISO 9613-2 method is $\pm$3 dBA for a source and receiver mean height of 5 to 30 meters and a distance of 100 to 1000 m. Although the mean source height between wind turbines and receivers is closer to 47 meters, use of Cadna/A and ISO 9613-2 has been found to be accurate for prediction of wind turbine sound levels at the compliance locations.[3]

The terrain for the surface model was mapped from USGS topographic contours at six meter intervals (19.7 ft) provided to BEA by Stantec Consulting with turbine base elevations ranging from 390 to 604 feet above mean sea level. The parcel boundaries and dwelling locations for the model were also provided by Stantec. Dwellings locations were mapped through use of aerial photography and field verification with the parcel associations confirmed from review of state and local tax records. Stantec also reviewed state and local records to identify parcels with approved residential building permits or that are part of an approved residential subdivision.

The following provides an assessment of sound levels associated with construction and operation of the Bull Hill Wind Project.

6.1 Construction Sound Levels

Construction of Bull Hill Wind will involve the use of heavy machinery to clear and grade roads, turbine pads, erect the wind turbine towers, and assemble the nacelle and turbine blades. This equipment will include trucks, excavators, loaders, bull dozers, cranes, portable generators and compressors among other machines. Construction staging areas will also be established in designated areas for storage of equipment, materials, and wind turbine components.

Depending upon whether aggregate material can be found on site or will be transported to the project, there may also be equipment operating at the project site to excavate gravel, crush rock and process aggregate. Mobile construction and portable processing equipment is likely to generate sound levels in the range of 75 to 95 dBA at 50 feet. Due to the arrangement and size of the project site, most of this equipment will be well distributed and not focused in a single area.

Operation of heavy equipment for site work and other major construction activity between 7 am and 7 pm or during daylight hours is not subject to the Maine DEP noise control regulation as set forth by Maine statute (ref. 38 MRSA Section 484). Operation of construction equipment during nighttime non-daylight hours must comply with the nighttime limits applicable to routine facility operation. All construction equipment must also comply with applicable federal noise regulations and include environmental noise control devices in proper working condition as originally provided by the equipment manufacturer.

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[3] K. Kaliski and E. Duncan, Propagation Modeling Parameters for Wind Power Projects.
Town of Oakfield, Wind Energy Review Committee, Final Report.
Stetson Wind, Operations Compliance Sound Level Study.
EnRad Consulting, Oakfield Wind Project Amendment, Sound Level Assessment – Peer Review.

6.2 Operating Sound Levels

Wind turbine sound power levels were provided by Vestas Wind Systems A/S based on sound testing as set forth in IEC 61400-11. The IEC method establishes detailed procedures for measurement of wind turbine sound and calculation methods for determining the sound power level of a wind turbine as a point source for the stated purpose of conducting community assessments of sound levels resulting from wind turbine operation. Vestas reports that the full rated sound power of the Vestas V100 is 105.0 dBA with an uncertainty of $\underline{+}$2.0 dBA based on IEC testing. Adding the uncertainty to the full sound output yields a maximum continuous sound power level of 107.0 dBA for modeling purposes. At hub heights of 95 meters (311.7 ft) above ground level, the resulting elevations of the turbine hubs (modeled point sources) range from 701 to 916 feet above msl.

Cadna/A allows flexibility in defining model settings and adjustments related to calculation methods, ground absorption and other factors. Additionally, as discussed above, conservative assumptions are utilized with respect to each of these factors. Turbine sound measurements at similar distances can be used to ensure that model is "calibrated" to actual sound levels for reliable model estimates. As the following describes, model settings have been applied to estimate the highest wind turbine sound levels as measured under a wide variety of site and weather conditions at other projects in Maine.

Although the proposed Vestas wind turbines are different than the turbines operating at other projects in Maine, sound power levels are determined by the same international specification for wind turbine testing (IEC 61400-11). Results from other wind energy facilities in Maine where wind turbines are located on similar ridge top settings indicate that the high end of the measurement range can be predicted by adding the sound power level uncertainty and the stated accuracy of ISO 9613-2. For this reason, the sound power level of the Vestas V100 was increased by 5.0 dBA for modeling purposes.

Other model settings were selected to calculate ground attenuation using the spectral method per ISO 9613-2 and using a default ground absorption factor of 0.5 to represent a mix of hard and soft ground. Surface water bodies were mapped and assigned a ground absorption factor of 0.0 similar to hard ground for an acoustically reflective surface. Attenuation resulting from intervening terrain and atmospheric absorption using standard day conditions (temperature 10^{o}C, relative humidity 70%) was also calculated. No attenuation was calculated due to trees or other foliage that could act to reduce sound levels at receiver locations.

Wind turbine sound level estimates were calculated for a height of 5 feet above ground level as specified by Maine DEP 375.10. Sound levels were calculated and presented specifically for community receptor points. "Receptor points" are the locations in any direction from the project with the greatest potential to exceed the Maine DEP sound level limits. In addition, sound level contours were calculated to provide estimates at all locations within the study area. A grid spacing of 20 meters by 20 meters was used to calculate the sound level contours.

Sound level estimates were calculated with all proposed wind turbines operating at full rated sound power output and the addition of 5 dBA for modeling purposes. The estimates are presented in Figure 8 for selected receptor points and as sound level contours at 1 dBA intervals. The sound level contours corresponding to Maine DEP quiet daytime and nighttime limits of 55 dBA and 45 dBA are shown as bold lines. Figure 8 also shows the turbine locations, parcel boundaries, dwelling locations, and water bodies. Parcels that are owned or will be leased by Blue Sky are shown by hatching and a parcel with a sound easement is annotated.

A review of sound level estimates for facility operation indicates that when operating at full sound output, the Bull Hill Wind Project will comply with Maine DEP sound level limits of 55 dBA daytime and 45 dBA nighttime at all regulated protected locations. The Maine DEP limits do not apply to sound received within the project boundary, or where Blue Sky has obtained a sound easement. A summary of sound levels at the receptor points and comparison to daytime and nighttime sound level limits is provided in Table 4.

Receptor Point	Description	Distance to Nearest Turbine (ft)	Estimated Hourly Sound Level, dBA	Maine DEP Sound Level Limit, dBA	
				Daytime	Nighttime
P1	500 feet from Dwelling	4,340	37.2	55	45
P2[4]	Lot Line of Residential Parcel	3,705	39.6	55	45
P3	Conservation Area	6,160	35.4	55	55

Table 4. Estimated Daytime and Nighttime Sound Levels from Wind Turbine Operations at Receptor Points

The sound level estimates in Table 4 indicate that sound levels downwind from full operation of Bull Hill Wind will be approximately 5 dBA below the 45 dBA nighttime limit at the lot line of the nearest dwelling on a regulated protected location as represented by receptor point P2. Further, the sound level estimates indicate that sound levels from Bull Hill Wind will be nearly 8 dBA below the daytime and nighttime limit of the nearby regulated protected location represented by receptor point P1. The nighttime limit at the Conservation Area represented by receptor point P3 is 55 dBA because this point is more than 500 feet from sleeping quarters. Estimated sound levels at P3 are approximately 20 dBA below the applicable limit of 55 dBA.

[4] P2 represents the closes protected location. The dwelling is 3,880 feet to the closest turbine, and the quiet nighttime limit applies.

6.3 Tonal and Short Duration Repetitive Sounds

The Maine DEP regulation requires an adjustment to the measured sound level at a protected location if sound from a development generates certain types of sound that are considered to be more annoying than relatively steady sound with no prominent tones or frequencies. These regulated types of sound are 1) tonal sounds and 2) short duration repetitive sounds.

6.3.1 Tonal Sounds

Tonal sounds are similar to prominent discrete tones that are audible from a development at a protected location. The Maine DEP defines a tonal sound as follows:

> "For the purpose of this regulation, a tonal sound exists if, at a protected location, the one-third octave band sound pressure level in the band containing the tonal sound exceeds the arithmetic average of the sound pressure levels of the two contiguous one-third octave bands by 5 dB for center frequencies at or between 500 Hz and 10,000 Hz, by 8 dB for center frequencies at or between 160 and 400 Hz, and by 15 dB for center frequencies at or between 25 Hz and 125 Hz. (ref. Maine DEP Chapter 375.10.G(24))."

Vestas has issued a Sound Level Performance Standard for the V100, which is attached to this report as Exhibit 1. In its V100 Standard, Vestas warranties the overall sound power level of the V100 and further warranties that the V100 will not produce a steady tonal sound as defined by Maine DEP 375.10. A measurement report by Delta for the V90 turbine, a similar Vestas turbine, indicates potential for tonality in some frequencies but at levels well below the Maine DEP criteria for regulated tonal sounds.[5] From the available turbine testing data [for the Vestas V90 turbine] and Vestas Sound Level Performance Standard, the proposed V100 wind turbines are not expected to generate regulated tonal sounds during routine operation.

6.3.1 Short Duration Repetitive Sounds

Maine DEP Chapter 375.10 defines short duration repetitive sounds as:

> "A sequence of repetitive sounds which occur more than once within an hour, each clearly discernible as an event and causing an increase in the sound level of at least 6 dBA on the fast meter response above the sound level observed immediately before and after the event, each typically less than ten seconds in duration, and which are inherent to the process or operation of the development and are foreseeable." (ref. Maine DEP Chapter 375.10.G(19)).

Concerning assessment of the 5 dBA penalty for SDR sounds, the Maine DEP noise regulation states:

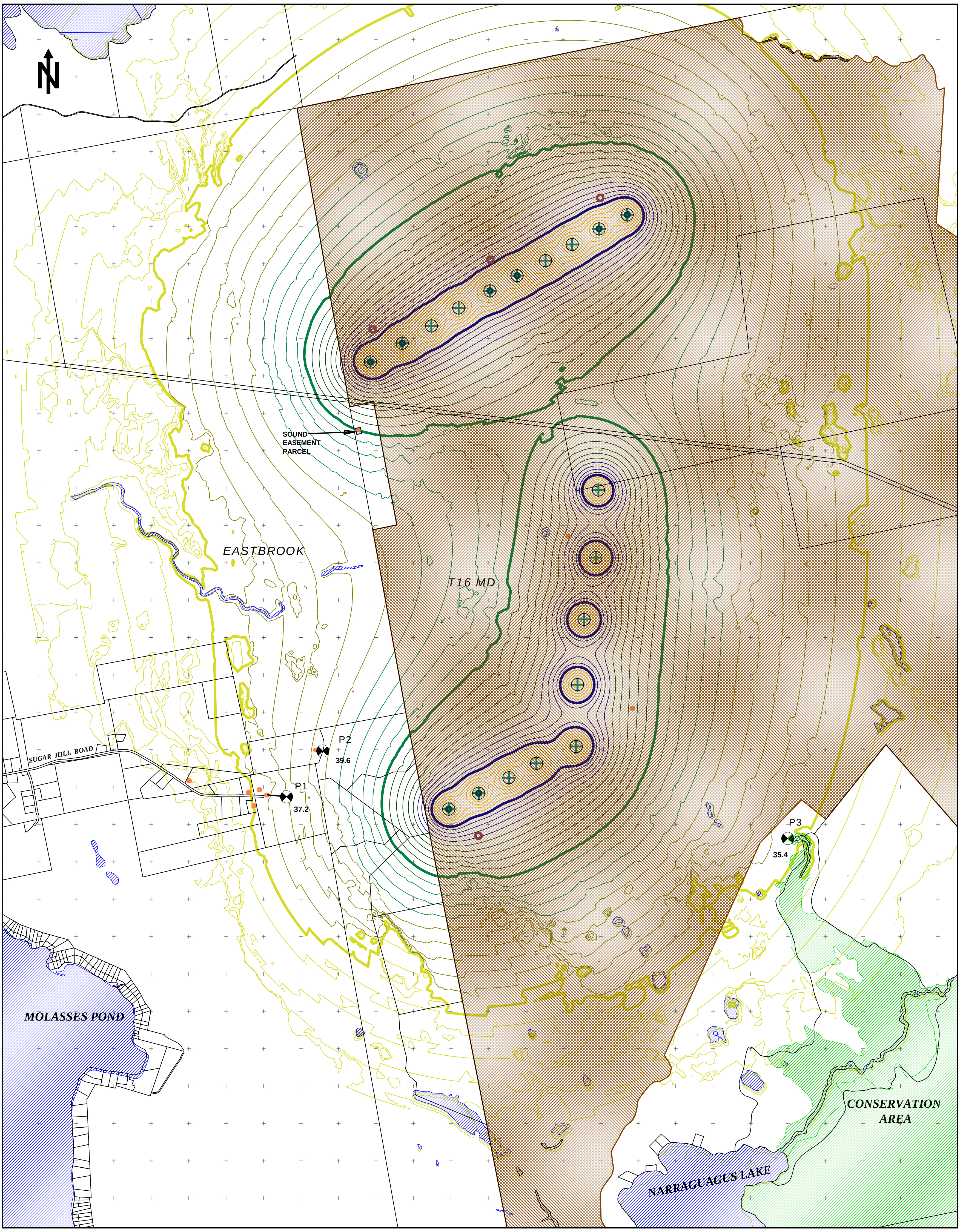
> "For short duration repetitive sounds, 5 dBA shall be added to the observed sound levels of the short duration repetitive sounds that result from routine operation of the development for the purposes of determining compliance with the above sound level limits." (ref. MDEP Chapter 375.10.C.1.e.i.)

