



May 25, 2011

Fred Todd, Project Planner  
Maine Land Use Regulation Commission  
22 State House Station  
Augusta, ME 04333

Re: Champlain Wind, LLC  
Bowers Wind Project – DP 4889

Dear Fred:

Champlain Wind, LLC (“Champlain”) is providing the following response to LURC review comments on the Bowers Wind Project, as well as to comments received from LURC third-party review consultants and other review agencies.

The comments are identified below and each is followed by Champlain’s response. As stated in the review comments and noted, as appropriate, some items have already been addressed and a further response is not required in connection with this submission. Note that Exhibits 1A and 10B have been revised based on agency comments and we understand that LURC will post to the project website.

## **A. LURC COMMENTS**

1. **Comment (Fred Todd, email dated 5/4/11)** “I understand the situation regarding tangible benefits has changed with the change in Department of Conservation administration and that our expectations regarding tangible benefits are addressed in the 3<sup>rd</sup> Procedural Order.”

**Champlain Response:** The proposed Tangible Benefits package for the Project will consist of the following:

1. Community Benefit Agreement with Carroll Plantation. On May 23, 2011, Carroll Plantation voted to accept a proposed Community Benefit Agreement. Under the Agreement, Champlain will pay Carroll Plantation an annual amount of \$92,000 for the life of the project. The Agreement will be forwarded to LURC once the documents are finalized and executed by the Assessors.
2. Payment to Washington County. Champlain will pay Washington County an annual amount of \$10,000 for the life of the Project. A letter from Washington County Commissioners indicating their willingness to accept these annual payments was received by LURC on May 17, 2011.
3. Kossuth Energy Fund. Champlain will establish an Energy Fund to offset the cost of energy for Kossuth residents as well as energy related projects. The Sunrise County Economic Council of Washington County has agreed to hold and administer the Energy Fund. Champlain will make an initial payment of \$20,000 to the Energy Fund and thereafter, shall make an annual payment of \$15,000 to said fund for the life of the project. A letter from the Sunrise Economic Council indicating its willingness to accept and administer said fund was received by LURC on May 24, 2011.

4. Bowers Mountain Conservation Fund. Champlain will establish a Conservation Fund in cooperation with the Forest Society of Maine. The Fund will be authorized to issue grants to further the conservation of land and natural resources in the area around the project including Carroll Plantation, Lakeville and Kossuth. The Forest Society of Maine will administer the Conservation Fund with a Board that shall consist of a representative from Carroll Plantation, Lakeville and Kossuth or Washington County. Champlain shall pay the Conservation Fund an annual amount of \$25,000.00 per year for the life of the project. A letter from Forest Society of Maine indicating their willingness to administer the Conservation Fund is in-progress and will be submitted to LURC when available.

2. **Comment (Fred Todd, email dated 5/4/11):** "Reference is made in section 14.3 of Volume I to the "likely" need to check two streams crossings "once additional consultation with MHPC is completed". Can you provide more information on your intentions here? Are you waiting on MHPC to decide on the need for such a check?"

**Champlain Response:** See Champlain's response in B.2.

3. **Comment (Warren Brown, review dated 5/6/11):** "In my opinion the Bowers Wind Project noise assessment is reasonable and technically correct according to standard engineering practices required by LURC."

**Champlain Response:** No further response required.

4. **Comment (Warren Brown, review dated 5/6/11):** "I recommend required routine operation noise compliance measurements at a minimum of three protected locations designated in the application noise assessment as "Receptor Locations" R1, R2 and R3."

**Champlain Response:** Champlain intends to conduct post-construction monitoring to demonstrate compliance, as described in Section 7 of Exhibit 16, consistent with the recommendations described. No further response required.

4. **Comment (Jim Palmer, review dated 4/28/11):**

**Champlain Response:** As authorized by Fred Todd email dated 5/23/11, response will be provided under separate cover.

## **B. MHPC COMMENTS (4/25/11)**

1. **Comment:** "We note that field #49 (Farm Acreage) on the farmstead survey forms was not completed. If the applicant provides this information for the newly surveyed farmsteads, we will add this information to the appropriate forms."

**Champlain Response:** This information was provided to MHPC on May 6, 2011. No further response needed.

2. **Comment:** "Stream crossings for the express collector corridor at Tolman Brook and Lindsey Brook need further archaeological field checks and/or testpit excavation, once those locations are better specified. This is the only further archaeological work necessary for this project."

**Champlain Response:** Please see memorandum prepared by Rick Will of TRC, dated May 23, 2011, in Attachment 1. For Lindsey Brook, the terrain around the crossing is low and wet. It does not appear to be navigable by canoe even during spring high water. No further investigation is recommended. For Tolman Brook, the express collector is located in the upper elevation of this small tributary where there are no breaks in slope or topographic high spots where Precontact people would have engaged in land use activities. No further investigation is recommended.

### C. MDIFW COMMENTS (4/15/11)

1. **Comment:** “MDIFW requests clarification on the survey effort conducted for colonies. Were surveys only conducted along the shores of waterbodies, or were smaller wetlands and beaver flowages included as initially requested? MDIFW requested that “all wetlands with the potential of containing snags be searched as well”. If there is a second season of eagle surveys to be conducted and all potential wetlands were not searched as requested, then MDIFW would request that these smaller wetlands and beaver flowages be searched during the June eagle survey effort.”

**Champlain Response:** Survey effort for great blue heron colonies were conducted along all waterbodies as well as large wetland complexes in the survey area, including Lindsey Bog, a wetland complex with extensive beaver flowages, and the large wetland systems associated with Baskahegan Stream. Stantec performed an extensive search for great blue heron nest #142 located north of the survey area along Baskahegan Stream but was unable to locate it. In addition, large wetland complexes immediately adjacent to all waterbodies within the survey area were also surveyed. It’s also important to note that no great blue herons were observed during raptor migration flights or noted as incidental wildlife observations during other project surveys.

2. **Comment:** “Bats: Recent studies (Arnett et al. 2009 & 2010, Baerwald et al. 2008) at operating wind facilities have indicated that increasing the cut-in speed (the wind speed at which the turbine is allowed to begin rotating) for operating turbines to 5.0 meters per second has significantly decreased turbine-caused fatalities for bats. Therefore, in order to minimize risk of mortality to bats MDIFW recommends that operational control measures be established. These measures should be employed from April 20<sup>th</sup> through October 15<sup>th</sup>, such that the applicant set the turbine cut-in speed to 5.0 m/s starting at one-half hour before sunset to one-half hour after sunrise. During this time frame when the wind speed is less than the 5.0 m/s threshold, turbine blades are not allowed to rotate thus reducing risk of fatality for bats. If at any point during this time period the wind speed increases to > 5.0 m/s the turbine blades are free to rotate. Included below are full citations for the above references:”

**Champlain Response:** Please see memorandum prepared by Mr. Adam Gravel of Stantec, dated May 24, 2011, in Attachment 2. We would like to meet with MDIFW to discuss the recommended approach described in that memo.

3. **Comment:** “Post-Construction Avian and Bat Fatality Monitoring Protocol: MDIFW will be requesting a minimum of two years of post-construction monitoring with an option for a third depending on results from the previous two years. Exhibit 19 of the Application provides a good starting point however as stated by the Applicant, the final work plan will be developed in consultation with MDIFW if and when the project is approved by LURC. The post-construction monitoring plan must be finalized and approved by MDIFW prior to the approval for the permit. Of note in the Avian and Bat Survey Reports, the proportion of targets flying below the maximum turbine height was quite high during the spring surveys.”

**Champlain Response:** The development of effective post-construction monitoring plans is based on information gathered during pre-development assessments as well as post-

construction surveys conducted elsewhere in Maine and Northeast. Through consultation with MDIFW and USFWS, new knowledge about avian and bat impacts becomes available after each year of study. We have revised Exhibit 19 to include the details that are consistent with the current information and current MDIFW requirements; it is included as Attachment 3. If there are specific gaps, please let us know. Additionally, Champlain intends to continue consultation and incorporate the results of ongoing monitoring efforts once the project is approved by LURC, and will work with MDIFW and USFWS to finalize the post-construction monitoring plan based on any additional available information.

In response to the note about the proportion of targets flying below maximum target height during the spring season, as described in Appendix A, Table 5 in Exhibit 12B of the application, the average percentage documented at Bowers (26% in Spring 2010) was very similar to percentages documented at the nearby Stetson Wind Project (22% in Spring 2007). The average percentage documented during fall surveys were also very consistent between Bowers (14% in Fall 2009) and Stetson (13% in Fall 2006). The proportion for both spring and fall surveys were within the range of percentages documented at other pre-construction surveys in similar forested landscapes. It's important to note that this pre-construction estimate does not directly correlate to avian fatality documented post-construction. For example, during two years of post-construction monitoring at Stetson, fatality estimates of birds ranged from 2.14 to 2.4 birds/turbine/year.

#### **D. MNAP COMMENTS (3/21/11)**

No comments required response.

#### **E. MPUC COMMENTS (4/22/11)**

No comments required response.

