

**ATTACHMENT E**

Water Quality Calculations and Meeting Minutes

**Black Nubble Wind Farm Project**  
**Phosphorus Calculations for Flagstaff Lake**

Black Nubble Parcel Area Tributary to Flagstaff	399.7	With Slopes included <b>399.7 Acres</b> 0.5 Acres 3.5 Acres 395.7 Acres  0.045 Lbs P per Acre <span style="font-size: small;">see note 4</span>  <b>17.81 Lbs P</b>
Areas of Black Nubble with over 25% Slopes:	50%	
Total Parcel Area Tributary to Flagstaff Lake:	399.7 Acres*	
Wetland Areas:	0.5 Acres	
Areas with over 25% Slopes:	199.9 Acres	
Protected Soil and Geology Area:		
Net Developable Area (See Note 4):		
Allowable Export Rate Determined by MeDEP:		
Allowable Export for Developable Area:		

	Length (feet)	Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs)
<b>Black Nubble Side:</b>					
Gravel Surface	28,538	12	7.86	1.75	13.76
Riprap Ditch	24,625	5.5	3.11	0.5	1.55
	0	12	0.00	1.75	0.00
	0	5.5	0.00	0.5	0.00
<b>Substation Access Road</b>					
Gravel Surface	550	12	0.15	1.75	0.27
Riprap Ditch	600	5.5	0.08	0.5	0.04
<b>Substation Crushed Stone Area</b>					
			0.44	1.75	0.77
<b>Maintenance Site</b>					
			1.00	1.75	1.75
<b>Turbine Foundations (18' Diameter + 10' = 615 SF 16 BN)</b>					
			0.23	1.0	0.23
<b>Phosphorus Export to Flagstaff Lake(lbs)</b>					<b>18.36</b>

Notes:

1. Only 12 feet of gravel surface along new roadway segments is to be left after construction of the project. Shoulders and travel surfaces beyond 12 feet are to be scarified to a 4 inch depth, covered with erosion control mix and allowed to revegetate over time. This will require limited grading of the gravel travel surface to remain to raise the surface or lower the adjacent surface and placement of 4 inches of erosion control mix over the remaining gravel area to allow revegetation to occur.
2. Crane and turbine pad assembly areas are to be scarified to a 4 to 6 inch depth, covered with 4 inches of erosion control mix and allowed to revegetate after construction.
3. Travel surfaces of existing road segments to be widened at corners or narrow straight sections will be reduced to the same 12 foot travel width after construction as described above. This will generally mimic the current existing logging road conditions in these areas; therefore, addition phosphorus calculations have not been performed in these areas.
4. Jeff Dennis with the MeDEP provided a 0.045 lbs/acre allowable export value for Flagstaff Lake on December 2, 2005 for developable area to include steep slopes. This value will need to be verified by MeDEP during formal review. Refer to attached meeting minutes from a Dec. 1st, 2005 meeting with MeDEP.

**Black Nubble Wind Farm Project  
Phosphorus Calculations for Redington Pond**

Black Nubble Parcel Area Tributary to Redington Pond 86.8  
 Areas of Black Nubble with over 25% Slopes: 50%

Total Parcel Area Tributary to Flagstaff Lake: 86.8 Acres  
 Wetland Areas (insignificant amount for calcs.)  
 Areas with over 25% Slopes: 43.4 Acres  
 Net Developable Area (See note 4):

With Slopes Included
86.8 Acres
0.039 Lbs P per Acre
<b>3.39 Lbs P</b>

Allowable Export Rate Determined by MeDEP:

see note 4

**Allowable Export for Developable Area:**

	Length (feet)	Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs)
	0	12	0.00	1.75	0.00
	0	5.5	0.00	0.5	0.00
Black Nubble Side:					
Gravel Surface	4,600	12	1.27	1.75	2.22
Riprap Ditch	2,700	5.5	0.34	0.5	0.17
Turbine Foundations (18' Diameter + 10' = 615 SF X 2)			0.03	1.0	0.03

**Phosphorus Export to Redington Pond (lbs)      2.42**

**Notes:**

1. Only 12 feet of gravel surface along new roadway segments is to be left after construction of the project. Shoulders and travel surfaces beyond 12 feet are to be scarified to a 4 inch depth, covered with erosion control mix and allowed to revegetate over time. This will require limited grading of the gravel travel surface to remain to raise the surface or lower the adjacent surface and placement of 4 inches of erosion control mix over the remaining gravel area to allow revegetation to occur.
2. Crane and turbine pad assembly areas are to be scarified to a 4 to 6 inch depth, covered with 4 inches of erosion control mix and allowed to revegetate after construction.
3. Travel surfaces of existing road segments to be widened at corners or narrow straight sections will be reduced to the same 12 foot travel width after construction as described above. This will generally mimic the current existing logging road conditions in these areas; therefore, addition phosphorus calculations have not been performed in these areas.
4. Jeff Dennis provided 0.039 lbs/acre allowable export value for Redinton Pond on December 2, 2005. Refer to attached meeting minutes.