[5] Delta, Measurement of Noise Emission from a Vestas V90 1.815 MW Wind Turbine, AV 122/10, March 26, 2010.

The regulation makes a clear distinction that the 5 dBA penalty is to be added to the sound levels of the SDR sounds, and therefore, not to the overall equivalent sound level (LAeq) for the time period.

For wind turbines, brief changes in sound levels occur as the passage of rotor blades, commonly referred to as "amplitude modulation". The highest sound levels are generally recognized to take place on the down stroke of each rotor blade which occurs at a rate of just over once per second at full rotational speed (16.6 rpm). The Delta report on sound measurements of the Vestas V90 does not specifically address the sound level change that occurs due to amplitude modulation. Measurements of operating wind turbines at other projects in Maine and published literature concerning amplitude modulation from wind turbines indicates that sound level fluctuations during the blade passage of wind turbines typically range from 2 to 5 dBA (see also Section 2.3), with occasional but infrequent events reaching 6 dBA or more. Even assuming that occasional SDR events over 6 dBA occur, and 5 dBA is added to the observed sound level for those events, the Project would still comply with the relevant sound level limits at all protected locations.

Figure 8. Estimated Sound Levels from Wind Turbine Operations



Parcel Leased or Owed by Blue Sky

Wind Turbine

Dwelling

500 ft
40.4
Receptor Point & Estimated Sound Level

Permanent Met Tower

Temporary Met Tower

Coordinate Grid Spacing = 1000 ft

Sound Level Contour Interval = 1 dBA

55 dBA (Daytime Limit)

45 dBA (Nighttime Limit)

35 dBA

Bodwell EnviroAcoustics LLC
R Scott Bodwell PE

7.0 Sound Level Testing

The purpose of sound level testing is to confirm by measurement that sound levels emitted by the Bull Hill Wind are at or below the sound level limits applicable to the project.

7.1 Project Construction

Construction of Bull Hill Wind is planned to primarily occur during daylight and daytime hours within which sound levels generated by construction activity are exempt from the Maine DEP sound level limits by Maine statute. Therefore, no sound level testing is planned for the construction phase of the project. If nighttime non-daylight construction occurs, such construction activity is required to comply with nighttime sound level limits for routine operation and maintenance of the project.

7.2 Wind Turbine Operations

Sound level testing of wind turbine operations is a complex and critical component of the proper and responsible operation of a wind energy facility. The most difficult aspect of wind turbine sound testing is to perform the required measurements under the proper site and weather conditions. Operation of wind turbines at full sound output requires a significant level of wind acting on the turbine hubs for extended period of time. Often when hub wind speeds are at the required levels, surface winds will also be high enough to cause extraneous sound levels from wind forces acting on terrain and vegetation. These extraneous sound levels can make it difficult to isolate turbine sound.

However, during nighttime periods, the winds aloft along the project ridges and wind turbine hubs can remain strong while the surface winds at lower elevations near protected locations can diminish to light or nearly calm. These conditions are commonly referred to as a “stable atmosphere” and are the best conditions under which to measure the sound level contributions of wind turbines for several reasons. First, the ambient (non-wind turbine) sound levels from wind and daytime activities are reduced so that the sound levels from wind turbines become more prominent and easier to quantify. Second, technical literature concerning wind turbine noise emissions indicates that the potential for amplitude modulation increases under these conditions. Therefore, full sound output under a stable atmosphere is the preferable condition for measuring worst case sound levels and determining the presence of short duration repetitive sounds.

BEA has worked closely with LURC, the Maine DEP and EnRad Consulting, acoustical consultant to Maine DEP, to develop a specific and detailed testing protocol for measuring sound levels from wind turbines in Maine. The purpose of this protocol is to measure wind turbine sound levels to evaluate compliance with Maine DEP sound level limits including appropriate adjustments for tonal and short duration repetitive sounds. The most recent version of this Sound Testing Protocol was prepared by BEA and submitted to and approved by LURC in support of the Stetson II Wind Project in Washington County, Maine. It is contained in this report as Exhibit 2. The Stetson II Protocol was supplemented by Protocol Details & Calculation Methods prepared by BEA that provides details and examples for assessing penalties for short duration repetitive and tonal sounds. This supplement was reviewed and approved by LURC and EnRad Consulting and is contained in this report as Exhibit 3. These approved test protocols will be used to develop a similar protocol for sound level testing of turbine operations for Bull Hill Wind.

8.0 Summary of Findings

This Sound Level Assessment establishes sound level limits to be applied to the Bull Hill Wind Project and provides sound level predictions for daytime and nighttime turbine operations using a terrain-based computer model. Model settings reflect the results of turbine sound level testing of similar wind energy facilities in Maine. The most stringent Maine DEP hourly sound level limits of 55 dBA daytime and 45 dBA nighttime will be applied to the Project. Sound level estimates indicate that with all wind turbines operating simultaneously at full capacity, Bull Hill Wind will be approximately 5 dBA or more below the applicable Maine DEP nighttime sound level limits at all protected locations. The Sound Level Assessment establishes guidelines for sound level testing of turbine operations to evaluate compliance with applicable sound level limits, including methods for measurement and analysis for tonal and short duration repetitive sounds.

9.0 References

ANSI S12.9-2005/Part 4 American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-term Community Response.

Bodwell EnviroAcoustics, R. Scott Bodwell, P.E., Stetson II Wind Project Sound Testing Protocol, March 2010.

Bodwell EnviroAcoustics, R. Scott Bodwell, P.E., Stetson II Wind Project Sound Protocol Details & Calculation Methods, September 2010.

Danish Electronics, Light and Acoustics, Low Frequency Noise from Large Wind Turbines, 2008.

Delta, Measurement of Noise Emission from a Vestas V90 1.815 MW Wind Turbine, AV 122/10, March 26, 2010.

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IEC 61400-11 Wind turbine generator systems – Part 11: Acoustic noise measurement techniques, Edition 2.1, November 2006.

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K. Kaliski and E. Duncan, Propagation Modeling Parameters for Wind Power Projects, Sound & Vibration, December 2008.

Maine Department of Environmental Protection (DEP) Site Location of Development regulations for Control of Noise (ref. 06-096 CMR c. 375.10), November 1989.

Maine Land Use Regulation Commission, Section F.1 Noise of LURC Chapter 10 Land Use Districts and Standards.

Maine Revised Statutes, Standards for Development, 38 MRSA 484, Subsection 3, 1993.

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Town of Oakfield, Wind Energy Review Committee, Final Report, September 4, 2009.

Van den Berg, G. P., The Sounds of High Winds, the effect of atmospheric stability on wind turbine sound and microphone noise, University of Groningen, 2006.

<u>EXHIBIT 1: Sound Level Performance Standard</u>[6]

Sound Level Performance Standard

<u>Warranted Sound Power Level V100 – 1.8 MW WTG IEC Class 3A</u>

When measured in accordance with the Sound Level Testing Procedures attached as <u>Exhibit N.2</u> to the Wind Turbine Supply Agreement to which this <u>Exhibit N.1</u> is attached, the V100 – 1.8 MW WTG IEC Class 3A warranted sound power level at 8m/s (10m height) is

Mode 0: LwA = 105 dB(A).

Mode 1: LwA = 105 dB(A).

Mode 2: LwA = 103 dB(A).

This warranted sound level is subject to a tolerance for measurement uncertainties of the greater of (i) the actual measurement uncertainty determined in accordance with the Sound Level Test Standard (IEC 61400-11) and (ii) ± 2dB(A). If the measured sound power level is at or below the warranted sound power level <u>plus</u> the uncertainty, the standard has been met.

Supplier makes no warranties hereunder with respect to the tonality of the sound generated by the Wind Turbines, except that:

Supplier warrants that the Turbine Equipment shall not produce any steady Tonal Sounds during operation. A Tonal Sound is defined to exist if the one-third (1/3) octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one-third (1/3) octave bands by five (5) dB for center frequencies between five hundred (500) Hz and ten thousand (10,000) Hz, by eight (8) dB for center frequencies between one hundred and sixty (160) Hz and four hundred (400) Hz, or by fifteen (15) dB for center frequencies twenty-five (25) Hz between one hundred and twenty-five (125) Hz.

[6] Source: Vestas Wind Systems A/S

EXHIBIT 2: STETSON II WIND PROJECT SOUND TESTING PROTOCOL

Stetson II Wind Project
Sound Testing Protocol
Draft March 2, 2010
Revised March 15, 2010
R. Scott Bodwell, P.E.

This wind turbine sound testing protocol for compliance assessment was developed for Stetson II in recognition of recent assessment plans/protocols established by the Maine DEP for similar projects. These recent protocols evolved through years of sound level testing of wind turbine projects in Maine and comprehensive evaluation of those test programs by the Maine DEP and its acoustical consultant (W. Brown of EnRad Consulting). R. Scott Bodwell, P.E. of Bodwell EnviroAcoustics worked closely with Maine DEP staff and Mr. Brown to refine testing protocol criteria including instrumentation, site and weather conditions, meteorological observations, sound level measurement data and analysis methods.

These efforts culminated with development of a Sound Compliance Assessment Plan for the Rollins Wind Project on April 6, 2009. For Rollins, the focus of the sound level testing was re-oriented from extended quarterly sound level measurements over 24-hour periods to collecting test data under specific operating, site and weather conditions.

The specific test conditions required for Rollins were established based on the results of sound testing at wind projects in Maine under a wide range of site and weather conditions and are also supported internationally by technical literature from acoustical experts and scientists. Atmospheric stability is a key component of the Rollins protocol, which is designed to yield measurement results during the most critical operating conditions for sound propagation from wind turbines. Other components of the Rollins protocol establish measurement, reporting and analytical criteria for assessing tonal and short duration repetitive sound levels, which are types of sounds regulated by Maine DEP Chapter 375.10 and not regulated by LURC's noise standard (LURC Chapter 10.25). Similar protocols have been approved for other recent projects in Maine with some additional refinements based in part on compliance testing at Stetson I Wind. Further, the test protocol for Oakfield Wind was reviewed and approved by an independent acoustical consultant acting on behalf of the Town of Oakfield.

Stetson II Wind is the first utility scale wind energy project in LURC jurisdiction where the Maine DEP noise regulation (Chapter 375.10) is being applied. Bodwell EnviroAcoustics and First Wind propose a Sound Testing Protocol for Stetson II that is similar to that established for Rollins and other recent wind projects. In lieu of quarterly testing, the proposed testing protocol dictates reporting sound level measurement results for twelve 10-minute measurement periods meeting precise test conditions. The proposed Sound Testing Protocol for Stetson II Wind is as follows:

Operations sound testing for Stetson II Wind requires carefully specified measurement conditions, monitoring specifications and reporting requirements to characterize and consistently quantify wind turbine sound levels. Compliance for Stetson II will be demonstrated when the specified test conditions have been met for 12, ten-minute measurement intervals for each monitoring location selected as set forth below and in accordance with Maine DEP Chapter 375.10 requirements.

Measurements will be obtained during weather conditions when wind turbine sound is most clearly noticeable. This occurs when the monitoring location is downwind from the wind turbines and the maximum surface wind is 6 mph or less with concurrent turbine hub-elevation wind speeds sufficient to generate the maximum continuous rated sound power from the five nearest wind turbines to the monitoring location. These conditions usually occur during nighttime inversion periods. A downwind location is defined as within 45 degrees of the direction between a specific monitoring location and the acoustic center of the five nearest wind turbines.

Measurement intervals influenced by increased biological activity, leaf rustling, traffic, high water flow or other extraneous ambient sounds that affect the ability to demonstrate compliance will be excluded from the reported data. The objective is to obtain 10-minute measurement intervals that fully meet the specified criteria. If Stetson II must adjust measurement results for such sounds, background ambient monitoring will be necessary.   If background ambient monitoring is proposed, locations and times will be determined with concurrence from LURC.