#### **F. DEP, DIVISION OF ENVIRONMENTAL ASSESSMENT COMMENTS (5/10/11)**

1. **Comment:** "No water supply or wastewater disposal is described for the substation; it is assumed that water supply and wastewater disposal will be required for at least the Operations and Maintenance Building, but that information is not included in the materials received for review, and relevant information should be provided as soon as possible."

**Champlain Response:** No water supply or wastewater disposal are required for the substation. The water supply and wastewater disposal for the Operations and Maintenance Building are included in Section 15A of the application and were provided for Mr. Hopeck's review on May 23, 2011.

2. **Comment:** "The blasting plan as submitted does not include the specific performance standards for management of possible adverse effects of ground vibration, air overpressure, flyrock control, record keeping, and other relevant requirements...."

**Champlain Response:** The standards listed in Mr. Hopeck's letter of May 10, 2011 have been incorporated in a revision to Exhibit 5B, and are included in Attachment 4.

3. **Comment:** “No precautionary measures [for acid drainage] beyond those taken at the Rollins Mountain site and as described in Exhibit 15C of this application are considered necessary at this time.”

**Champlain Response:** No further response needed at this time.

4. **Comment:** “Prior to operation, the applicant should submit for review and approval a Spill Prevention, Control, and Countermeasures Plan addressing the operation of the project.”

**Champlain Response:** Champlain intends to develop a detailed SPCC Plan prior to operation. No further response needed at this time.

5. **Comment:** “The applicant should submit for review and approval by the commission a vegetation management plan addressing herbicide use, manual clearing, and other procedures for maintenance of the rights-of-way and other relevant areas of the project.”

**Champlain Response:** Champlain intends to develop a detailed vegetation management plan prior to operation. No further response needed at this time.

#### **G. DEP, DIVISION OF WATERSHED MANAGEMENT COMMENTS (5/10/11)**

1. **Comment:** “Engineering: Please direct me to the project SPCC plan.”

**Champlain Response:** The SPCC Plan is included as Section 7C and was provided for Mr. Waddell’s review on May 23, 2011.

2. **Comment:** “Basic Standards #1-10, General Comments #11-39, Flooding Standard #40.”

**Champlain Response:** Please see memorandum prepared by Sewall, dated May 23, 2011, and included as Attachment 5.

#### **H. STATE SOIL SCIENTIST COMMENTS (4/6/11)**

1. **Comment:** “General: Standard details sheet should include details for blast rock roads, blast rock crane paths and blast rock turbine pads.”

**Champlain Response:** A note has been added to the existing detail.

2. **Comment:** “General: use of rock sandwiches.”

**Champlain Response:** In some areas of concern, rock sandwiches were added to the plans in the revised Exhibit 1A. Notes were also added to the details describing the site conditions in which rock sandwiches should be installed, to allow the contractor flexibility to install where appropriate.

3. **Comment:** “Specific Comments #1-12,” which include specific requests for revisions to the civil design plans.

**Champlain Response:** Please see memorandum prepared by Sewall, dated May 23, 2011, included as Attachment 6.

4. **Comment:** "Specific Comments #13-14," which include specific requests for soils information in the vicinity of the proposed Operations and Maintenance building.

**Champlain Response:** Requested materials were provided on April 25. and Mr. Rocque indicated on May 6 that no further comment is needed regarding that information.

5. **Comment:** "Specific Comments #15-18," which request additional information about soils identified along the express collector and construction access and techniques for the express collector.

**Champlain Response:** Please see memorandum prepared by Mr. Dale Knapp of Stantec, dated May 23, 2011, included as Attachment 7.

6. **Comment:** "Specific Comments #19," which requests details for road construction associated with the substation.

**Champlain Response:** The standard detail sheets for all road construction to be permitted as part of this project are included on Sheets 1-4 of Exhibit 1A – no further response is required at this time.

Thank you for your consideration of these comments. Please do not hesitate to contact me with any questions.

Sincerely,



Neil Kiely  
Project Developer  
Champlain Wind, LLC

Attachments:

- 1 – Memo from TRC
- 2 – Memo from Stantec
- 3 – Revised Exhibit 19
- 4 – Revised Exhibit 5B
- 5 – Memo from Sewall
- 6 – Memo from Sewall
- 7 – Memo from Stantec

Revised Exhibit 1A submitted via FTP  
Revised Exhibit 10B submitted via FTP

## **Attachment 1**

## Memorandum

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To: Dr. Arthur Spiess, Maine Historic Preservation Commission.  
From: Rick Will, TRC, Inc  
Re: Addendum to Bower Wind Project  
Date: May 23, 2011

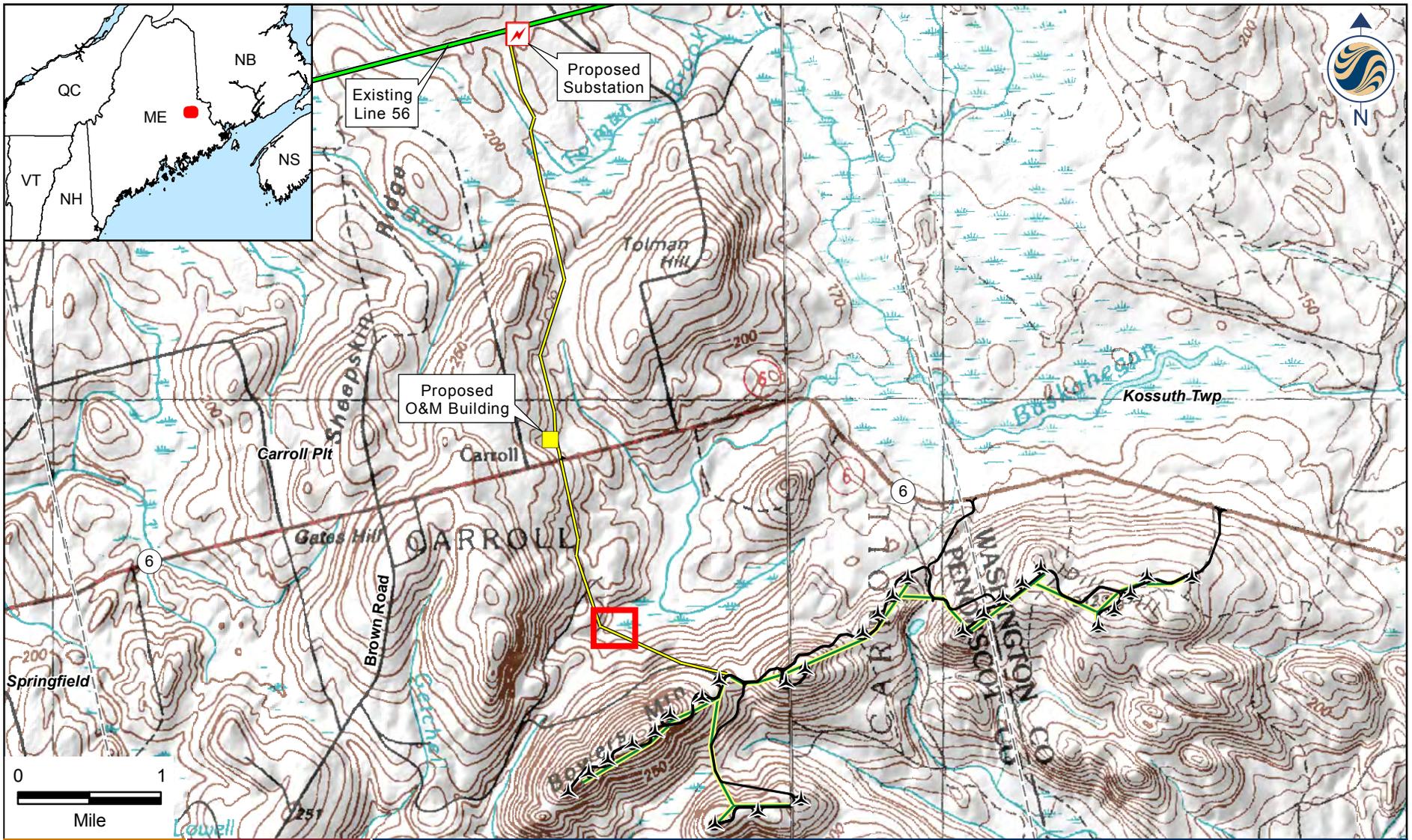
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Review of Precontact period archaeological resources within the proposed Bowers Wind Project that is planned by Champlain Wind Energy was completed by Dr. Arthur Spiess of the Maine Historic Preservation Commission (April 25, 2011). The wind energy generating facility will be located on leased, private property in Carroll Plantation and Kossuth Township, Penobscot and Washington counties, Maine. Dr. Spiess agreed with the conclusions that the project area generally posed low Precontact period archaeological sensitivity and that additional archaeological consideration would have to be given to the location of the transmission line, substation, and operations and maintenance (O & M) building once their locations were determined.

The attached Figure 1 shows the location of the proposed transmission line and accompanying structures. Notably, the final location of the proposed transmission line is west of the originally proposed line. The proposed substation is at the intersection of the project transmission line and the existing Line 56 transmission line. The proposed O & M building is located near Route 6 and the intersection of the proposed project transmission line. Both of these facilities are located in areas with no nearby water sources. These areas are not considered sensitive for Precontact period archaeological resources.