**Black Nubble Wind Farm Project**  
 Water Quality Lengths

JN1708.08 12/15/2006

**Black Nubble Side**

To Flagstaff			
Sheet	12' Road	Ditch	Pad
8+	2100	2100	
9	1200	1100	400
10	1650	1700	200
11	1400	850	
12	1800	350	600
13	970	900	400
14	950	1325	100
15	150	300	
17+	7168	1600	
18		2000	
19		2200	
20+	5350	2550	
21	800	2650	400
22	300	1500	400
23	1600	3500	600
	25438	24625	3100
To Redinton Pond			
8	850	250	
9	650	200	
14	300	200	
15	1350	1350	
16	1050	500	400
21		200	
	4200	2700	400
To Caribou			
NA			
	0	0	0

**Totals (ft)**    29638    27325    3500

**Totals (mi)**    5.6    5.2    0.7

Note: These lengths are conservative. Key facts lengths are more accurate.



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- CONSTRUCTION ADMINISTRATION
- TRAFFIC STUDIES AND MANAGEMENT

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## MEETING MINUTES

**Project:** Redington Wind Farm Project

**Date:** December 1, 2005

**Time:** 9:00AM

**Location:** Maine Department of Environmental Protection (MeDEP) Office, Augusta, Maine

**Attendees:** Marcia Spencer-Famous – LURC  
Lisa-Kay Keen – MeDEP  
Jeff Dennis – MeDEP  
Harley Lee – Endless Energy  
Eva Polisner – Endless Energy  
Dwight D. Anderson, P.E. – DeLuca-Hoffman Associates, Inc.

**Purpose:** To meet with MeDEP and LURC Officials to discuss stormwater controls related to Phosphorus exports from the project.

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Jeff Dennis opened the meeting by stating that the 1992 Phosphorus Control Technical Guide by MeDEP will apply to this project. Lisa agreed and noted that the new stormwater rules would not apply to this project because substantive meetings have already been held for the project and this has been verified by MeDEP council. Harley Lee presented a brief overview of the project.

Phosphorus allocations for the affected water bodies were discussed. Jeff indicated that phosphorus criteria would need to be met for Flagstaff Lake and Redington Pond but not Caribou Pond. Phosphorus calculations for Caribou Pond are not required due to the small size of its watershed. Jeff planned to provide the respective phosphorus allocations per acre for Flagstaff Lake and Redington Pond the following day if possible.

During the meeting, Jeff indicated that the phosphorus export allocations would not likely be lower than 0.04 lbs per acre and could possibly be higher than 0.05 lbs per acre of developable area. Following the meeting on December 2, 2005, Jeff Dennis provided anticipated phosphorus export allocations to Dwight Anderson over the phone as noted below in footnote 1<sup>1</sup>.

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<sup>1</sup> During a follow-up phone call between Dwight Anderson and Jeff Dennis on December 2, 2005, Jeff Dennis provided 0.039 lbs/acre as an anticipated allowable export for Redington Pond, considering that steep slopes would be included in the developable area of the Redington and Black Nubble parcels. Jeff also provided a 0.045 lbs/acre as an anticipated allowable export value for Flagstaff Lake for developable area including steep slopes. These values have been used for phosphorus calculations for the project and will need to be verified by MeDEP during formal review.

The unique nature of the project was discussed. Typically areas with sustained slopes >25% covering more than 1 acre are excluded from the developable area when calculating the projects allowable phosphorus export; however, a significant portion of this project is being constructed in areas with slopes in excess of 25%.

The potential treatment measures below were discussed:

- Wooded Buffers are the most practical treatment method for this project. (Note: A deed restriction will need to be added to buffer areas. Jeff noted that buffer areas will need to be reviewed for areas of concentrated flow and that sheet flow is to be maintained in buffer areas).
- Ponds do not make sense to use in such steep areas and infiltration is not likely to work well for this project.

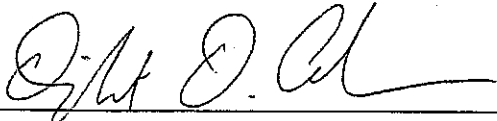
The following phosphorus export rates from the planned surface treatments were discussed:

- Gravel Road 1.75 lbs/acre\*
- Riprap Slope 0 lbs/acre
- Riprap Ditch 0.50 lbs/acre
- Walls 0 lbs/acre
- Wood/Bark Mulch 0 lbs/acre
- Grass (mowed annually) 0 lbs/acre

- \* Gravel roads will likely need to be reduced to a 12-foot width after construction to limit phosphorus exports for the project. Shoulders and travel surfaces beyond 12 feet would be scarified and covered with a bark mulch to promote re-vegetation after the project is complete.

Where compensation fees could be applied:

- Compensation fees cannot be used on projects which do not treat to a 50% removal rate. This project is not likely to be able to treat to a 50% level.



Prepared by: Dwight Anderson, P.E., DeLuca-Hoffman Associates, Inc.

Distribution:

- Jeff Thaler
- Attendees