Sound monitoring locations will be positioned to most closely reflect representative protected locations for purposes of demonstrating compliance with applicable sound level limits, subject to permission from the respective property owner(s). Selection of monitoring locations will also consider the origin of community noise complaints that may be received by Stetson II Wind. Monitoring locations will require concurrence from LURC prior to testing.

Meteorological measurements of wind speed and direction will be collected using anemometers at a height of 10 meters above ground. To the maximum extent practicable, the anemometers will be positioned at the center of large unobstructed areas generally correlated with sound monitoring locations. Results will be reported based on 1-second measurement intervals and synchronously with wind turbine power output and sound level measurements at 10-minute intervals. The average and maximum surface (10 meter) wind speed will be reported from each meteorological station. Concurrence from LURC is required on selection of meteorological station locations.

Sound level parameters reported for each 10-minute measurement interval meeting the protocol criteria will include the following:

1. Ten-minute A-weighted and C-weighted equivalent sound levels (L_{Aeq} and L_{Ceq}).
2. Ten-minute 10% and 90% percentile exceedance levels (L_{A10} and L_{A90}).
3. Ten one-minute 1/3-octave band linear equivalent sound levels (dB) with analysis for the presence of tonal sounds.
4. Short duration repetitive events characterized by event duration and amplitude based on A-weighted sound levels measured at an interval of 50 milliseconds or less using the fast time response:

   a. Event duration is the time in seconds when the maximum sound level exceeds the average minima immediately before and after the event by a specified dBA level;
   b. Amplitude is the difference between the maximum sound level and the average minima immediately before and after the event; and
   c. Events will be reported by percentage of 50 ms or less intervals for each observed amplitude integer above 4 dBA.
5. Calculation of the required 5 dBA assessment for tonal and short duration repetitive sounds when they occur.
6. Reported measurements will be confirmed to be free of extraneous sounds to the extent possible.
7. Measurement data will be reported at each monitoring location for 12, 10-minute periods meeting the protocol criteria.

Note that reporting items for tonal and short duration repetitive sounds are not required when measured 10-minute equivalent sound levels (L_{Aeq}) are 5 dBA or more below the applicable sound level limits.

In some circumstances, it may not be feasible to meet the wind speed and operations criteria due to terrain features or limited elevation change between the wind turbines and monitoring locations. In these cases, measurement periods are acceptable if the following conditions are met:

i. The difference between the L_{A90} and L_{A10} during any 10-minute period is less than 5 dBA, and
ii. The surface wind speed (10 meter height) is 6 mph or less for 80% of the measurement period and does not exceed 10 mph at any time; or the turbines are shut down during the monitoring period and the difference in the observed L_{A50} after shut down is equal to or greater than 6 dBA, and
iii. Observer logs or recorded sound files clearly indicate the dominance of wind turbine sounds;

OR, if the following condition is met:

iv. The overall 10-minute L_{Aeq} is 5 dBA or more below the applicable sound level limit.

Prior to initiating sound level compliance testing, Stetson II will provide detailed procedures and sample calculations to LURC to be used for assessment of the 5 dBA penalty for the presence of short duration repetitive and tonal sounds as set forth in Maine DEP Chapter 375.10. In addition, within 60 days of final commissioning, Stetson II will provide procedures to document, analyze and respond to sound complaints from the community. A summary of community sound complaints will be reported to LURC on a quarterly basis.

Compliance monitoring data in accordance with the assessment methods outlined above will be gathered and submitted to LURC at the earliest possible opportunity after commencement of facility operation with consideration for the required weather and operating conditions, and selection of sound monitoring locations and meteorological stations. Stetson II will report the status of compliance monitoring to LURC staff on a quarterly basis. A compliance assessment report providing sound level and meteorological data, and analysis of results shall be submitted to LURC for review and approval prior to the end of the first year of facility operation. Additional sound level testing beyond the first year of operations is not planned but could be initiated if deemed appropriate in response to a consistent pattern of community sound complaints.

EXHIBIT 3: STETSON II WIND PROJECT PROTOCOL DETAILS & CALCULATION MEHTODS

Stetson II Wind Project
Sound Testing Protocol (Original Issue March 15, 2010)
Protocol Details & Calculation Methods
September 13, 2010
R. Scott Bodwell, P.E.

The Sound Testing Protocol for Stetson II Wind Project was developed in coordination with staff at the Land Use Regulation Commission (LURC) and the Maine Department of Environmental Protection (DEP) and submitted to LURC on March 15, 2010 for review and approval. The Protocol establishes criteria for sound level testing of wind turbine operations at Stetson II Wind including instrumentation, site and weather conditions, meteorological data, and sound level measurement reports. The Protocol states "Prior to initiating sound level compliance testing, Stetson II will provide detailed procedures and sample calculations to LURC to be used for assessment of the 5 dBA penalty for the presence of short duration repetitive and tonal sounds as set forth in Maine DEP Chapter 375.10." The following provides details for assessing penalties for short duration repetitive and tonal sounds.

Penalties for Tonal and Short Duration Repetitive Sounds

Maine DEP Chapter 375.10 applies a 5 dBA penalty to certain characteristic sounds that are considered to be more annoying than steady-state broadband sound. This penalty is added to the measured sound levels for these types of sounds and the overall equivalent sound level is re-calculated before it is compared to the applicable sound level limits. The following provides specific details and sample calculations on how to apply the Maine DEP short duration repetitive and tonal sound penalties. Based on testing of other wind turbine projects, occurrences of these types of sounds are not expected to result in significant penalties or adjustments to measured sound levels. An objective of operations testing and analysis of measurement results is to verify this expectation.

Short Duration Repetitive Sounds

The purpose of the short duration repetitive (SDR) sound assessment is to determine the total duration and equivalent sound level (L_{Aeq}) of all SDR events for each 10-minute test period. The Protocol requires reporting of sound level and meteorological data for twelve, 10-minute test periods that meet the specified operating, site and weather conditions. Once the L_{Aeq} of the SDR events is determined, the +5 dBA "penalty" is applied to total duration of SDR events for each test period to calculate the adjusted 10-minute L_{Aeq} for evaluation of compliance.

Rotation of wind turbine blades produces a characteristic swishing or thumping on the down-stroke of each rotor blade, which briefly increases sound output. The change in sound levels that occurs is known as "amplitude modulation". At full rpm of the GE 1.5 sle wind turbine, the down-stroke of a rotor blade occurs at a rate of approximately once per second. Figure 1 presents a sampling of sound level measurements that shows amplitude modulation cycle that occurs approximately once per second. This data was developed for the purposes of establishing calculation details and is not from actual wind turbine measurements.

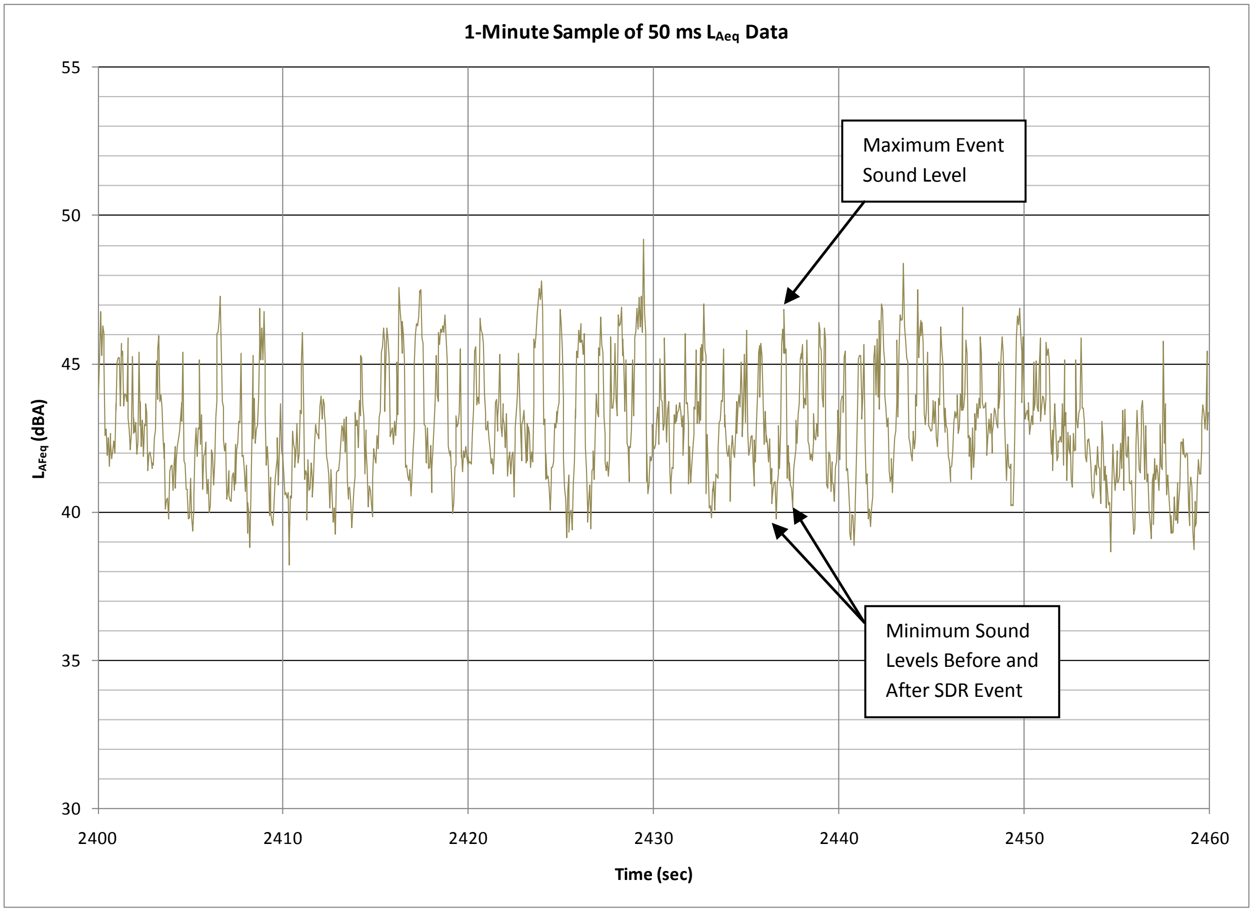


Figure 1. Sound Level Measurements of Amplitude Modulation

Maine DEP Chapter 375.10 applies a 5 dBA penalty for "short duration repetitive sounds" which are defined as:

> "A sequence of repetitive sounds which occur more than once within an hour, each clearly discernible as an event and causing an increase in the sound level of at least 6 dBA on the fast meter response above the sound level observed immediately before and after the event, each typically less than ten seconds in duration, and which are inherent to the process or operation of the development and are foreseeable." (ref. Maine DEP Chapter 375.10.G(19)).

To determine the presence of SDR sound events, the Sound Testing Protocol requires measurement of A-weighted sound levels at an interval of 50 milliseconds (0.05 seconds) or less using a fast time response, i.e. 125 ms. The amplitude of an SDR event is the highest measured 50 ms sound levels during the event minus the average of the minimum sound levels measured immediately before and after the event. Sound level fluctuations from wind turbines qualify as SDR sound events when the amplitude or increase in sound levels during the event is 6 dBA or more. For the example annotated in Figure 1, the sound level increases approximately 7 dBA between the minima before and after the event. In this case, a 5 dBA penalty would be applied to the measured sound levels of the SDR sound event.

The following graph (Figure 2) presents a 10-second sample period of 50 ms sound level measurements to demonstrate the procedure for determining the amplitude and duration of SDR events. Individual 50 ms measurements are indicated as marker symbols on the graph to show the number of SDR events that occurred during the 10-second period. The minimum sound level before and after each event and average minima are also indicated by labels. Event duration is the time in seconds extending from the minima immediately before and after the maximum sound level of the SDR event. The first SDR event occurs when the measured sound level reaches 47.0 dBA, or 6 dBA above the average minima of 41.0 dBA. There were five SDR events during the 10-second sample period as indicated in Figure 2.