The original route planned for the express electrical collector crossed Tolman Brook and it was recommended for examination once the final line configuration was established. The final configuration for the collector is located in the upper elevation of this small tributary where there are no breaks in slope or topographic high spots where Precontact people would have engaged in land use activities. No further investigation of this stream crossing is recommended. The proposed express electrical collector does cross another small brook (Lindsey) to the north of Bowers Mountain. Figure 2 is a photograph of this stream where the proposed electrical collector will cross it. The nearest poles will be located approximately 46 m to the south and 91 m to the north of the brook. The terrain around the crossing is low and wet. It does not appear to be navigable by canoe even during spring high water. No further archaeological consideration of this area for Precontact period archaeological resources is recommended.

In summary, review of the proposed Bowers Wind project features (i.e., the transmission line, substation, and O & M building) indicates that sensitivity for Precontact period archaeological resources is low and that no further archaeological evaluation is warranted.



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**Legend**

- Proposed Turbine Layout
- Express Collector Corridor
- Mountain Top Collector Corridor
- Proposed Access Road

**Client/Project**  
 Bowers Mountain Wind Project  
 Carroll Plt. and Kossuth TWP, Maine

Figure No.  
**1**

Title  
**Site Location Map**  
 January 10, 2011



Figure 2.

Photograph of stream associated with Lindsey Brook where the proposed electrical collector will cross stream.

The nearest poles will be located approximately 46 m to the south and 91 m to the north of the brook.

## **Attachment 2**



**Stantec**

May 24, 2011

Neil Kiely  
First Wind, LLC  
129 Middle Street, 3<sup>rd</sup> Floor  
Portland, ME 04101

**Subject: Response to Maine Department of Inland Fisheries and Wildlife (MDIFW)  
Comments for the Bowers Wind Project (DP 4886)**

Dear Mr. Kiely:

We have reviewed the email from Mark Caron, the Assistant Regional Wildlife Biologist of MDIFW dated April 15, 2011, recommending operation control measures to be established at Bowers to minimize risk of mortality to bats. We are familiar with the two studies cited in his review that have indicated decreased turbine-caused bat fatalities with increased cut-in speeds (Arnett et al. 2009 and 2010, Baerwald et al. 2009). However, we believe it's critical that any decisions about operational control measures should be based on data from the project site or similar locations in Maine. These local results show that:

- Detection rates at Bowers are consistent with pre-construction acoustic surveys conducted at Stetson;
- Post-construction surveys at Stetson and elsewhere in Maine have documented low rates of mortality, compared to surveys in mid-Atlantic locations cited by MDIFW;
- During four years of post-construction monitoring in Maine, peak fatalities occurred during a ten-day period in mid August, when between three and eight fatalities were documented on three separate days; and
- Although MDIFW expresses concern for declining populations of *Myotis* species as a result of White Nose Syndrome, only seven calls of *Myotis* species were recorded during Bowers pre-construction acoustic surveys in met towers.

Therefore, we do not believe Bowers presents a risk of bat mortality sufficient to warrant the implementation of increased cut-in speed as an initial mode of operation. Within this letter, we will provide further information supporting this statement and present an alternative study approach for MDIFW consideration.

Comparison of Studies cited by MDIFW with Studies conducted in Maine

The curtailment studies cited by MDIFW have been conducted at sites with some of the highest documented bat mortality at operational wind energy projects in North America. On a per turbine basis, bat mortality rates at these projects are much higher than rates observed in Maine, as described in Exhibit 12B of the application.

A total of 32 bat fatalities were found at 12 turbines at the Casselman Wind Project in Somerset County, Pennsylvania between July and October, 2008 (Arnett et al. 2009 and 2010). At the Summerville Wind Project in southwestern Alberta, Canada, the project at which Baerwald et al. (2009) performed their mitigation experiment, a total of 532 bats were found at 39 turbines between January 2005 and January 2006 (Brown and Hamilton 2006). At an additional Pennsylvania project, the Meyersdale Wind Project, a

total of 262 bat fatalities were found at 10 turbines between late July and September, 2004 (Arnett et al. 2005).

In contrast, post-construction mortality studies conducted in Maine documented a much lower fatality rate. At the Mars Hill project, a total of 27 bat fatalities were found during two years of monitoring at 28 turbines (Mars Hill; Stantec 2008 and 2009); at the Stetson I project, a total of 5 bat fatalities were found at 19 turbines at the (Stetson; Stantec 2010a); at the Stetson II project, a total of 14 bat fatalities were found at 17 turbines (Normandeau 2010)<sup>1</sup>. It is important to note that although the Maine studies were carried out over a longer monitoring period, they were conducted in similar landscapes (i.e. forested ridgelines), and included a greater number of turbine searches compared to the sites cited above; far fewer bat fatalities have been discovered and mortality rates in Maine appear to be substantially lower.

In addition to the differences between the surveys in Maine and other locations, several other datapoints inform our statement that operational control measures are not appropriate during the first year of operation.

#### Consistent Pre-Construction Results from Detectors Placed in Met Towers

Despite the current lack of a strong statistical relationship between pre construction acoustic bat activity and post construction mortality, comparison of pre-construction acoustic bat survey results from proposed projects and projects that have since been constructed helps inform the level of risk to bats. The pre-construction acoustic bat surveys conducted at Bowers followed methods consistent with those conducted at other projects in Maine, including at Mars Hill and Stetson, two projects that are now operational and for which post-construction mortality monitoring has been conducted. The purpose of these pre-construction acoustic studies was to document overall species composition and activity rates of bats in the project area to inform predictions of potential risk to bats as a result of the project.

Stantec conducted pre-construction acoustic bat surveys in meteorological towers at Mars Hill in 2005, at Stetson in 2006 and 2007, and at Bowers in 2010. The results of these studies are presented in Table 1 and results of over 50 other pre-construction surveys are presented in Exhibit 12B of the application.

**Table 1.** Comparison of bat detection rates between Bowers, Mars Hill and Stetson

Project	Year	Season	Survey Dates	# of Met Detectors	Met Detection Rate (call seq/det/night)	Reference
Mars Hill	2005	Fall	late Aug – mid Sept	2	0.8*	Woodlot Alternatives, Inc. 2006
Stetson	2006	Summer/Fall	late Jun – mid Oct	4	2.6	Woodlot Alternatives, Inc. 2007a
Stetson	2007	Spring	late Apr – mid Jun	3	2.0	Woodlot Alternatives, Inc. 2007b
Bowers	2010	Spring	late Apr – mid Jun	2	1.8	Stantec Consulting 2010b
Bowers	2010	Summer/Fall	mid Jun – early Sept	2	1.28	Stantec Consulting 2010b

\* detection rate calculated on 25 total calls recorded during 30 nights of sampling.

Although surveys occurred in different years, with different numbers of detectors, the detection rates are consistently low. Exhibit 12B of the application includes results from over 25 additional pre-construction surveys, showing similar results for sites in forested landscapes. These findings suggest that anticipated bat mortality rates would also be similar among sites, and would be expected to be at the low end of the documented range compared to other operational wind projects in the Northeast.

<sup>1</sup> The 2007 monitoring period at Mars Hill lasted from April to June and July to September, and from April to June and July to October in 2008. The 2009 monitoring period at Stetson I and 2010 monitoring period at Stetson II lasted from April to October.

### Results of Post-Construction Monitoring at Nearby Stetson Wind Projects

The overall detection rates of the acoustic detectors at Bowers were lower than those documented pre-construction at Stetson I and II, where, as described in Exhibit 12B, post-construction monitoring in 2009 and 2010 estimated 2.14 to 2.48 bat fatalities/turbine/year. Additional information from post-construction acoustic bat surveys also show similar trends as these and other pre-construction surveys in Maine and New England. At Stetson in 2009, post-construction acoustic surveys were conducted concurrent with weekly mortality surveys and documented an overall detection rate of 0.3 call sequences per detector night at detectors deployed on the wind turbine nacelles.

### Timing of Bat Fatalities in Maine

Figure 2 in Exhibit 19 in the application describes the timing of bat carcass discovery during four mortality studies in Maine in four different years. Throughout these four years, the peak period of bat fatality discovery was between July 15 and September 22. Specifically, over these four years, on four days, two bat carcasses were discovered, and on three days, between August 8 and 18, three to eight bat carcasses were discovered. Approximately 50 percent of bat fatalities were documented during this ten-day period over the four years.

### Low Number of *Myotis* Calls Recorded

MDIFW has expressed concern for declining populations of *Myotis* species as a result of White Nose Syndrome and has recommended that operational control measures be implemented as a minimization strategy to reduce potential impacts to bats. We understand and share this concern; however, based on the pre-construction surveys at Bowers, only seven calls from *Myotis* species were recorded by the met tower detectors.