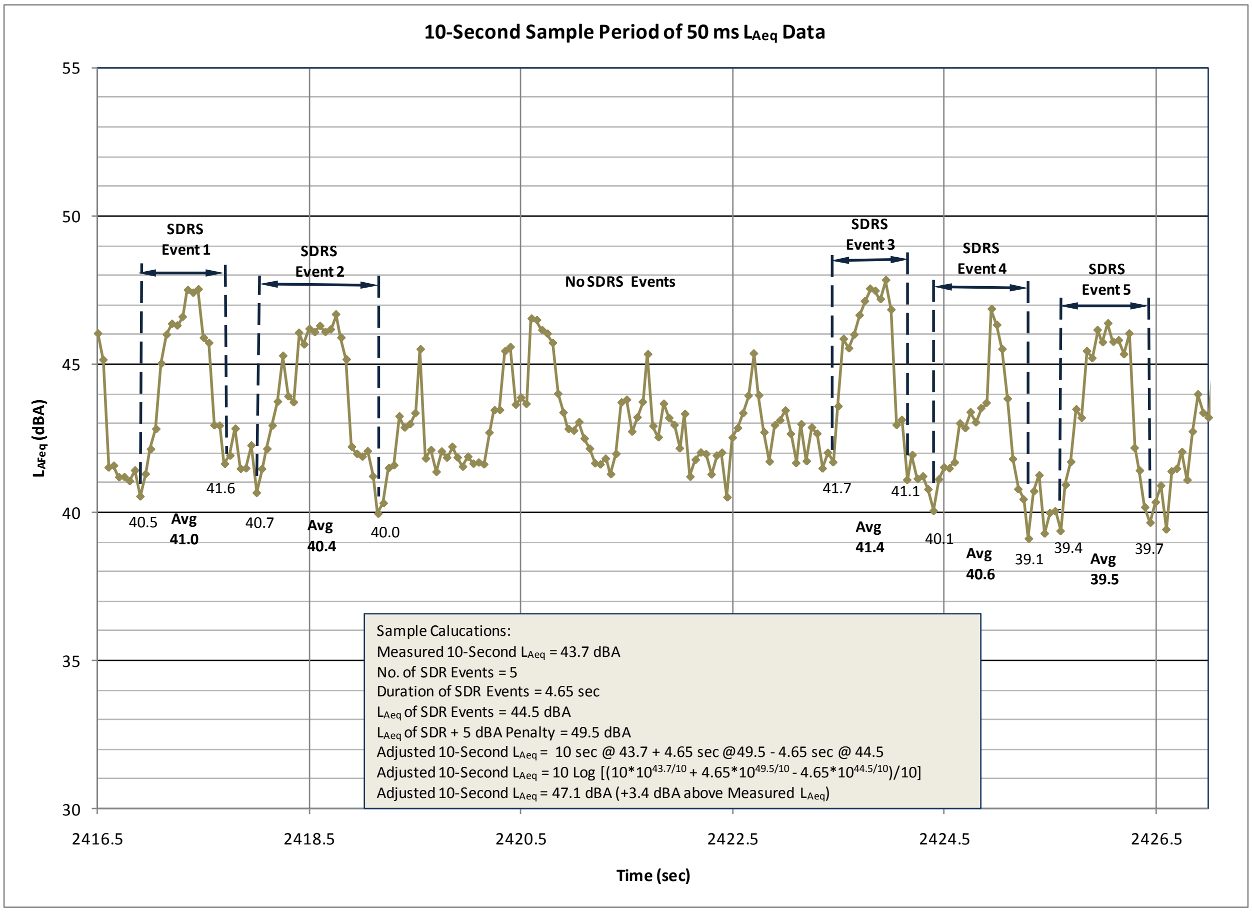


Figure 2. SDR Event Duration and Sound Level Calculation

Concerning assessment of the 5 dBA penalty for SDR sounds, the Maine DEP noise regulation states:

> "For short duration repetitive sounds, 5 dBA shall be added to the observed sound levels of the short duration repetitive sounds that result from routine operation of the development for the purposes of determining compliance with the above sound level limits." (ref. MDEP Chapter 375.10.C.1.e.i.)

The regulation makes a clear distinction that the 5 dBA penalty is to be added to the sound levels of the SDR sounds, and therefore, not to the overall equivalent sound level (L_{Aeq}) for the time period. With this method, more SDR sound events will yield a larger increase in overall sound levels after the penalty is applied.

A sample calculation is provided on Figure 2 that demonstrates how to apply the 5 dBA penalty to the total number of SDR events that occurred during the 10-second measurement sample. The sample calculation indicates there were five SDR events with a total event duration of 4.65 seconds. The L_{Aeq} of the SDR events was 44.5 dBA and adding the 5 dBA penalty increases the L_{Aeq} of these SDR events to 49.5 dBA. The final step is to add the L_{Aeq} of the SDR events with the 5 dBA penalty included to the measured L_{Aeq} of 43.7 dBA for the 10-second period. This step also requires that the measured L_{Aeq} of the SDR events be subtracted out so that the sound levels of the SDR events are not double counted. As shown in the example, application of the 5 dBA penalty will yield an adjusted L_{Aeq} of 47.1 dBA, which is 3.4 dBA above the measured 10-second L_{Aeq}.

In relation to the Sound Testing Protocol, this same calculation method is applied on a 10-minute basis to each of the compliance measurement periods. The first step is to determine the duration and L_{Aeq} of all SDR events that occurred during each 10-minute measurement period. Once this is completed, the 5 dBA penalty is applied to the SDR events in order to calculate the adjusted 10-minute L_{Aeq}. The following provides an example calculation for applying the SDR penalty to a 10-minute measurement.

SDR Assessment – Sample Calculation for 10-minute Measurement Period:

- 10-minute L_{Aeq} (600 seconds) = 45.0 dBA
- Total Time of all SDR Events = 30 Seconds
- SDR Event L_{Aeq} = 50.0 dBA
- SDR Event L_{Aeq} with 5 dBA penalty = 55.0 dBA

Adjustment Calculation:

Adjusted 10-min L_{Aeq} = $10 \text{ Log } [(600*10^{45.0/10} + 30*10^{55/10} – 30*10^{50.0/10})/600]$ = 46.2 dBA*

*Net dBA adjustment = +1.2 dBA

The net dBA adjustment will vary depending on the duration and amplitude of SDR events. The following Table 1 provides examples of SDR adjustments for different measurement results.

ASSESSMENTS FOR SHORT DURATION REPETITIVE SOUND EVENTS					
10-Min LAeq	**SDR LAeq**	**SDR Time (sec)**	**SDR with 5 dBA**	**Adjusted 10-Min LAeq**	**Net Change**
45	50	5	55	45.2	0.2
45	50	10	55	45.5	0.5
45	50	20	55	45.9	0.9
45	50	40	55	46.6	1.6
45	50	60	55	47.3	2.3
45	48	15	53	45.4	0.4
45	50	15	55	45.7	0.7
45	52	15	57	46.0	1.0
45	54	15	59	46.6	1.6
45	56	15	61	47.3	2.3

Table 1. SDR Assessments for Varying Event Durations and Sound Levels

Tonal Sounds

Maine DEP Chapter 375.10 also applies a 5 dBA penalty to tonal sounds: "For purposes of determining compliance with the above sound level limits, 5 dBA will be added to the observed levels of any tonal sounds that result from routine operation of the development." (ref. MDEP 375.10.C.1.e). Tonal sounds are defined in the Maine DEP regulation as follows:

> "For the purpose of this regulation, a tonal sound exists if, at a protected location, the one-third octave band sound pressure level in the band containing the tonal sound exceeds the arithmetic average of the sound pressure levels of the two contiguous one-third octave bands by 5 dB for center frequencies at or between 500 Hz and 10,000 Hz, by 8 dB for center frequencies at or between 160 and 400 Hz, and by 15 dB for center frequencies at or between 25 Hz and 125 Hz." (ref. Maine DEP Chapter 375.10.G(24)).

The Maine DEP definition of a tonal sound is consistent with "sounds with tonal content" defined in ANSI standard S12.9-2005/Part 4.[1] This ANSI standard is not specific to wind turbines and gives procedures for the "description and measurement of environmental sound."

The first objective of the tonal sound assessment is to determine whether operation of the wind turbines results in tonal sounds at any nearby protected location. For each 10-minute measurement interval meeting the protocol criteria, the Sound Testing Protocol requires that one-third octave band sound levels be reported as "Ten one-minute 1/3-octave band linear equivalent sound levels (dB) with analysis for the presence of tonal sounds."

The "analysis for tonal sounds" is performed by calculating the difference between the third octave sound level at each frequency (Hz) and arithmetic average of the sound levels in the two adjacent third octave bands. For each frequency, this difference is then compared to the threshold criteria in the definition to determine whether a tonal sound occurred during the measurement period.

An example of this calculation is presented in Table 2. In this example, Table 2 shows that a tonal sound occurred in the 160 Hz third-octave band where the tonal difference was 9.2 dBA compared to a threshold of 8 dBA.

[1] ANSI S12.9-2005/Part 4 was first published in 1996, reaffirmed in 2002 and revised in 2005 and well after Maine DEP 375.10 was promulgated in 1989. The definition of "sounds with tonal content" traces its origin to ANSI standard S12.9-1987 Part 3 Annex C. Although Part 3 of ANSI S12.9 also contains guidance on the measurement of one-third octave-band sound pressure levels it does not contain any guidelines with respect to adjustment of sounds with tonal content. Further, ANSI 12.9/Part 4 states that "If sounds are not audible at the location of interest … the adjusted sound exposure for these sounds shall not be included in the total (ref. Table 2 Note 4)."

Third Octave Frequency Hz	Measured Sound Level dB	Tonal Differential dB	DEP Threshold dB	Tonal Sound Yes or No
20	70.5		-	
25	66.7	2.3	15	no
31.5	58.4	-1.3	15	no
40	52.6	0.2	15	no
50	46.4	-3.0	15	no
63	46.1	0.4	15	no
80	45.1	0.1	15	no
100	43.9	-0.1	15	no
125	42.8	-4.8	15	no
160	51.4	9.2	8	yes
200	41.6	-4.4	8	no
250	40.6	-0.5	8	no
315	40.6	0.8	8	no
400	39.1	0.3	8	no
500	37.0	-0.1	5	no
630	35.1	-0.8	5	no
800	34.8	0.8	5	no
1000	32.8	-0.5	5	no
1250	31.7	0.0	5	no
1600	30.5	0.5	5	no
2000	28.4	0.2	5	no
2500	25.8	-0.2	5	no
3150	23.6	0.1	5	no
4000	21.2	0.4	5	no
5000	18.1	-0.5	5	no
6300	16.0	0.8	5	no
8000	12.4	-2.3	5	no
10000	13.3	0.4	5	no
12500	13.3		-	

Table 2. Sample Calculation for Determining the Presence of Tonal Sounds

When tonal sounds occur, the next step is to apply the 5 dBA penalty to each tonal sound as set forth in Maine DEP Chapter 375.10. Section H of the regulation provides measurement procedures and methods for determination of compliance with the DEP Standards. Regarding tonal sounds, Subsection (4.2)(c) states:

> "Identification of tonal sounds produced by routine operation of a development for the purpose of adding the 5 dBA penalty in accordance with subsection C(1)(d) requires aural perception by the measurer, followed by use of one-third octave band spectrum analysis instrumentation. If one or more of the sounds of routine operation of the development are found to be tonal sounds, the hourly sound level component for tonal sounds shall be computed by adding 5 dBA to the one-hour equivalent sound level for those sounds."

This description indicates that the analysis for tonal sounds is based on the one-hour equivalent sound level ("the hourly sound level component for tonal sounds"). The intent of the Protocol is to focus measurements and analysis on 10-minute measurement intervals under stringent test conditions in lieu of hourly sound levels. Therefore, for the Sound Testing Protocol to be consistent with criteria set forth in Maine DEP 375.10, the tonal sound would need to be present in third octave data for the 10-minute measurement interval. Further, the regulation is clear that the 5 dBA penalty is to be applied to each tonal sound that occurs ("if one or more of the sounds … are found to be tonal sounds, the hourly sound level component for tonal sounds shall be computed by adding 5 dBA to the one-hour equivalent sound level for those sounds.") There is no language in the regulation that would indicate that the 5 dBA penalty is to be applied to the overall equivalent sound level or that the penalty should be applied based on the percentage of time that it occurs.

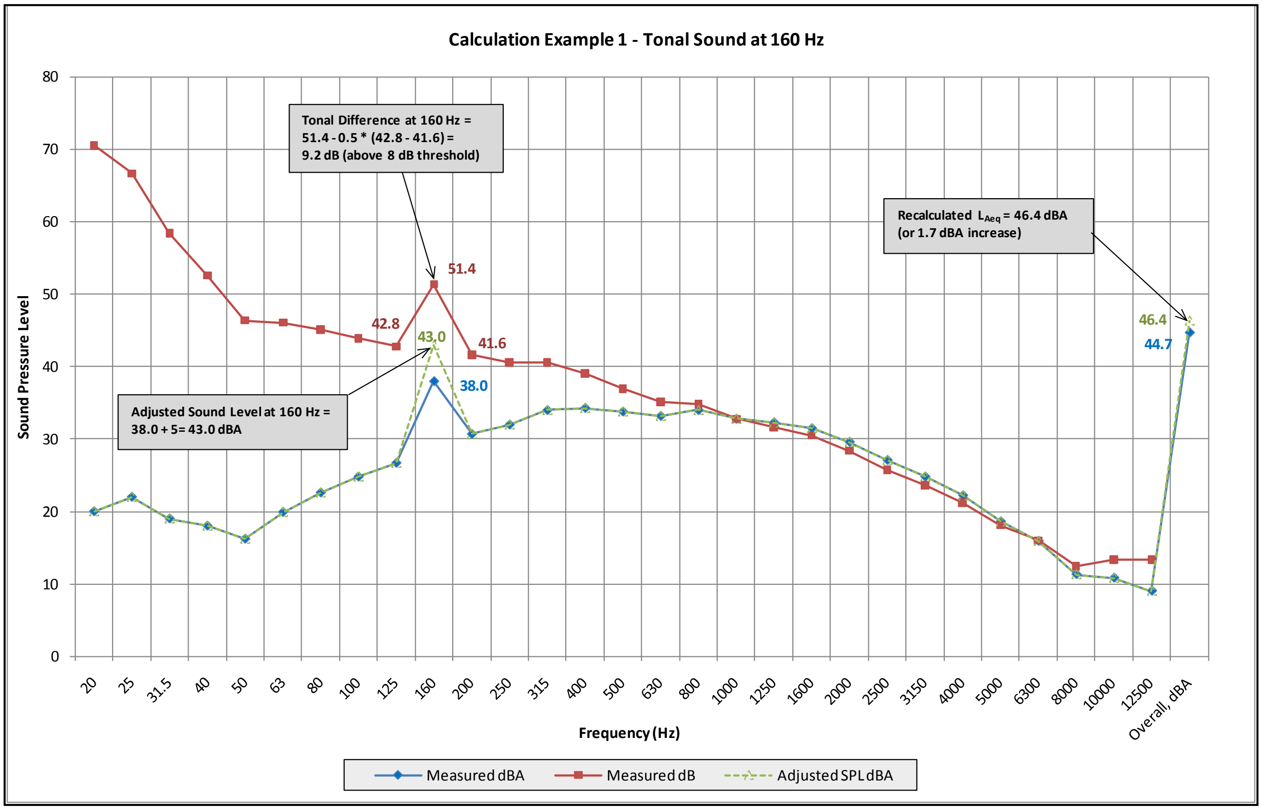
This method for application of the tonal penalty has been used and accepted by the Maine DEP since the noise regulation was adopted in 1989. With this calculation method, application of the 5 dBA penalty to the sound level of the tonal frequency effectively factors in the audibility of the tonal sound at the protected location. Consequently, applying the penalty to a less prominent or less audible frequency would yield a lower net increase or adjustment to the overall A-weighted sound level. Conversely, more prominent tones would result in a higher net increase. Importantly, this ensures that the resultant net increase is a function of the contribution of a particular component frequency to the overall broadband sound level at the measurement location.

As it relates to the Sound Testing Protocol for Stetson II, analysis of third-octave data for the purposes of adding 5 dBA to tonal sounds is to be done using ten-minute measurements in lieu of hourly sound levels. When tonal sounds occur, 5 dBA is to be added to the measured sound level in each third-octave band where tonal sounds are present. The following graphs and tables provide three detailed examples for calculating the change in the ten-minute sound levels that results from application of the tonal penalty.

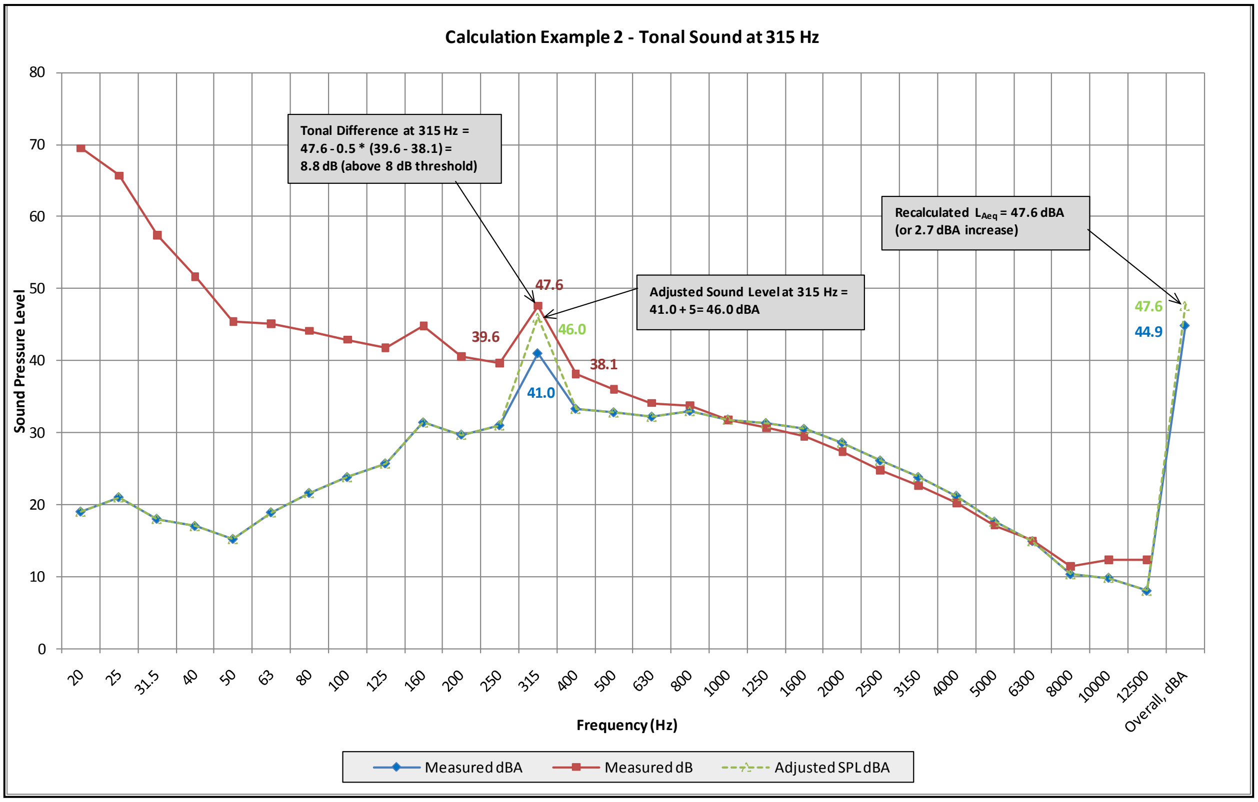
Calculation Example 1 – this example uses the same third-octave measurement results found in Table 2 where a tonal sound is found at 160 Hz. The graph shows the linear third-octave data (red line) used to identify the tonal sound. The other lines on the graph display the measured A-weighted sound levels (blue) and the adjusted A-weighted sound levels (green) with 5 dBA added to the measured sound level at 160 Hz where the tonal sound occurs. The net increase in the overall A-weighted sound level is shown on the right side of the graph. The spreadsheet calculations for Example 1 are shown below the graph. For example 1, the sound level increases from 44.7 to 46.4 dBA, for an increase of 1.7 dBA, with the tonal penalty applied.

Calculation Example 2 – this example shows a tonal sound at the more prominent frequency of 315 Hz. The sound level increases from 44.9 to 47.6 dBA for a net increase of 2.7 dBA.

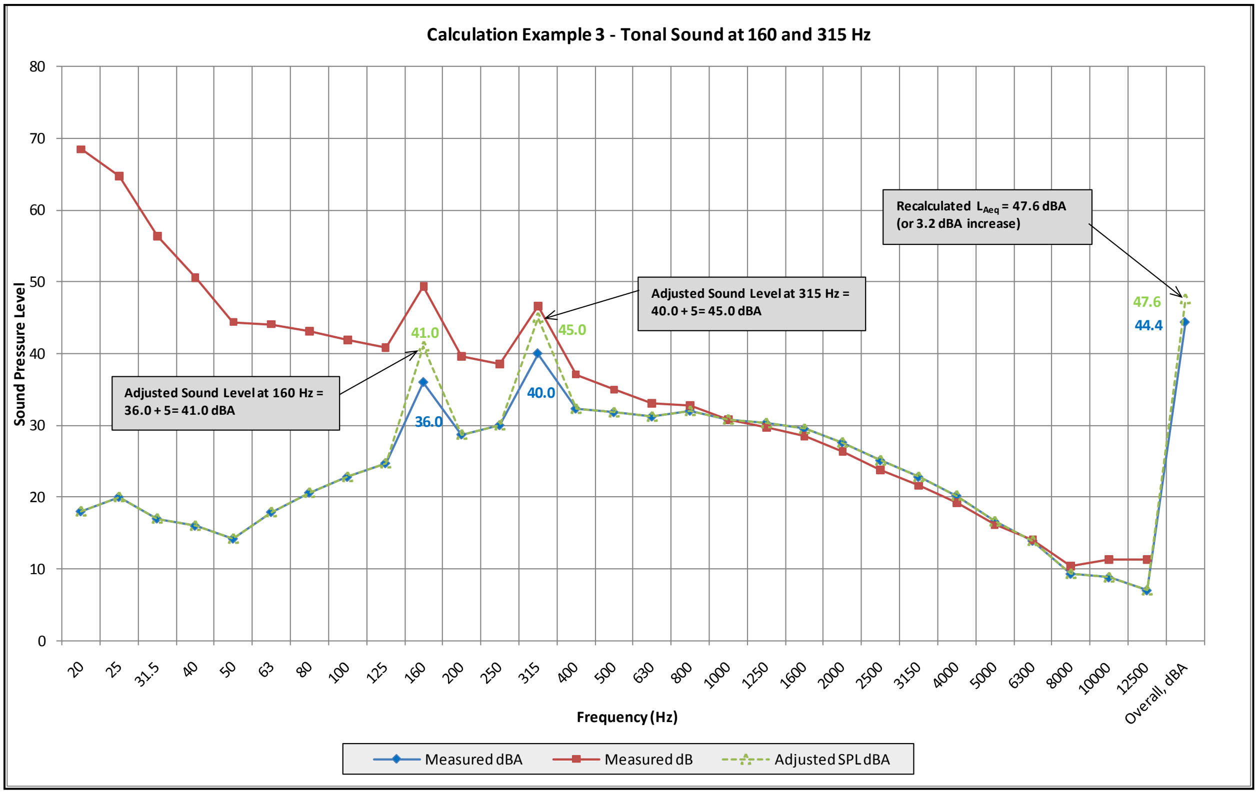
Calculation Example 3 – this example shows tonal sounds at both 160 Hz and 315 Hz. The sound level increases from 44.4 to 47.6 dBA for a net increase of 3.2 dBA.