For these reasons, we do not believe Bowers presents a risk of bat mortality sufficient to warrant the implementation of operational control measures as an initial mode of operation. However, we understand MDIFW's concern for the potential of declining bat populations and therefore, we recommend that First Wind commit to operational control measures as part of the final post-construction monitoring plan for the Project. A similar study has been proposed at Bull Hill, as described below, and we recommend meeting with MDIFW to evaluate the merits of a similar program for Bowers.

For reference, the following measures were described in the Revised Exhibit 19 from the Bull Hill application submitted to MDIFW on May 16, 2011:

"First Wind will implement operational control measures at the Project during the first two years of operation. This will include curtailment of half [10] of the turbines in the Project at a cut-in speed of 5 m/s. The other half of the turbines will be allowed to operate at normal cut-in speeds so that a control can be established to determine the effectiveness of these minimization measures for a project in Maine, a state where bat mortality has been documented to be low. Operational control measures will occur only during night hours (roughly ½ hour after sunset until sunrise) when bats are active and when wind speeds are less than 5 m/s and temperatures are above 50 degrees Fahrenheit. Operational control measures will be implemented from early May through late September to coincide with the period when the majority of bat mortality has occurred at other operational wind projects."

We believe the timing of any operational control measure is particularly important to evaluate. The results of nearly every pre-construction acoustic bat survey conducted at proposed wind energy projects have documented that bat activity is greatest during July, August, and early September and on nights with low wind speeds (i.e., at or below 5 meters per second) and warm temperatures (i.e. at or above 50 degrees Fahrenheit). This period of increased bat activity also corresponds with the time period that the majority of bat fatalities have been documented at other operational wind energy projects. Similar patterns of bat activity and mortality are expected at Bowers, as these patterns have been observed at the nearby Stetson project, as well as at a wide range of projects with differing levels of mortality. As described, bat activity is typically considered to be low when nightly temperatures are less than 50 degrees Fahrenheit (10 degrees Celsius); at Bowers, average nightly temperatures were less than 50 degrees on 33 nights between April 15 and June 15 and on 23 nights between September 4 and October 14.

In addition to the information described above, new information about the effectiveness of operational control measures will be available from other projects prior to the approval and construction of Bowers and these results should be used to inform any post-construction monitoring plan or implementation of operational control measures. For example, as part of the permitting process for the Sheffield Wind Project in Sheffield, Vermont, First Wind entered into an agreement with the Vermont Agency of Natural Resources to conduct a post-construction mortality study once the project becomes operational. This study is designed to test operation control measures that include curtailment of turbines at different cut-in speeds. This study will be conducted by Bat Conservation International, the same organization that conducted the curtailment study at the Casselman Wind Project cited above. The Sheffield Project is similarly-sized and is at similar latitude as Bowers and will be the first project in New England to study the effects of different turbine cut in speeds on bat mortality. The Sheffield study may provide an opportunity to better understand the applicability of operational control measures at wind energy projects in New England, and can inform appropriate methodology.

Please feel free to contact me if you have any questions.

Respectfully,  
**STANTEC CONSULTING**

A handwritten signature in black ink, appearing to read "Adam Gravel".

Adam Gravel, CWB  
Associate

Literature Cited

- Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. Bats and Wind Energy Cooperative.
- Arnett, E. B., M. R. Schirmacher, M. P. Huso, and J. P. Hayes. 2009. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. An annual report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.
- Arnett, E. B., M. P. Huso, M. R. Schirmacher, and J. P. Hayes. 2010. Altering turbine speed reduces bat mortality at wind-energy facilities. *Frontiers in Ecology and the Environment*. : 101101071900096 DOI: 10.1890/100103
- Baerwald, E. F., J. Edworthy, M. Holder, and R. M. R. Barclay. 2009. A Large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. *Journal of Wildlife Management* 73:1077-1081.
- Brown, W.K., and B.L. Hamilton. 2006. Monitoring of Bird and Bat Collisions with Wind Turbines at the Summerview Wind Power Project, Alberta, 2005-2006. Prepared for Vision Quest Windelectric.
- Normandeau Associates. 2010. Stetson Mountain II Wind Project Year 1 Post-Construction Avian and Bat Mortality Monitoring Study. Prepared for First Wind, LLC.
- Smallwood, K. S., D. A. Bell, S. A. Snyder, and J. E. Didonato. 2010. Novel Scavenger Removal Trials Increase Wind Turbine—Caused Avian Fatality Estimates. *The Journal of Wildlife Management* 74: 1089–1096.
- Stantec Consulting. 2008. Spring, Summer, and Fall Post-construction Bird and Bat Mortality Study at the Mars Hill Wind Farm, Maine. Unpublished report prepared for UPC Wind Management, LLC.
- Stantec Consulting. 2009. Post-construction Monitoring at the Mars Hill Wind Farm, Maine – Year 2. Unpublished report prepared for First Wind Management, LLC.
- Stantec Consulting. 2010a. Year 1 Post-construction Monitoring at the Stetson I Mountain Wind Project 2009, Maine. Prepared for First Wind Management, LLC.
- Stantec Consulting. 2010b. Fall 2009 Avian and Bat Survey Report for the Bowers Project, Maine. Prepared for Champlain Wind, LLC
- Stantec Consulting. 2010c. Spring-Summer 2010 Avian and Bat Survey Report for the Bowers Wind Project, Maine. Prepared for Champlain Wind, LLC
- Woodlot Alternatives, Inc. 2006. A Fall 2005 Radar, Visual, and Acoustic Survey of Bird and Bat Migration at the Mars Hill Wind Farm in Mars Hill, Maine. Prepared for Evergreen Windpower, LLC.
- Woodlot Alternatives, Inc. 2007a. Fall 2006 Survey of Bird and Bat Migration at the Proposed Stetson Wind Power Project in Washington County, Maine. Prepared for Evergreen Wind V, LLC.
- Woodlot Alternatives, Inc. 2007b. Spring 2007 Survey of Bird and Bat Migration at the Proposed Stetson Wind Power Project in Washington County, Maine. Prepared for Evergreen Wind V, LLC.

## **Attachment 3**

**Exhibit 19**  
**Avian and Bat Monitoring Protocol**

### 1.0 Post-Construction Avian and Bat Fatality Monitoring Protocol

In order to assess wildlife impacts due to operation of the Project, Champlain Wind, LLC (Champlain) will conduct post-construction monitoring for at least two years. The methods in this work plan are based on standard post-construction monitoring techniques used at existing wind farms in the region, including the work plans at the nearby Stetson I and Stetson II projects, which were developed in consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW). 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;

#### Fatality Search Methods:

Mortality monitoring during the first year of project operation will include searches at all 27 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 late summer.

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).

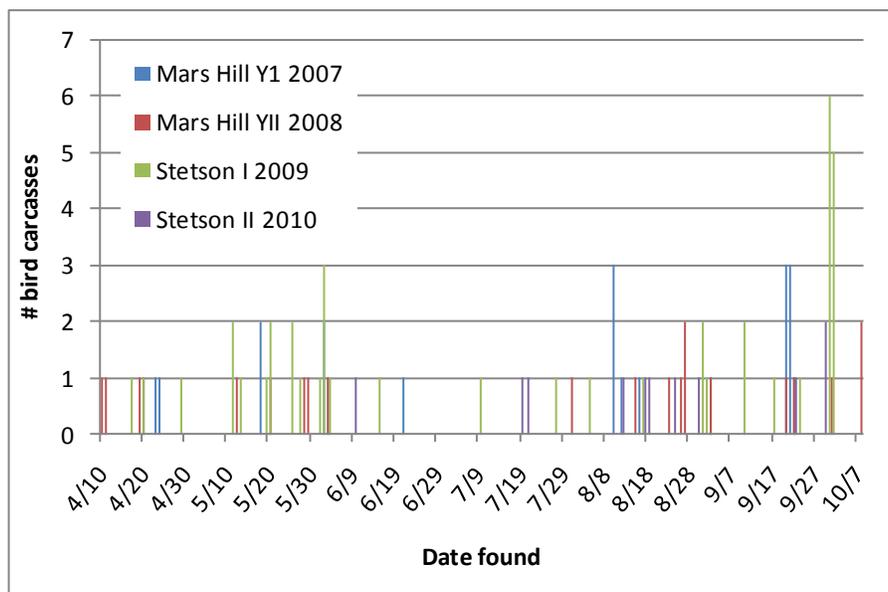
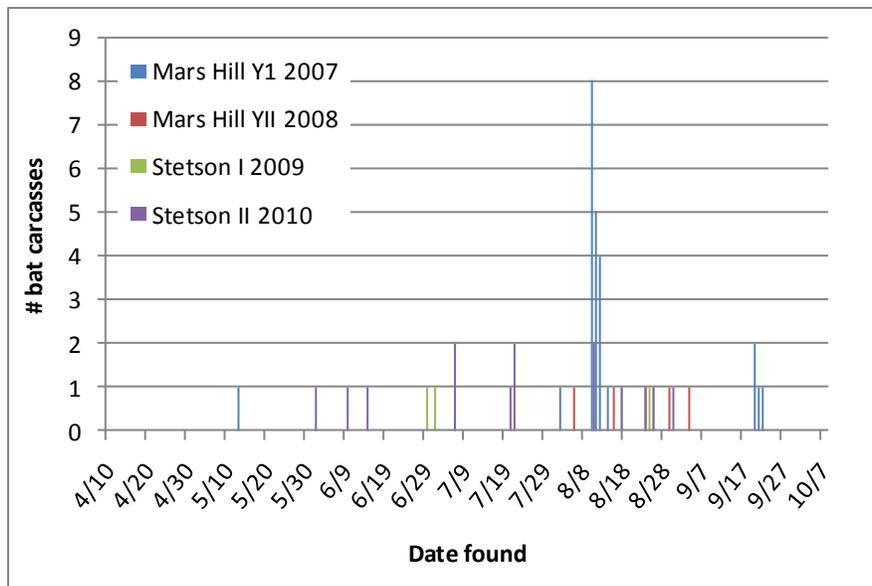


Figure 1. Timing of bird carcass discovery during four mortality studies in Maine.