Example 1								
	Measured		Measured	Tonal	DEP		Tonal	Adjusted
Frequency	Sound Level	A-Weighting	Sound Level	Differential	Threshold	Tonal Sound	Adjustment	Sound Level
Hz	dBA	dB	dB	dB	dB	Yes or No	dB	dBA
20	20.0	-50.5	70.5		-			20.0
25	22.0	-44.7	66.7	2.3	15	no	0	22.0
31.5	19.0	-39.4	58.4	-1.3	15	no	0	19.0
40	18.0	-34.6	52.6	0.2	15	no	0	18.0
50	16.2	-30.2	46.4	-3.0	15	no	0	16.2
63	19.9	-26.2	46.1	0.4	15	no	0	19.9
80	22.6	-22.5	45.1	0.1	15	no	0	22.6
100	24.8	-19.1	43.9	-0.1	15	no	0	24.8
125	26.7	-16.1	42.8	-4.8	15	no	0	26.7
160	38.0	-13.4	51.4	9.2	8	yes	5	43.0
200	30.7	-10.9	41.6	-4.4	8	no	0	30.7
250	32.0	-8.6	40.6	-0.5	8	no	0	32.0
315	34.0	-6.6	40.6	0.8	8	no	0	34.0
400	34.3	-4.8	39.1	0.3	8	no	0	34.3
500	33.8	-3.2	37.0	-0.1	5	no	0	33.8
630	33.2	-1.9	35.1	-0.8	5	no	0	33.2
800	34.0	-0.8	34.8	0.8	5	no	0	34.0
1000	32.8	0.0	32.8	-0.5	5	no	0	32.8
1250	32.3	0.6	31.7	0.0	5	no	0	32.3
1600	31.5	1.0	30.5	0.5	5	no	0	31.5
2000	29.6	1.2	28.4	0.2	5	no	0	29.6
2500	27.1	1.3	25.8	-0.2	5	no	0	27.1
3150	24.8	1.2	23.6	0.1	5	no	0	24.8
4000	22.2	1.0	21.2	0.4	5	no	0	22.2
5000	18.6	0.5	18.1	-0.5	5	no	0	18.6
6300	15.9	-0.1	16.0	0.8	5	no	0	15.9
8000	11.3	-1.1	12.4	-2.3	5	no	0	11.3
10000	10.8	-2.5	13.3	0.4	5	no	0	10.8
12500	9.0	-4.3	13.3		-			9.0
Overall, dBA	44.7							46.4



Example 2								
	Measured		Measured	Tonal	DEP		Tonal	Adjusted
Frequency	Sound Level	A-Weighting	Sound Level	Differential	Threshold	Tonal Sound	Adjustment	Sound Level
Hz	dBA	dB	dB	dB	dB	Yes or No	dB	dBA
20	19.0	-50.5	69.5		-			19.0
25	21.0	-44.7	65.7	2.3	15	no	0	21.0
31.5	18.0	-39.4	57.4	-1.3	15	no	0	18.0
40	17.0	-34.6	51.6	0.2	15	no	0	17.0
50	15.2	-30.2	45.4	-3.0	15	no	0	15.2
63	18.9	-26.2	45.1	0.4	15	no	0	18.9
80	21.6	-22.5	44.1	0.1	15	no	0	21.6
100	23.8	-19.1	42.9	-0.1	15	no	0	23.8
125	25.7	-16.1	41.8	-2.0	15	no	0	25.7
160	31.4	-13.4	44.8	3.6	8	no	0	31.4
200	29.7	-10.9	40.6	-1.6	8	no	0	29.7
250	31.0	-8.6	39.6	-4.5	8	no	0	31.0
315	41.0	-6.6	47.6	8.8	8	yes	5	46.0
400	33.3	-4.8	38.1	-3.7	8	no	0	33.3
500	32.8	-3.2	36.0	-0.1	5	no	0	32.8
630	32.2	-1.9	34.1	-0.8	5	no	0	32.2
800	33.0	-0.8	33.8	0.8	5	no	0	33.0
1000	31.8	0.0	31.8	-0.5	5	no	0	31.8
1250	31.3	0.6	30.7	0.0	5	no	0	31.3
1600	30.5	1.0	29.5	0.5	5	no	0	30.5
2000	28.6	1.2	27.4	0.2	5	no	0	28.6
2500	26.1	1.3	24.8	-0.2	5	no	0	26.1
3150	23.8	1.2	22.6	0.1	5	no	0	23.8
4000	21.2	1.0	20.2	0.4	5	no	0	21.2
5000	17.6	0.5	17.1	-0.5	5	no	0	17.6
6300	14.9	-0.1	15.0	0.8	5	no	0	14.9
8000	10.3	-1.1	11.4	-2.3	5	no	0	10.3
10000	9.8	-2.5	12.3	0.4	5	no	0	9.8
12500	8.0	-4.3	12.3		-			8.0
Overall, dBA	44.9							47.6



Example 3								
	Measured		Measured	Tonal			Tonal	Adjusted
Frequency	Sound Level	A-Weighting	Sound Level	Differential	DEP	Tonal Sound	Adjustment	Sound Level
Hz	dBA	dB	dB	dB	Threshold	Yes or No	dB	dBA
20	18.0	-50.5	68.5		-			18.0
25	20.0	-44.7	64.7	2.3	15	no	0	20.0
31.5	17.0	-39.4	56.4	-1.3	15	no	0	17.0
40	16.0	-34.6	50.6	0.2	15	no	0	16.0
50	14.2	-30.2	44.4	-3.0	15	no	0	14.2
63	17.9	-26.2	44.1	0.4	15	no	0	17.9
80	20.6	-22.5	43.1	0.1	15	no	0	20.6
100	22.8	-19.1	41.9	-0.1	15	no	0	22.8
125	24.7	-16.1	40.8	-4.8	15	no	0	24.7
160	36.0	-13.4	49.4	9.2	8	yes	5	41.0
200	28.7	-10.9	39.6	-4.4	8	no	0	28.7
250	30.0	-8.6	38.6	-4.5	8	no	0	30.0
315	40.0	-6.6	46.6	8.8	8	yes	5	45.0
400	32.3	-4.8	37.1	-3.7	8	no	0	32.3
500	31.8	-3.2	35.0	-0.1	5	no	0	31.8
630	31.2	-1.9	33.1	-0.8	5	no	0	31.2
800	32.0	-0.8	32.8	0.8	5	no	0	32.0
1000	30.8	0.0	30.8	-0.4	5	no	0	30.8
1250	30.3	0.6	29.7	0.0	5	no	0	30.3
1600	29.5	1.0	28.5	0.5	5	no	0	29.5
2000	27.6	1.2	26.4	0.2	5	no	0	27.6
2500	25.1	1.3	23.8	-0.2	5	no	0	25.1
3150	22.8	1.2	21.6	0.1	5	no	0	22.8
4000	20.2	1.0	19.2	0.4	5	no	0	20.2
5000	16.6	0.5	16.1	-0.5	5	no	0	16.6
6300	13.9	-0.1	14.0	0.8	5	no	0	13.9
8000	9.3	-1.1	10.4	-2.3	5	no	0	9.3
10000	8.8	-2.5	11.3	0.4	5	no	0	8.8
12500	7.0	-4.3	11.3		-			7.0
Overall, dBA	44.4							47.6

These examples show how the net increase changes depending on the relative sound level contribution of the tonal sound and how to apply the 5 dBA penalty to tonal sounds at more than one frequency. The data used in these examples is similar to actual wind turbine sound levels but has been revised for the purposes of these examples.

The presence of one or more tonal sounds does not necessarily indicate non-compliance unless the adjusted overall sound level exceeds the Maine DEP quiet limits. The Complaint Response and Resolution Protocol (under separate cover) provides an additional level of protection against tonal sounds that either do not implement the DEP tonal penalty and/or do not result in exceedances of any applicable noise limits, but nonetheless could be annoying.

If tonal sounds develop, the best practice is to mitigate and eliminate these tones. Stetson II will implement measures to minimize the likelihood that tonal sounds will occur and if they do occur, that they will be adequately addressed. The SCADA system and regular inspections by operating personnel would reveal the existence of these types of problems, which may also reduce overall turbine performance. Accordingly, Stetson II's regular inspection and maintenance program for turbines will reduce the likelihood that tonal sounds will occur.

In the event tonal or SDR sounds occur and cause an exceedance of the applicable DEP sound limits, they will be addressed to ensure that Stetson II remains in compliance with the DEP noise standards. If tonal or SDR sounds cause an exceedance of the applicable DEP noise standards, Stetson II will promptly notify LURC and expedite an investigation of the sound level exceedance and the associated tonal or SDR sounds and develop a mitigation plan and schedule to achieve compliance with the applicable sound level limits. Stetson II will provide copies of the mitigation plan to LURC, implement the mitigation plan, and provide a written report describing the action(s) taken and new measurement results that demonstrate compliance. Mitigation options could include reduction of the overall sound level, amplitude modulation, and/or the tonal sound component.

EASEMENT
(Bull Hill Camp Lot)

THIS EASEMENT is made by **Howard Abbott** of Eastbrook, Maine, **Warren C. Abbott** of Abbott, Maine, **Michael Frederick Bunker** of Eastbrook, Maine, **Scott Almon Bunker** of Eastbrook,Maine, **Scott Alan Bunker** of Roseville, California, **Timothy Jay Bunker** of Bucksport, Maine, **Ernest Butler, Jr.** of Hancock, Maine, and **Stephen Coffin** of Hancock, Maine (collectively and together with their successors and/or assigns, "Grantor"), the owner of a certain lot or parcel of land situated in Township 16, MD BPP, Hancock County, Maine more particularly described in the following deeds: Deed from Clyde Bunker to Scott A. Bunker (a/k/a Scott Almon Bunker), Frederick E. Bunker, Irvin Abbott and James MacLeod dated November 24, 1970 and recorded at the Hancock County Registry of Deeds in Book 1111, Page 28; Deed from James C. MacLeod to Scott Alan Bunker, Timothy Jay Bunker, Howard Abbott, and Ernest Butler, Jr. dated December 5, 1989 and recorded at said Registry in Book 1785, Page 135; Deed from Irvin Abbott to Warren C. Abbott dated May 14, 2003 and recorded at said Registry in Book 3728, Page 287; Deed from Frederick E. Bunker to Michael Frederick Bunker dated ____________, 2010 and recorded at said Registry in Book _____, Page _____; and Deed from James MacLeod to Stephen Coffin dated ____________, 2010 and recorded at said Registry in Book _____, Page _____ (hereinafter referred to as the "Servient Land").

WHEREAS, **Blue Sky East, LLC**, a Delaware limited liability company having a mailing address at c/o First Wind Energy, LLC, 179 Lincoln Street, Suite 500, Boston, MA 02111 ("Grantee"), plans to construct and operate a wind power project, including wind turbine generators and towers and related equipment, facilities, infrastructure and substructures, which may be built in one or more phases (hereinafter referred to as the "Wind Power Project"), on lands near the Servient Land, including (without limitation) the lands described on the attached Exhibit A; and

WHEREAS, the Wind Power Project will emit sound, including potential levels that may exceed applicable state, local or other maximum allowable sound level limits for the Servient Land, and additionally may cast shadows onto or produce a shadow flicker effect on the Servient Land;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby grants, with warranty covenants, a perpetual easement, right and entitlement to Grantee for: (a) the right to have sound generated from the Wind Power Project impact the Servient Land and exceed otherwise applicable federal, state, local or other maximum sound level limits applicable to locations on the Servient Land; (b) the right to have any audio, visual, light, vibration, electromagnetic, ice or weather hazard resulting from Wind Power Project operations or activities impact the Servient Land; and (c) the right to cast shadows or shadow flicker from the Wind Power Project onto the Servient Land. Further, as of the date hereof, Grantor does hereby release and forever discharge Grantee (and Grantee's officers, directors, affiliates, consultants, advisors and owners) from any action, claim, suit or proceeding in equity, law and/or administrative proceeding that Grantor may now have or may have in the future against Grantee with respect to the emanation of such sound, shadow or shadow flicker, including any such actions, claims, suits or proceedings arising from or relating to (i) applicable zoning, planning or other federal, state or local permitting requirements or other authorizations, and (ii) construction or operational impacts to or upon the Servient Land or to Grantor. Grantor further agrees that it shall not publicly oppose or disparage the Wind Power Project that is associated with the rights granted hereunder.

This Easement shall extend to, be binding upon and shall inure to the benefit of heirs, personal representatives, successors and assigns of the parties hereto. The burden of the easement and rights hereby granted shall run with the Servient Land and shall pass automatically to successor owners of the Servient Land. The benefit of the easement and rights hereby granted is not appurtenant to any particular property, but shall be transferable in whole or in part, and may be sold, leased, assigned, pledged, and mortgaged by Grantee, it being the intent of the parties that such benefit may be transferred to any successors or assignees of Grantee that own or operate the Wind Power Project, as it may be modified, divided or expanded.

Grantor hereby agrees that (i) no use of or improvement to the Servient Land which is permitted by this Easement and (ii) no apportionment, assignment or granting of a subeasement thereof shall, separately or in the aggregate, constitute an overburdening of this Easement or limit its effectiveness.

The benefit of the Easement hereby granted may be enforced by Grantee, its successors and assigns, by any appropriate legal or equitable remedy. In the event that Grantee, its successors or assigns, shall bring an action against Grantor, its successors or assigns, by reason of a breach or violation of this Easement by Grantor or its successors and assigns, to enforce its rights hereunder, the substantially prevailing party in such action shall be entitled to recover their reasonable attorneys' fees and court costs incurred in such action from the substantially non-prevailing party.

Each party agrees that they shall execute such additional documents or instruments, and shall undertake such actions as are necessary and appropriate to effectuate the intent of this Easement, including but not limited to, executing and delivering such additional documents as may be reasonably required by any lenders or assignees.

If Grantee violates the terms or conditions of this Easement, Grantor shall be entitled to any remedy available under applicable law or equity, provided, however that no such violation by Grantee shall result in a termination of the easements or rights granted by this Easement. The easement rights granted herein shall not be terminable by Grantor under any circumstances.