**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 5 weeks during spring migration (May 1 to June 7); and for 6 weeks during the bat swarming and fall migration periods (July 15 to August 31); weekly surveys will continue at the remaining turbines during these two timeframes. Accordingly, there will be as many as 930 turbine searches over the course of the survey year, depending on the sample size determined in consultation with MDIFW.

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

- spring migration – April 15 to June 7;
- summer breeding – June 7 to July 14;
- late-summer – July 15 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 turbine searches will be completed during 5 survey days per week (a biologist will search 4 to 6 turbines per day). Searches will generally be scheduled for the same five days each week (Monday through Friday). During the weekly and daily search timeframes, it is anticipated that the 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 discreetly 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.

## **Attachment 4**

## **Exhibit 5B Blasting Plan**

Rock removal will be required in some areas of the project site to develop roadways and turbine clearings and to install turbine foundations. The grading for the access roads, crane path roads, associated spurs, and the turbine clearings are designed to minimize the amount of cut required. While some proposed roads will be constructed on top of stabilized, existing logging roads, some blasting of bedrock will be unavoidable. Blasted bedrock, as feasible, will be broken into a well-graded mixture in accordance with the geotechnical engineer's specifications and used on-site as surface gravel for crane path and access roads, riprap, and potentially for deeper fills greater than two feet below finish grade.

The predominant mapped soils are Monson and Elliottsville on ridgetops and upper sideslopes, which are shallow to moderately deep bedrock, and are interspersed with moderately well-drained Chesuncook (see Soil Narrative Report in Exhibits 15A and 15B). Depths to bedrock for these soils are generally as shown in the following table.

Soil Type	Depth to Bedrock
Monson	Shallow, 10-20"
Elliotsville	Moderately deep, 20-40"
Chesuncook	Very deep, >60"

The shallow depth to bedrock, especially in Monson soil areas, suggests that more blasting may be required in areas that include these soils.

Blasting is expected to be required for most, if not all, of the 27 turbine foundations, the crane paths in areas requiring extensive cuts, and the underground electric line trenches. A Preliminary Geotechnical Investigation Report has been completed for this site and is included in Exhibit 5A. The geotechnical investigation report includes soil boring logs and provides an indication of geologic conditions at the project site. Based on the report findings, the majority of the turbine foundations are anticipated to be rock anchor foundations, with the remainder requiring spread footing foundations.

Blasting will be performed in conformance with the "Blasting Guidance Manual", Office of Surface Mining, Reclamation, and Enforcement, U.S. Department of Interior. Blasting will also be conducted in accordance with Figure B-1 of Appendix B, U.S. Bureau of Mines RI 8507. Additionally, per 38 MRSA §484, sub-§9, blasting will also comply with 38 MRSA §490-Z(14) including, but not limited to, the following standards:

- a) Ground vibration at offsite structures may not exceed the limits shown in Figure B-1 of Appendix B, U.S. Bureau of Mines RI 8507.
- b) Air overpressure offsite may not exceed the limits provided at Department Rules Chapter 357.10(C)(4)(c) and 38 MRSA §490-Z(14)(H).
- c) Fly rock must be controlled so as to remain on the site and may not enter an protected resource unless the Commission has previously approved alteration of that resource in the impacted area
- d) Records of blasts generally consistent with the requirements of 38 MRSA §490-Z(14)(L) must be kept and provided to the Commission if requested (it is understood that the Department of Environmental Protection generally does not consider such records incomplete if the social security number of the blaster is not included).

There are no wells or structures within close proximity of the project that would be impacted by the blasting. A blasting schedule will be prepared and distributed to local governments and public utilities. The schedule will conform to 30 CFR 816.64.

## **Attachment 5**

May 23, 2011

Sewall has studied the review comments from David Rocque, the State Soil Scientist, dated April 6, 2011. This document addresses the specific comments numbered 1-12 from his review memo. Responses are provided in italics after each comment. In addition, a revision to Exhibit 1A has been issued and provides supporting materials for this submission.

### **BASIC STANDARDS:**

1. Laydown areas are proposed for the project. These areas may be necessary during decommissioning or upgrades at a later date. After construction use these areas could be covered in a layer of erosion control mix with a minimum of 4 inches in thickness.  
*The grading of the laydown areas will be determined by the contractors depending on what they will be using the area for. A note will be added to the plans directing the contractor to avoid grading in laydown areas that promotes concentrated flows. The area will be allowed to revegetate once construction is complete.*
2. Through out the project there are three types of level spreaders used on the project to return concentrated flow back into sheet flow: typical level spreaders, ditch turnouts, and stone bermed level lip spreaders. Details are provided for ditch turnouts and stone bermed level lip spreaders. For the typical level spreaders please provide a detail and information on sizing. The peak flow rate to a level spreader due to runoff from a 10-year 24 hour storm must be less than 0.25 cubic feet per second (0.25 cfs) per foot of level spreader lip. The maximum drainage area to the spreader is typically 0.10 acres per foot length of the level spreader. Level spreaders should also be sited so that flow from the level spreader will remain in sheet flow until entering a natural or man made receiving channel.  
*All of the level spreaders are 25' long. The calculations are attached showing that this is adequate for each level spreader.*
3. Loam stock piles are called for but no detail of the stock pile was provided. Locations of the stock pile should be identified.  
*Stockpiles will be located within the laydown areas as needed.*
4. The rip rap slope protection detail should have the fabric keyed at the top of the embankment.  
*See the revised detail.*
5. It is somewhat standard that the type of lining and the depth of the ditch determined by the application of Manning's equation and the velocity in the ditch line at that location for the 10 year / 24 hour storm event. The ditch linings details proposed for the project call for stone lining on slopes greater than 8% and geotextile and vegetation for slopes less than 8%. Is that determination left to the contractor to determine or will it slopes and ditch lining types be located for the contractor by the applicant's agent?? In places where grass lining is called for down gradient of stone lining, the transition zone between linings where flow loses velocity may succumb to erosion. A reinforced turf mat may work but it is standard for stone lining to be continued to a stable collection area. The detail for stone ditch protection states that the riprap will be 6 inch in size. Please direct me to the sizing calculations. Typically the sizing is based on the flow rate anticipated in the ditchline and is stated as a d50. Does this sizing hold for all of the riprap lining for this project?  
*Notes have been added to the stone ditch detail for contractor to continue stone ditch protection in ditch locations that follow five percent slopes until they reach protected outlet.*
6. Plan Sheet C-4 Silt Fence Detail: Notes do not limit silt fencing to ¼ acre of drainage for each 100 feet of fencing. The detail also does not require fencing be installed along the contour. Please correct.  
*See the revised details. Additional notes have been added to detail to address.*

7. In some locations on the E+S plan, silt fencing is shown at the top of the ditch slope. I'm not sure why. Please review. Example: 500, DP, at Sta 21+00 to 23+00.  
*The silt fencing and bark mulch berms are shown for illustrative purposes only. A note has been added to direct the contractor to the details for the proper installation of the silt fencing or bark mulch berms.*
8. It is typical for filter barriers such as silt fencing, hay bale barriers, and erosion control mix barriers (wood waste berms) to be installed along the contour. The location sheets show the location of the fencing at the down gradient toe of any disturbance. As discussed on other projects notations on the plan sheets indicating that location line is for reference and fencing needs to be installed along the contour may be sufficient. Please consider a small detail for reference showing how the silt fencing is installed in staggered line along the toe of a slope. This detail can then be referenced in the notation.  
*Filter barriers shown on plan view are shown for illustrative purposes only. Notes have been added to plans and details to address comment.*
9. Provide a detail for the appropriate discharge of foundation and pit dewatering discharge.  
*The dirtbag detail, temporary dewatering sediment basin, and dewatering notes have been modified on the detail sheets.*

## **GENERAL STANDARDS**

*Based on the recommendations from Mr. Waddell, revised stormwater calculations have been tabulated and are attached as a Revision to Exhibit 10B.*