[Intentional end of page. Signatures and acknowledgments follow.]

WITNESS our hands and seals this 9th day of November, 2010.

In the presence of:

John Whitmore

GRANTOR

Howard E Abbott

Howard Abbott

STATE OF ______________
COUNTY OF ______________

Nov 10, 2010

Personally appeared the above-named Howard Abbott and acknowledged the foregoing instrument to be his free act and deed.

Before me,

____
Notary Public
Print:
My commission expires:

In the presence of:

Elizabeth R Yeo

GRANTOR

Warren C. Abbott

STATE OF Maine
COUNTY OF Hancock

9/4/10, 2010

Personally appeared the above-named Warren C. Abbott and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of: GRANTOR

John Whitmore

Michael Frederick Bunker

STATE OF Maine
COUNTY OF HANCOCK 9/4/10, 2010

Personally appeared the above-named Michael Frederick Bunker and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Charles L. Yeo
Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of:

GRANTOR

Charlene B Bunker

Scott Almon Bunker

Scott Almon Bunker

STATE OF Maine
COUNTY OF Hancock

9/4/10, 2010

Personally appeared the above-named Scott A. Bunker and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Charles Yeo

Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of:

Charlene B Bunker

GRANTOR

Scott Alan Bunker

Scott Alan Bunker, Jr.

STATE OF Maine
COUNTY OF Hancock

Sept. 4, 2010

Personally appeared the above-named Scott Alan Bunker, Jr. and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Charles Yeo

Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of:

Elizabeth R Yeo

GRANTOR

Timothy Jay Bunker

STATE OF Maine
COUNTY OF Hancock

9/4/10, 2010

Personally appeared the above-named Timothy Jay Bunker and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Charles L. Yeo

Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of:

Elizabeth R Yeo

STATE OF Maine
COUNTY OF Hancock

GRANTOR

Ernest L Butler Jr

Ernest Butler, Jr.
221 Eastside Rd.
Hancock, Me 04640

9-16-, 2010

Personally appeared the above-named Ernest Butler, Jr. and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Charles Yeo

Notary Public
Print:
My commission expires:

CHARLES L. YEO
Notary Public, Maine
My Commission Expires
May 31, 2014

In the presence of:

John Whitmore
____

GRANTOR

Stephen C. Coffin
____
Stephen Coffin

STATE OF ______________
COUNTY OF ______________

Nov. 10, 2010

Personally appeared the above-named Stephen Coffin and acknowledged the foregoing instrument to be his free act and deed.

Before me,

____
Notary Public
Print:
My commission expires:

In order to assess wildlife impacts due to operation of the Bull Hill Wind Project (Project), post-construction monitoring will be conducted for at least one year. During the first year of operation, monitoring will entail bird and bat fatality searches. The fall 2009 and spring 2010 nocturnal marine radar surveys indicated a low mean nightly flight height and relatively high mean nightly passage rate at Bull Hill (Appendix 13C); therefore, pending consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW), an additional season of nocturnal migration radar survey may be conducted.

The need for, scope, focus, and timing of consecutive years of post-construction monitoring will depend on the results of the first year of monitoring; therefore, this work plan is applicable to the first year of post-construction monitoring only. This monitoring plan also includes adaptive management in the event that unusually high bird or bat fatality rates are found at the Project area as a whole, or in isolated parts of the Project area; or if there are impacts to species of conservation concern. The methods in this work plan are based on standard post-construction monitoring techniques used at existing wind farms in the region. The final work plan will be developed in consultation with MDIFW.

Objectives of post-construction monitoring:

- to document the species and number of individuals of bird and bat fatalities during the spring, summer, late-summer, and fall of the first year of operation of the wind farm;
- to estimate the level of take of birds and bats during the 2012 study period based on the results of standardized searches, searcher efficiency trials, scavenger carcass removal trials, and if necessary, a search area correction factor;
- to determine if fatality events are uniform across the Project area;
- to assess whether fatality rates constitute an unreasonable adverse impact to birds or bats;
- if fatality rates are unusually high, to determine the factors influencing mortality;
- in the event of unusually high mortality, to determine the need for and appropriateness of adaptive management action(s); and
- should an additional season of radar be necessary, to document nocturnal bird migration activity (passage rates, flight heights, flight direction), and possibly relate radar data to fatality data at specific turbine locations.

Fatality Search Methods:

Mortality monitoring in 2012 will involve searches at all 19 turbines (100%). Survey effort will include weekly searches between April 15 and October 30, as well as daily searches at a subset of turbines during peak migration periods in the spring and fall. Accordingly, weekly searches will be conducted at all turbines from April 15 to April 30, May 15 to August 31, and October 1 to October 30. Figures 1 and 2 show the peak timing of discovery of bird and bat fatalities during four mortality studies at wind farms in Maine (Mars Hill 2007 and 2008, Stetson I 2009, and Stetson II 2010).

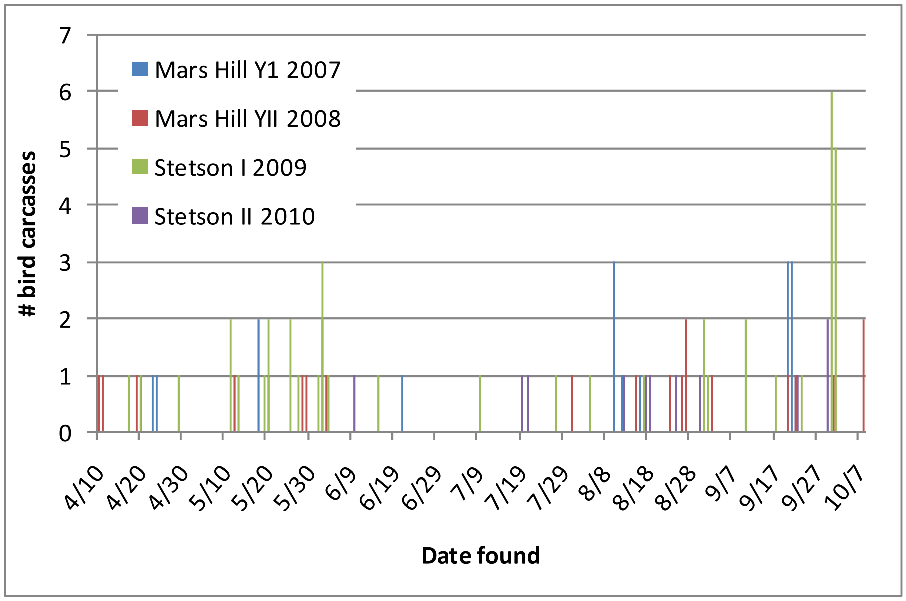


Figure 1. Timing of bird carcass discovery during four mortality studies in Maine.

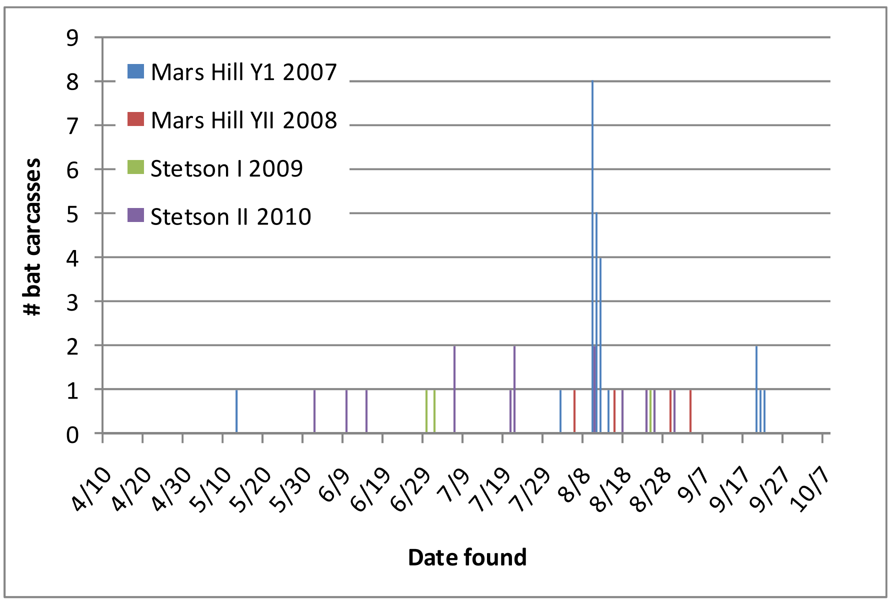


Figure 2. Timing of bat carcass discovery during four mortality studies in Maine.

Peak periods of avian carcass discovery occurred between May 15 and June 5 in the spring, and September 15 and September 30 in the fall. Bat fatality discovery peaked between July 15 and September 22. To cover the peak timing of bird and bat fatalities determined by the recent mortality studies, daily searches will be conducted at 5 turbines (located throughout the Project area) for a period of 3 weeks during spring migration (May 15 to June 5); and for 6 weeks during the bat swarming and fall migration periods (August 1 to September 15); weekly surveys will continue at the remaining 14 turbines during these two timeframes. Accordingly, there will be as many as 802 turbine searches over the course of the survey year.

Continuous monitoring during this period will result in 28 consecutive weeks of surveys. Monitoring will cover four distinct seasons:

- spring migration – April 15 to May 31;

- summer breeding – June 1 to July 15;
- late-summer – July 16 to August 31; and
- fall migration – September 1 to October 30.

The entire leveled, graded lay-down area, adjacent stable side slopes, and adjacent road sections will be searched. Therefore, the standard search area is expected to be approximately 80 meters (m) in diameter, on average. Transects will be established 4 m (13 feet [']) apart within search areas.

During periods when weekly surveys alone are being conducted, it is anticipated that 19 turbine searches will be completed during 4 survey days per week (a biologist will search 4 to 6 turbines per day). Searches will generally be scheduled for the same four days each week (Monday through Thursday). During the weekly and daily search timeframes, it is anticipated that the 14 weekly-searched turbines will be surveyed over a period of 4 days (3 to 4 weekly-searched turbines per day), in addition to the 5 turbines that will be searched daily (period of 7 days). It is expected that one biologist will be able to complete all surveys, even during the periods of increased effort.

The biologist conducting turbine searches will be trained on the search protocol by the project manager. During searches, all carcasses found (intact or scavenged) will be photographed and documented on standardized field forms. The following information will be recorded for each carcass found:

- date and time;
- biologist identification;
- search plot identification;
- general weather conditions;
- ground cover conditions (e.g., vegetation type and height, wet, dry, gravel);
- distance (determined by a laser range finder) and compass direction from the turbine;
- distance and compass direction from the transect from which the carcass was detected;
- carcass condition (e.g., fresh, rigor, decomposed, intact carcass, scavenged, feather spot);
- carcass position (e.g., face-up or down, sprawled out or balled up); and
- species, age, gender, and reproductive condition (when possible).

Carcasses will be collected under the appropriate state and federal permits and will be individually bagged and frozen. Carcasses will be retained in a freezer at the Operations and Maintenance building and may be used in searcher efficiency and scavenger carcass removal trials.

In the event that a federally or state-listed species is found, the appropriate agency will be contacted and arrangements will be made to submit the carcass to the agency. If a large-scale fatality event (i.e., more than 5 carcasses at one turbine, more than 20 carcasses found across the Project area in one survey day) is observed, MDIFW will be contacted within 24 hours. If an injured bird or bat is found, when possible, the animal will be transported to a local wildlife rehabilitator.

Maintenance personnel will be informed of the timing of standardized searches and will be trained on the collision event reporting protocol in the event that a carcass or injured animal is found. Carcasses found outside of standardized searches will be documented and collected but will be reported separately from those carcasses found during standard searches, and will not be used for estimates of take.

Vegetation conditions, including percent coverage within search areas and vegetation height, will be monitored on a weekly basis. First Wind will assess the need to mow plots to increase searcher efficiency throughout the survey year.

Nightly weather conditions will be monitored throughout the survey period. Wind speed and direction, barometric pressure, and temperature will be recorded at an on-site meteorological tower, and/or by an anemometer on a turbine nacelle. Additional weather parameters will be recorded by the biologist from a location in proximity of the Project on nights prior to fatality searches. These parameters will include cloud type, percent cloud cover, general ceiling height, relative visibility, moon phase, precipitation, and any notable weather events (passing of storms or fronts). Additionally, during site visits the biologist will document incidental wildlife observations on standardized field forms.