### General Comments:

10. Diversion berms are called for in some areas. Please provide a detail.  
*An additional detail has been added to the plan set to address this comment.*
11. The ditch lines does not show any diversions that divert flow into cross culverts. This could be done in a standard culvert crossing detail without showing it on the proposed contour plans. However, without a detail it is assumed that flow in the ditchlines is not being directed into the cross culvert and continues down the fall line of the ditch.  
*An additional detail has been added to the plan set to address this comment.*
12. In general the level spreader buffers are shown with straight sides and do not follow the fall line of the contours or cross them perpendicularly. This results in the treatment areas not being the areas protected by the buffer plan.  
*Buffers have been adjusted on the erosion control plans to address this comment.*

### Road Specific: *See the revised plans and calculations that address all of the following comments.*

13. 402, O+M Road, Sta 6+00 to 12+00, please review this area. Flow does not appear to enter the buffer in sheet flow. The road is super elevated to the left and diverts flows to a culvert at Sta 5+65.
14. 402, O+M Road, Sta 12+65 level spreader discharges onto the laydown area.
15. 402, O+M Road, Sta 12+65 to 15+00, does the road ditch to road right go to the level spreader? It appears to divert past the LS.
16. 402, Substation, Is the substation pad underdrained or does it infiltrate?? Identify if the surfacing material is the same as outlined in the agreement between CMP and MDEP.  
*The material is the same as agreed upon by CMP and DEP.*
17. 500, DP, Sta 10+00, LS on road right collapses to road please relocate.
18. 500, PMT 14, Sta 5+25 BL35 is in a bad location for treatment. Contours concentrate flow.
19. 500, DP, Sta 18+75. Is BL30 in the right location???
20. 500, PMT, Sta 0+00 to 5+25, what function does the BMB serve in this location??
21. 500, DP, Sta 14+00 to 17+00, what function does the BMB serve in this location??

22. 500, DP, Sta 38+50, BL 27 appears to collect more flow than noted in the calculations. Appears to be DHA, Sta 51+00 to 53 +50 of the next road segment.
23. 501, BHA, Sta 4+00, The cross culvert goes to a ditch that takes the flow off site. The calculations say that treatment is provided for 4+00 to 6+00.
24. 501, BM, Sta 1178+00 to 1182+50, This section of road overlaps with BHA 34+40 to 38+50 and is counted twice in the calculations.
25. 501, BM, Sta 1177+00 to 1178+00 goes to BL13 not RB17 as stated in the calculations.
26. 600, BM, Sta 1023+75 to 1027+00 trans, left side drains to LS at 1023+75. Counted for treatment but should get no treatment.
27. 600, BM, Turbine 4, Buffer is consistently over 40%. This is too steep for treatment.
28. 600, BM, Sta 1040+25 to 1041+75 right side of the road goes to LS above B5 not to BL1.
29. 600, BM, Sta 1052+00 to 1059+50, This stretch is a cut section on the backslope with a long run to get to any water resources. Level spreaders may cause problems. Consider a rock sandwich here.
30. 600, BM, Sta 1059+50, culvert apron is shown but there is no culvert.
31. 600, BM, Sta 1061+75, BL @ a long buffer needs to have berm of erosion control mix at 150' down the buffer to ensure flow stays in sheet flow.
32. 601, BM, Sta 1065+75, show diversion to BL3.
33. 601, BM, Sta 1082+75 This LS sits in a saddle. Please address.
34. 601, BM, Sta 1097+75 LS collapses to the road. Please address.
35. 602, BM, Sta 1139+50 BL36 does not follow any contour at all. Buffer collapses to the road ditch. Please address.
36. 701, SP, Sta 3029+00, BL20's orientation is wrong.
37. 801, DH, Sta 102+00 to 106+25, Should be extended to 106+75 and the subsequent section shortened by the same.
38. My review relies heavily on the contour information provided with the application. It is understood due to the nature of the project that during construction changes may be necessary to accommodate inaccuracies in the contour information, soils, or to accommodate infrastructure needs. Small changes in the locations of drainage / treatment structures to improve the treatment provided can be approved through the third party inspector. A cover letter outlining the changes should be submitted to the Commission for the project file at the end of construction. For changes that go beyond the scope above consider the following condition:
39. No culvert sizing schedule was found, nor was there any individual ID for culverts on the project except for road stationing. Please direct me to the calculations used for structure sizing of the proposed drainage features like ditch lines, culverts and level spreaders.  
*A culvert schedule was added to the detail sheets that included the stationing, culvert size and drainage area.*

## **Attachment 6**

May 23, 2011

Sewall has studied the review comments from David Rocque, the State Soil Scientist, dated April 6, 2011. This document addresses the specific comments numbered 1-12 from his review memo. Responses are provided in italics after each comment. In addition, a revision to Exhibit 1A has been issued and provides supporting materials for this submission.

### Specific Comments:

1. Proposed road ditch contours appear to directly connect into the few streams shown on the plans. Doing so can result in sediment and/or other pollutant discharges into streams which is not appropriate. It is important that road ditches have turnouts to filter out sediment or cross culverts to direct ditch water away from streams and not be allowed to discharge directly into them. Therefore, I recommend that the plans be revised to indicate that ditch turnouts are to be installed prior to reaching any stream. It would also be a good idea to include a general construction note and a note on the ditch turnout detail specifying that ditch turnouts or cross culverts are to be used prior to any ditch reaching a stream. Since it is likely that there are at least a few small intermittent streams not shown on the plans, the note would provide assurance that ditch water would not be allowed to directly discharge into any stream. Road ditch contours should also be revised to show that ditches empty into all cross culverts within them that don't discharge directly into a stream. Ditch berms are the preferred technique to prevent water in ditches from bypassing culverts which could result in the water overwhelming the road ditch before it finally is discharged.

*See the revised plans and details.*

2. Stormwater Berms – The design plans indicate occasional use of stormwater berms to direct runoff water to a specified location for discharge. In the case of a road ditch where water is to be directed to a ditch turnout, such berms are appropriate. I do not however, believe there is a need to concentrate runoff water for a longer time and distance to reach a specific buffer area if the area it is being directed away from is also suitable for filtering it. Such berms need to be maintained to work for the long term whereas allowing the runoff to discharge as sheet flow to a forested area where it naturally wants to do not require maintenance. This is a very rural area so there is plenty of forested area to treat the runoff.

*The majority of the diversion berms were eliminated from the project. A few still remain therefore a detail was added to the plans.*

3. The legend sheet should include a symbol for ditch turnouts. Areas where ditch turnouts are proposed are shown on the plans along with stormwater buffers but there is no symbol on the legend to indicate that they are ditch turnouts. Ditch turnouts or cross culverts should be shown before any ditch reaches a stream.

*A ditch turnout symbol was added to the legend.*

4. The index sheet for stormwater plans, 400 and 401, state that those series are for stormwater but the sheets that follow, 402, 500 series, 600 series, 700 series and 800 series indicate they are erosion control plans. Both are closely related but the labeling should be the same to avoid confusion.

*The index sheet has been revised.*

5. Standard Details –

- a. I would like to see a standard detail for a blast rock road since I believe they will be used in a number of locations. There are a number of differences between a standard detail for blast rock roads and roads built with common borrow and gravel. Blast rock in this detail should be shown on the upslope cut face, preferably to the top of the cut but at least to the top of the area that is below the groundwater table. No soil or other material should be placed on the downslope fill extension since groundwater may need to discharge from the voids. Blast rock roads should not have ditches that extend below the bottom of the blast rock to encourage as much pass through of water as possible.

*See revised detail.*

- b. Typical Ditch Turnout Detail – This detail is appropriate for ditches with cross culverts but not for typical ditch turnouts. It should be renamed something like “Ditch berm at cross culverts”. The berm is used to assure ditch water will enter cross culverts and can not continue down the ditch. A ditch turnout almost always will need to be an excavation since the ditch bottom usually is lower than the ground on either side of the ditch. Therefore, two details should be shown.

*See revised detail.*

- c. Typical Ditch Cross Section – I did not see any stand alone cross section detail for a typical ditch. There is one for ditches with stone protection and some of the road and crane path details show V shaped ditches that include a few specifications but I believe a stand alone detail is needed. V shaped ditches are not the recommended shape, particularly for soil based ditches. They should be trapezoidal in shape and need to be stabilized according to the expected volume, velocity and height of flowing water in them. Erosion control mulch can be used on disturbed soil surfaces above expected height of water and above any seeps but the sides and bottom of the ditch below the height of water need to be stabilized by tacked down mulch, erosion control blankets or rock, depending on how much and how fast water moves in them.

*The ditch details have been revised to show a trapezoidal ditch to match the plans. A typical ditch detail was also added to the plan set.*

- d. Rip-rap outlet for culvert protection. The detail for a rip-rap apron at the culvert outlet is appropriate for a culvert that discharges to a concentrated flow channel. If however, a culvert is to discharge road ditch water to an area without a concentrated flow channel, the rip-rap apron should include a stone berm level spreader in a semi-circle shape at the end of the apron. This will assure the discharge of ditch water as sheet flow and prevent the scouring of a channel.

*An alternative level spreader detail was added to accommodate this type of situation.*

- e. Typical Level Spreader – The standard details sheet indicates that “all level spreaders shall be constructed in cut sections”. That may be appropriate for ditch turnouts but I believe that stone level spreaders can be constructed for some areas without the need for an excavation or cut. Just place stone in a semi-circle shape on the undisturbed ground surface. Water will filter through the stone voids so that sheet flow is assured, even if the ground surface is a little irregular. I would like to see a detail for that type of application as well as the one with a cut.