Searcher Efficiency Trials:
Searcher efficiency trials will be conducted throughout the study period, and the biologist will be unaware of trial dates. Carcasses will be discreetly marked and placed at turbines by the trial coordinator early in the morning prior to scheduled turbine searches. Any carcasses not found during searches will be retrieved at the end of the survey day. Trial results will be documented on standardized field forms. A target number of 25 carcasses will be placed during trials over the course of the survey year. Carcasses will be of native species, if available; otherwise, surrogate non-native species will be selected. Trial carcasses will include both large and small bird and bat carcasses. Trials will be distributed across the four seasons of surveys, and carcasses will be placed in the variety of ground cover types that occur within search areas. The percent of carcasses found during trials will be used to estimate the level of bird and bat take during the study period.

Scavenger Carcass Removal Trials:
Scavenging rate trials will be conducted during each survey season and will be completed independently of the searcher efficiency trials. A target total of 25 carcasses will be placed within all available ground cover types within search areas. Fresh bird and bat carcasses of native species will be discretely marked and monitored until they are removed by scavengers or completely decomposed. Carcasses will be checked during the first 5 days after they are placed, then again on days 7, 10, 14, 24, 28, and on additional days if necessary. During the trial periods, the status of all carcasses, including all evidence of scavenging or decomposition, will be documented on standardized field forms. The scavenger carcass removal data will be used to estimate the percent of carcasses that remain detectable in search areas during the 7-day interval between standardized searches. Monitoring of carcasses beyond the 7-day period will also indicate the average number of days that carcasses remain in search areas.

Search area correction:
If the generally 80-m diameter search area is significantly reduced by forest edge at any search turbines, a correction factor may be applied to the number of carcasses found at these turbines. To estimate the number of carcasses that may have occurred in non-searchable areas at abbreviated search plots, a correction factor would take into account the total searchable area, the total non-searchable area, and the number of carcasses observed within the searchable area.

Analysis and Reporting:
The species, date, turbine number, and weather conditions for each bird and bat fatality will be compiled into a table and included in the annual report. Analysis will include a summary of the distances bird and bat carcasses were found from turbines and the distribution of fatalities among turbines throughout the Project area in relation to topographical and Project design features (e.g., on slope, top of hill, turbine string, location within turbine string, Federal Aviation Administration [FAA] lighting). The number of carcasses found during standard searches, the percent of carcasses found by the biologist as determined by the searcher efficiency trials, the percent of carcasses that are not removed by scavengers between search intervals, and if necessary, an area correction factor will be used to determine an estimate of bird and bat take during the study period. This will include an estimate of the number of bird and bat fatalities per turbine and per megawatt per study period. The formula used to estimate mortality will be a standard formula employed by other recent mortality studies and will be based on the method deemed most accurate at estimating fatality at the time of reporting.

Nocturnal Migration Radar Survey
If consultation with MDIFW indicates the need for survey, nocturnal migration activity will be sampled by radar during an additional migration season. Sampling will be timed to occur during peak migration periods, and will correspond with weather conditions either conducive to migration activity, and/or conditions that could place nocturnal migrants at greater risk of collision (i.e., foggy or inclement weather). Standard marine surveillance radar methodologies will be used to document and calculate nightly passage rates, flight heights, and flight directions. The survey will be conducted to identify if the higher

passage rates and relatively low flight heights documented during pre-construction surveys at Bull Hill represents a pattern or an anomaly.

If the additional season of radar survey takes place post-construction, a radar location at which at least five turbines are visible on the radar screen will be selected. The nightly radar surveys will be followed by fatality searches at the five turbines visible on the radar screen the following morning. The radar data will be analyzed to determine if use, as documented with the radar, and fatality appear to be related and, if so, how.

Adaptive Management:
An adaptive management plan (AMP) will be developed in consultation with MDIFW. The AMP will include 1) an assessment of the level of impact of observed fatality rates, 2) if fatality rates are unusually high, further study to determine the biological or behavioral factors, Project design features, and/or environmental conditions (i.e., weather) that may influence morality, and 3) implementation of appropriate management action(s) to reduce mortality in the event that it is determined to be an unreasonable adverse impact.

If the first year of monitoring finds that mortality levels (at all turbines combined or at a sub-set of turbines) present a possibly unreasonable adverse impact (i.e., unusually high mortality or impacts to sensitive species), follow-up monitoring would be initiated. Subsequent monitoring would focus on determining the factors (biological/behavioral, Project design, and/or environmental) that are influencing mortality. The scope and methods of more focused monitoring would be determined in consultation with MDIFW.

Based on the results of more focused monitoring, the need for and appropriateness of possible management actions would be investigated. Management actions would largely depend upon the bird or bat species group impacted, as well as the factors contributing to mortality. Possible management options, pending the specific circumstances resulting in increased collision risk, include but are not limited to:

- lighting schemes on Project structures may be changed, as permissible by the FAA;
- project structures, such as stairways leading up to tower doors, may be modified if being used for perching or nesting by birds;
- nests may be relocated and/or nesting birds may be deterred from an area if the locations of nests are resulting in increased collision mortality;
- the formation of seasonal water sources may be prevented in the direct vicinity of turbines if resulting in increased collision mortality of birds or bats;
- pending cooperation of landowners, on-site land uses or habitats surrounding turbines may be altered to reduce attraction of birds or bats; or
- limited operational curtailment may be implemented during increased collision risk periods for birds or bats.[1]

The appropriateness and effectiveness of potential management actions would be determined in consultation with MDIFW. Specific management actions would focus on the factors contributing to increased mortality. For example, if a sub-set of turbines were found to be resulting in a relatively high rate of mortality of bats during a specific timeframe, operational curtailment of this sub-set of turbines may be implemented during the timeframe of increased collision risk. Development of the components of the Bull Hill AMP will consider the best available and most current scientific information.

Literature Cited:
Arnett, E., M. Schirmacher, M. Huso, J. Hayes. 2009. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. Prepared for the Bats and Wind Energy Cooperative and the Pennsylvania Game Commission.

[1] A study at the Casselman Wind Project in Somerset County, PA indicated that reducing operational hours during low wind periods reduces bat fatalities (Arnett *et al*. 2009). The study showed a 53 to 87% reduction of nightly bat fatalities, resulting in marginal annual power loss.

1.0 Anticipated Life of Wind Turbines

Megawatt-scale wind turbines are designed and certified by independent agencies for a minimum expected operational life of 20 years.

As the wind turbines approach the end of their expected life, it is expected that technological advances will make available more efficient and cost-effective generators that will economically drive the replacement of the existing generators.

Following the commencement of operation of the project, absent the existence of a Force Majeure event, as defined herein, there will be a rebuttable presumption that owner shall decommission the project in the event that there is an absence of electricity generated by the Project for a continuous period of twelve (12) months. In addition to the Force Majeure exception, the owner may also provide reasonable evidence that the project has not been abandoned and should not be decommissioned.

"Force Majeure" as used herein shall mean fire, earthquake, flood, tornado or other acts of God and natural disasters; strikes or labor disputes; war, civil strife or other violence; any law, order, proclamation, regulation, ordinance, action, demand or requirement of any government agency; suspension of operations of all or a portion of the project for routine maintenance, overhaul, upgrade or reconditioning; or any other act or condition beyond the reasonable control of a party.

2.0 Estimated Cost of Decommissioning

The cost of decommissioning the wind turbines is offset by the salvage value of the towers and the turbine components. The underground electrical system will be left in place. The Operations and Maintenance building will be transferred to the underlying landowner, and the substation will be transferred to Bangor Hydro Electric. As of the date hereof, estimated cost of decommissioning, minus salvage value is $250,000 as shown in Table 1, below.

Table 1. Estimated Decommissioning Costs and Salvage Values

Category	Decommissioning Cost	Salvage Value	Net
Project Management (contractor costs, equipment, etc)	$ 2,050,000.00	$ -	$ (2,050,000.00)
Site work/Civil (site reclamation)	$ 750,000.00	$ -	$ (750,000.00)
Wind Turbine Foundations	$ 500,000.00	$ -	$ (500,000.00)
Wind Turbine Generators and MET towers (towers/hub/nacelle/blades/etc.)	$ 5,950,000.00	$ 9,000,000.00	$ 3,050,000.00
		Total	**$ (250,000)**

3.0 Ensuring Decommissioning and Site Restoration Funds

On or prior to December 31 of each calendar year beginning with the calendar year in which the project commences commercial operations through and including calendar year 7, an amount equal to $35,000 shall be reserved for decommissioning and site restoration. Such amount may be in the form of a performance bond, surety bond, letter of credit, parental guaranty or other acceptable form of financial assurance (the "Financial Assurance").

On or prior to the end of calendar year 15 of the project's operation, the estimated cost of decommissioning (minus salvage value) will be reassessed and an amount equal to the balance of such updated estimated cost of decommissioning (minus salvage value) less the amounts reserved pursuant to the immediately preceding paragraph will be reserved for decommissioning and site restoration.

The Financial Assurance shall be kept in place until such time as the decommissioning work has been completed, provided, however, to the extent available as liquid funds, the Financial Assurance may be used to offset the costs of the decommissioning.

4.0 Decommissioning Process Description

Decommissioning and restoration activities will adhere to the requirements of appropriate governing authorities, and will be in accordance with applicable federal, state, and local permits.

The decommissioning and restoration process comprises removal of above-ground structures; removal of below-ground structures to a depth of 24 inches; grading, to the extent necessary; restoration of topsoil and seeding;

The process of removing structures involves evaluating and categorizing all components and materials into categories of recondition and reuse, salvage, recycling and disposal. In the interest of increased efficiency and minimal transportation impacts, components and material may be stored on-site in a pre-approved location until the bulk of similar components or materials are ready for transport. The components and material will be transported to the appropriate facilities for reconditioning, salvage, recycling, or disposal.

Above-ground structures include the turbines, transmission lines, and meteorological towers. Below-ground structures include turbine, foundations; collection system conduit and cable; fiber optic facilities; and subterranean drainage structures (if any). The above-ground structures and below-ground structures are collectively referred to herein as the "Wind Project Components".

In connection with the decommissioning of the Wind Project Components and removal as further set forth below, in the event that on or prior to decommissioning owner provides evidence of a plan of continued beneficial use of any of the Wind Project Components, such items shall be excepted from the requirements of decommissioning and the existing license shall be amended to reflect such revisions.

Turbine removal. Access roads to turbines will be widened to a sufficient width to accommodate movement of appropriately sized cranes, trucks, and other machinery required for the disassembly and removal of the turbines. Control cabinets, electronic components, and internal cables will be removed. The rotor, nacelle and tower sections will be lowered to the ground where they may be transported whole for reconditioning and reuse, or disassembled/cut into more easily transportable sections for salvageable, recyclable, or disposable components.

Turbine foundation removal. Topsoil will be removed from an area surrounding the foundation and stored for later replacement, as applicable. Turbine foundations will be excavated to a depth sufficient to remove all anchor bolts, rebar, conduits, cable, and concrete to a depth of 24 inches below grade. The remaining excavation will be filled with clean sub-grade material of quality comparable to the immediate surrounding area. The sub-grade material will be compacted to a density similar to surrounding sub-grade material. All unexcavated areas compacted by equipment used in decommissioning shall be de-compacted in a manner to adequately restore the topsoil and sub-grade material to the proper density consistent and compatible with the surrounding area.

Underground collection cables. The cables and conduits contain no materials known to be harmful to the environment. As part of the decommissioning, these items will be cut back to a depth greater than 24 inches. Cable and conduit buried greater than 24 inches will be left in place and abandoned, unless required for any future site development.

Access roads and construction pads. After decommissioning activities of a turbine site are completed, access gates shall remain operational until completion of decommissioning, at which time they will be removed unless required by the landowner that they remain.

Improvements to Town and County roads that were not removed after construction at the requested of the Town or County will remain in place.

5.0 Site Restoration Process Description

Topsoil will be removed prior to removal of structures from all work areas and stockpiled, clearly designated, and separate from other excavated material. The topsoil will be de-compacted to match the density and consistency of the immediate surrounding area. The topsoil will be replaced to original depth, and original surface contours reestablished where possible. Any topsoil deficiency and trench settling shall be mitigated with imported topsoil consistent with the quality of the affected site.

Following decommissioning activities, the sub-grade material and topsoil from affected areas will be de-compacted and restored to a density and depth consistent with the surrounding areas. The affected areas will be inspected, thoroughly cleaned, and all construction-related debris removed.

Disturbed areas will be reseeded to promote re-vegetation of the area to a condition reasonably similar to the original condition, reasonable wear and tear excepted. In all areas restoration shall include, as reasonably required, leveling, terracing, mulching, and other necessary steps to prevent soil erosion, to ensure establishment of suitable grasses and forbs, and to control noxious weeds and pests.