*An alternative level spreader detail was added to accommodate this type of situation.*

- f. Stone Check Dam Detail – This detail should include a size range for the stone to be used for the check dams (2”-3”). Blast rock is not appropriate for use in check dams as it usually has voids that are too large to be effective. This detail notes that “spacing of dams may be adjusted within rip-rap/blast rock armored ditches as approved by engineer”. Why would stone check dams be needed for rip-rap or blast rock armored ditches?

*The detail was revised to not include riprap/blast rock armored ditches. The stone size was not adjusted. The majority of the stone will be 1.5”-6’ stone and does not include blast rock as an option.*

- g. Stoned Bermed Level Lip Spreader Detail – This detail should include a stone size for the level spreader (2”-3”).

*The detail was revised and notes a median size of 3” with a max size of 6”.*

- h. Typical Stone Ditch Protection Detail – This detail indicates that rip-rap will be used to line all ditches exceeding 5% slope, which is appropriate. It is also appropriate to line ditches with rip-rap on lesser slopes if those ditches are to be constructed below the groundwater table, particularly if the length of slope is significant. This will typically occur when road cuts are made perpendicular to the slope. These ditches must carry water until they can outlet, which may be a considerable distance. They will be hard to vegetate due to prolonged wetness. The rip-rap protection should go up the cut face at least to the height of the seasonal ground water table to allow seeps to enter the ditch through voids in the stone. No filter fabric should be used above the expected height of the flowing water in the ditch. There will not be any threat of scouring from flowing water in this area. The issue here is to allow the seeping water to enter the ditch through the voids in the stone while preventing the soils themselves from slumping into the ditch. A bedding layer of gravel or small stone can be used for the rip-rap stone.

*Notes have been added to the stone ditch detail for contractor to continue stone ditch protection in ditch locations that follow five percent slopes until they reach protected outlet. See the revised details.*

- i. Organic/Duff Waste Disposal Detail – This detail indicates that all organic waste/duff will be disposed of along the downslope side of road fill extensions. That may be ok in some locations but may be a problem in others such as where a rock sandwich or blast rock is used and where significant amounts of runoff water will flow over the side of the road. I suggest the material simply be spread over the ground surface where it will decompose slowly. It can also be mixed with soil to form topsoil or it can be spread as is over blast rock surfaces on flat or gentle slopes to soften the appearance and/or narrow the road surface and provide a seed bed for native vegetation to become established.

*This detail has been removed from the plan set.*

- j. Typical Rock Sandwich Detail – This detail should be revised as follows: No filter fabric should be used under the rock on the upslope side of the road, above the expected height of flowing water. It is not needed because there will be no pressure forcing the stone into the underlying soil or scouring by flowing water. Instead, a layer of coarse gravel that is permeable enough to allow the seeping water into the rock layer should be used. Filter fabric may not be permeable enough to accommodate the seeping water so it will be circumvented and become

problematic. A note is included with this detail indicating that culverts may be used with rock sandwiches and indicates that they are to be installed at a higher elevation than the bottom of the rock sandwich which is appropriate. It would be helpful, however, to depict a culvert in the standard detail to show contractors how they should be installed. Another note indicates that the rock on the downslope side of the detail should be “Tied into the existing subsurface drainage layer”. This note should be removed since the rock on the downslope side should be placed on the existing soil surface. If it was to be tied into the existing subsurface layer, it would be unable to discharge properly and would back-up.

*The detail has been revised in accordance with the Department recommendations. A very permeable geotextile has been specified underneath the stone at side slope locations where groundwater may weep through the surface.*

- k. Superelevated Road Detail – The typical road details show road surfaces with a crown. This is appropriate for most roads but sometimes it is desirable to have the entire road surface slope to one side, for phosphorous control or for drainage purposes. Such roads are called a “superelevated” road. I would like to see a standard detail for a superelevated road so that the contractor has that technique to use at his/her discretion, along with the project engineer and third party inspector.

*See revised detail.*

- l. Typical Uphill Cut Road Detail – This detail includes a note saying that “ditches shall be constructed to not intercept the groundwater table”. For some projects that is possible and a desirable goal. For windfarm projects, which typically include steep slopes, deep cuts and the need for roads with slopes of less than 12%, that restriction is not practical. I suggest removing that note and replacing it with another one that indicates; ditches constructed below the seasonal groundwater table, with a significant upslope watershed, will be rock lined (for cuts on both sides) or will use rock sandwiches (for cuts on one side and a fill on the other).

*The detail has been revised.*

- m. Rock Burrito – The applicant may want to add a standard detail for a rock burrito which can be used in place of a cross culvert in locations where expected flows are not significant and include groundwater. Rock burrito’s are trenches filled with 3” – 6” rock that is fabric wrapped but open at each end (mini rock sandwiches). They do not heave, rust or collapse. When used to transmit groundwater, they do not freeze due to the latent heat of the groundwater.

*A detail for a rock burrito was added. This will give the contractor the flexibility to use it in the appropriate situation as approved by the engineer.*

6. There are a number of landing yard/laydown areas depicted on the plans but there are no details about how those sites are to be prepared. If only trees are to be cut but no stumps removed or ground leveled, I see no issues (provided that heavy equipment stays off the site when the soil is saturated). If however, stumps are to be removed and the ground is to be leveled, there should be soil erosion/sediment control measures shown as well as stormwater measures. For stormwater, since these are fairly large areas, the land should be shaped to direct runoff to as many directions as possible. This will limit the length of slope over which runoff can travel, limiting its ability to cause erosion and sedimentation.

Ideally, finished contours as well as erosion/sediment control measures and stormwater management measures should be shown on the construction plans for a contractor to follow for all sites. At a minimum, for most of the sites, a narrative description of what construction activities will be required and erosion/sediment control and stormwater management measures will be used should be included. A few of the sites are proposed to be located on wet soils. Those should have site specific design details provided.

*A note was added to the plan sheets describing how the landing yards/laydown areas are to be dealt with. A note was also added in the "clean-up & final stabilization" notes on the detail sheets.*

7. Baskahegan Access Road Plan and Profile – The Baskahegan Access Road plan, station 0+00 to station 34+00, does not include any soils mapping information (pages 20 and 21). I would like to see the soil mapping information for this road.

*The soils information has been added to the plans and this page was provided to Mr. Rocque.*

8. Some fill extensions depicted on the plans appear to be excessive, up to 250 feet in length. In talking with the project engineer, I understand that is being done to show a worse case scenario. I recommend, as stated above, the plans be revised to show blast rock roads in steeply sloping areas to reduce the fill extension foot print.

*The detail has been revised to show a steeper slope in areas where blast rock will be used.*

9. Rock Sandwich Locations on Plans – As mentioned in the general comments section, I believe that more than 1 or possibly 2 rock sandwiches will likely be needed for this project. Examples of areas where rock sandwiches (and/or blast rock roads) may be needed include (but are not limited to): South Peak Access Road sta. 2000+00 – 2056+00, Dill Hill Road sta. 52+00 to 62+00, 68+00 to 73+00, Dill Hill Crane Road sta. 114+00 to 119+75, 188+00 to 196+00. These are areas with somewhat poorly drained or wetter soils that appear to have roads constructed at grade or with a slight cut. I suggest these and similar areas be highlighted on the plans and include a note that says "install rock sandwich or equivalent if road base and/or ditch bottom is below the seasonal groundwater table" or something similar. Doing so will minimize the alteration of the natural hydrology and make a stronger road that is usable year round. Blast rock road base and rock burritos can also be used in these areas, in conjunction with rock sandwiches.

*Rock Sandwiches were added to the plans in some areas of concern. Notes were also added to the details describing the site conditions in which rock sandwiches should be installed in the event additional rock sandwiches are needed.*

10. Turbine Pads and Crane Paths – The standard details for constructing turbine pads and crane paths appear to require that they be constructed on the existing soil or of compacted fill with a gravel surface. If turbine pads are to be built with cuts and fills, there are likely to be compaction issues, hydrology (groundwater) issues, fill extension issues and stormwater runoff issues. If blast rock were to be used, none of the issues just listed will be a concern. Crane paths built along ridge tops with steep side slopes will require long fill extensions if built of soil material instead of blast rock (up to 250 feet according to the plans). Therefore, I recommend that turbine pads and crane paths to be constructed on steep slopes, be constructed with blast rock fill. Another standard detail should be added to show turbine pads and crane paths built on a base of blast rock. There should be plenty of blast rock for this purpose based on the proposed amounts of cuts along the crane paths which are mostly shallow to bedrock soils. Erosion control mulch can be placed on the blast rock surface to soften the appearance after construction and to allow for some natural re-vegetation, if desired.

*The detail has been revised to add blast rock as an option and to show a steeper slope in these areas.*

11. Ridge Line Crane Paths – The proposed crane path along the ridge line crosses through a few areas of somewhat poorly drained soils, as mentioned above. None of the roads shown crossing these areas indicate that rock sandwiches will be used. If these ridge top roads are to be built with blast rock, as I believe they should, there is less of a need for rock sandwiches since blast rock is porous. If however, these roads are to be built out of common borrow and gravel, rock sandwiches will be needed.

*See revised detail for the typical road sections with the blast rock options.*

12. Dill Hill Crane Path Laydown Area Sta. 115+50 to 121+25 – The majority of this proposed laydown area will be on soils with a shallow seasonal groundwater table. The soil pit logged for this map unit has a seasonal groundwater table at 11 inches below the organic horizon. Another soil pit for this map unit has an even shallower ground water table. It would be my recommendation that this laydown area be leveled by adding fill material instead of cuts and fills as is commonly the practice, unless the cuts are from knolls with a much greater depth to seasonal groundwater table. Cuts elsewhere will likely intercept the groundwater table and pose a problem. There should be plenty of material nearby to use for the fill material that can be taken from road and/or turbine pad cuts.

*The grading for the laydown areas will be left up to the contractor to adjust as they need. Some areas may not be used or graded. See the notes added to the details and the plan sheets.*

## **Attachment 7**



May 25, 2011

Neil Kiely  
First Wind, LLC  
129 Middle Street, 3<sup>rd</sup> Floor  
Portland, ME 04101

**Subject: Response to Comments for the Bowers Wind Project (DP 4886)  
from the State Soil Scientist**

Dear Mr. Kiely:

We have studied the review comments from David Rocque, the State Soil Scientist, dated April 6, 2011. This memo addresses items numbered 15-18 from his review memo; I understand that other items are being addressed in a separate memo from Sewall.

**Comment:**

15. Transmission Line and Substation Soil Mapping – I have a few questions about the transmission line and substation soil mapping. Included are; (a) soil profile descriptions, (b) soil series determinations, and (c) hydraulically sensitive area delineations on the transmission line soil map.
  - a. A number of the soil profile descriptions do not represent typical unaltered soil profiles. Included are soil horizons that appear to be out of place or are not in the usual order. Do they represent filled or disturbed soils? If so, do they represent the average soil condition within the soil map units? If that is the case, they should be called a Udorthent. If not, a more representative soil profile should be used to support the map unit classification.

**Response:**

Stantec recognizes that several soil profile descriptions included among the transmission line soil logs represent conditions unlikely to be observed in unaltered pedons. While every effort was made to dig observation holes in areas that had been minimally disturbed, the narrowness of the survey corridor limited our ability to stray too far in search of virgin soils. Our focus, therefore, was to accurately describe existing conditions within the transmission line corridor with regards to water table, restrictive layers and soil texture so that this information could be used for construction planning.

**Comment:**

- b. A number of soil series classifications do not look like they match the soil profile descriptions upon which they are based. Is that because they represent an inclusion and not the average condition within the map unit?

**Response:**

Each soil pit was assigned a “best fit” soil series based on many factors, including texture, color, horizon formation, water table, restrictive layers, and adjacent map units. Due to the limitations associated with Class L soil survey techniques, it is possible that diagnostic subsurface horizons were undescribed and therefore unavailable to assist in matching profiles to soil series. Care was taken to assure that soil texture and drainage class for each pit closely matches that of the soil series to which that pit was assigned.

**Comment:**

- c. The transmission line soil map includes cross hatching for hydraulically sensitive areas. Generally, these areas were mapped as complexes of poorly drained and somewhat poorly drained soils, which is appropriate. Not all somewhat poorly and poorly drained soil map units however were cross hatched. That may have been because some met the standard soil taxonomy definition of poorly and somewhat poorly drained soils. This section of the application includes a discussion of “hydraulically sensitive areas” which is limited to those areas that do not meet the standard definition in taxonomy. Since my overall interest is in providing information for the contractor, to know which soil map units have a seasonal groundwater table near the surface in the spring and fall as well as after significant rainfall events, the map units which include poorly and somewhat poorly drained soils meeting the definition in taxonomy should also be cross hatched. They may not meet the application’s definition of “hydraulically sensitive areas” but they will pose the same construction problems to the contractor.

**Response:**

The Stantec transmission line modified Class L and “unique hydrologic features” surveys were performed during a week of heavy, sustained rainstorms following leaf drop in November of 2010. Water tables were at or near seasonal highs, and hydrologic flow patterns were easily discernable. The blue hatched areas (along with the delineated wetlands) on our natural resources map represent the areas where, in our professional opinion, natural hydrology will be altered if special construction techniques are not implemented. We acknowledge that due a silty texture and somewhat poorly drained nature, other (unhatched) map units along the proposed transmission line have seasonal high water tables that could be compromised if certain construction techniques are used at inappropriate times of the year or without proper caution. Marking the majority of the transmission line as “unique hydrologic area” would diminish the purpose of identifying areas we believe to be more susceptible to having hydrology altered. .

**Comment:**

16. Transmission Line Construction Details – I did not find any narrative discussion, in my copy of the application for this project, about proposed construction techniques to be used in constructing the transmission line. There were though, construction details for the substation and substation access road which I comment on in 18 and 19 below. It may just be that my copy of the



application does not include that information. If so, I would be happy to review those construction details. If not, I suggest the incorporation of construction details for stream and wetland crossings. Typically, timber mats are used to cross wetlands by heavy equipment. I also suggest the transmission line plan show areas that are somewhat poorly drained or wetter, including the hydraulically sensitive areas. These areas have soils with a seasonal ground water table very near the soil surface in the spring, fall and after rainfall events. They are quite subject to rutting and subsequent alteration of the natural hydrology and therefore need to be crossed using construction techniques that take this into consideration. The plans should indicate that these areas will be crossed in one of three ways: (1) during the driest summer months of July, August or September when the soil is not saturated. Because Maine can sometimes have rainy summer months, dry soil conditions should be verified before crossing these areas. Conversely, it may be possible to work on them in another month if precipitation levels are below normal, (2) during the winter months when the soil is frozen and snow covered. This may require compacting the snow cover to make sure the soil below is sufficiently frozen to support the weight of construction vehicles, or (3) by the use of timber mats similar to crossing wetlands when the soils are saturated and not frozen. With proper planning, the contractor can schedule work on the better drained soils in the wetter time of year, leaving the drier time of year and frozen ground conditions for the wetter soils. It is important however, for the contractor to avoid construction on any soils when they are saturated, including the better drained soils. The better drained soils drain faster after precipitation so they can be worked on sooner than the wetter soils.

**Response:**

As described in our response to #15, marking all “hydrologically sensitive” areas would diminish the purpose of identifying areas we believe to be more susceptible to having hydrology altered. We plan to create an instructional guideline to be distributed to construction crews along with our resources map to assist in determining what areas require extra care; we would be happy to submit a copy of that for your review prior to construction. In addition, a detail for timber mat crossings has been added to Exhibit 1A, Sheet 4.

**Comment:**

17. Transmission Line Access – I did not find any discussion of how equipment will be accessing the transmission line but did note a few existing roads, logging roads and skid trails do intersect it. I assume that these existing accessways will be the primary means of reaching the transmission line with equipment. If the applicant should however, need to access the transmission line in another location where there is no existing road or skid trail, that should be accomplished using the techniques discussed above (16) for work on the transmission line.

**Response:**

Access for construction is described in Exhibit 7E. In summary, the footprint of existing roads does not change, and the ground disturbance will be minimal. As described in Exhibit 7E, access is considered to be adequate with a fairly good system of existing roads throughout the project area. The exhibit includes a description of the recommended road improvements for each road. The recommended improvements include road grading to establish adequate drainage of the road surface; brushing back existing vegetation to allow for construction access and visibility; building up the roadbed with additional gravel; installation and maintenance of culverts; and the reestablishment and maintenance of existing road ditches.



**Comment:**

18. Substation Site Soil Conditions – The substation soil map indicates that the substation site soils are a Dixmont/Monarda complex. The single soil pit shown on the map for this map unit indicates that there was standing water in the pit on the day it was excavated at a depth of 2 inches (though the soil profile description does not look like a poorly drained soil). A Dixmont/Monarda complex is a wet soil map unit and therefore should include construction techniques to overcome the shallow depth to seasonal ground water table, particularly since the applicant is proposing a deep cut on the upslope side. Those construction techniques should be part of the application. I recommend using rock burrito's as one of the construction techniques. I made a similar recommendation for the substation at Kibby and it has worked very well. The rock burritos should be installed below the base of the substation and then outlet through rip-rap facing on the downslope fill extension. There should still be a rock lined ditch around the site but it would be constructed a few inches above the invert elevation of the rock burritos, to act more as an overflow mechanism. By using the rock burritos, there would be significantly less alteration of the natural hydrology. Another recommendation is to outlet the proposed perimeter ditch through stone bermed level spreaders, on either side of the substation.

**Response:**

A typical rock sandwich detail has been added to Exhibit 1A, Sheet 3, along with potential field indicators.

I believe this fully addresses the questions raised in Mr. Rocque's memo. Please feel free to contact me if you have any questions.

Respectfully,  
**STANTEC CONSULTING**



Dale Knapp  
Associate

