ATTACHMENT E

Redington Wind Farm Project
Phosphorus Calculations for Flagstaff Lake

		With Slopes Included	
Redington Parcel Area Tributary to Flagstaff	254.0		
Areas of Redington with over 25% Slopes:	33%		
Black Nubble Parcel Area Tributary to Flagstaff	399.7		
Areas of Black Nubble with over 25% Slopes:	50%		
Total Parcel Area Tributary to Flagstaff Lake:	653.7 Acres	653.7 Acres	
Wetland Areas:		1.7 Acres	
Areas with over 25% Slopes:	283.7 Acres		
Protected Soil and Geology Area:		3.5 Acres	
Net Developable Area (See Note 4):		648.5 Acres	
Allowable Export Rate Determined by MeDEP:		0.045 Lbs P per Acre	see note 4
Allowable Export for Developable Area:		**29.18 Lbs P**	

	Length (feet)	Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs)
Upper Black Nubble Access Road					
Gravel Surface	6,276	12	1.73	1.75	3.03
Riprap Ditch (1,000 feet more due to cuts)	7,276	5.5	0.92	0.5	0.46
Lower Black Nubble Access Road					
Gravel Surface	480	12	0.13	1.75	0.23
Riprap Ditch	480	5.5	0.06	0.5	0.03
Redington Access Road					
Gravel Surface	9,596	12	2.64	1.75	4.63
Riprap Ditch (1,800 feet more due to cuts)	11,396	5.5	1.44	0.5	0.72
Redington Summit Road					
Segments	4,968				
	361				
	157				
	354				
	1,119				
	243				
	430				
	849				
	2,890				
	756				
	276				
	194				
	216				
Total	12,813				
Gravel Surface	12,813	12	3.53	1.75	6.18
Riprap Ditch (1,200 feet more due to cuts)	14,013	5.5	1.77	0.5	0.88
Lower Black Nubble Summit Road					
Segments	323				
	641				
	1,518				
	1,076				
	565				
	301	(200 at split + 101 to balance road lengths)			
	6,602				
	236				
	485				
Total	11,747				
Gravel Surface	11,747	12	3.24	1.75	5.66
Riprap Ditch (1,000 feet less due to Ridge*)	10,747	5.5	1.36	0.5	0.68

Redington Wind Farm Project
Phosphorus Calculations for Flagstaff Lake

	Length (feet)	Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs)
Upper Black Nubble Summit Road					
Segments	669				
	442				
	4,423				
	414				
	264				
	1,141				
	684				
	1,358				
Total	9,395				
Gravel Surface	9,395	12	2.59	1.75	4.53
Riprap Ditch (600 feet more due to cuts)	9,995	5.5	1.26	0.5	0.63
Substation Access Road					
Gravel Surface	450	12	0.12	1.75	0.22
Riprap Ditch	620	7	0.10	0.5	0.05
Substation Crushed Stone Area			0.64	1.75	1.12
Turbine Foundations (14.25' Diameter + 10' = 462 SF X 23)			0.24	1.0	0.24
Total Road Length	50,757				

Phosphorus Export to Flagstaff Lake(lbs) 29.28

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 a wood bark mulch and allowed to revegetate over time. This will require limited grading of the gravel travel surface to remain to raise the surface and placement of 4 inches of wood bark mulch over the remaining gravel area to allow revegetation to occur.

2. Transmission line access road surfaces, crane and turbine pad assembly areas are to be scarified to a 4 to 6 inch depth, covered with 4 inches of wood bark mulch 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.

* 2,200 foot ridge section without ditch less 1,200 foot cut section with ditch on both sides = 1,000 feet.

Redington Wind Farm Project
Phosphorus Calculations for Redington Pond

		With Slopes Included	
Redington Parcel Area Tributary to Redington Pond	101.0		
Areas of Redington with over 25% Slopes:	33%		
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:	187.8 Acres	187.8 Acres	
Wetland Areas (insignificant amount for calcs.)			
Areas with over 25% Slopes:	76.7 Acres		
Net Developable Area (See note 4):			
Allowable Export Rate Determined by MeDEP:		0.039 Lbs P per Acre	see note 4
Allowable Export for Developable Area:		**7.32 Lbs P**	

		Length (feet)	Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs)
Redington Summit Road						
		546				
		139				
		1,000				
		1,222				
		274				
		304				
	Total	3,485				
Gravel Surface		3,485	12	0.96	1.75	1.68
Riprap Ditch (800 ft less due to ridge*)		2,685	5.5	0.34	0.5	0.17
Lower Black Nubble Summit Road						
		2,558				
		496				
		287				
		297				
		66				
		296				
		750				
		0				
	Total	4,750				
Gravel Surface		4,750	12	1.31	1.75	2.29
Riprap Ditch		4,750	5.5	0.60	0.5	0.30
Turbine Foundations (14.25' Diameter + 10' = 462SF X 7)				0.07	1.0	0.07
	Total Road Length	8,235				
				Phosphorus Export to Redington Pond (lbs)		**4.51**

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 a wood bark mulch and allowed to revegetate over time. This will require limited grading of the gravel travel surface to remain to raise the surface and placement of 4 inches of wood bark mulch over the remaining gravel area to allow revegetation to occur.

2. Transmission line access road surfaces, crane and turbine pad assembly areas are to be scarified to a 4 to 6 inch depth, covered with 4 inches of wood bark mulch 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.

* 1000 foot ridge section without ditch less 200 foot cut section with ditch on both sides = 800 feet.

Redington Wind Farm Project
Phosphorus Calculations
Road Length Summary - Check for Water Quality Calculations

Flagstaff		Length (feet)
Upper Black Nubble Access Road		6,276
Lower Black Nubble Access Road		480
Redington Access Road		9,596
Redington Summit Road		12,813
Lower Black Nubble Summit Road		11,747
Upper Black Nubble Summit Road		9,395
Substation		450
	Subtotal	**50,757**
Redington Pond		
Redington Summit Road		3,485
Lower Black Nubble Summit Road		4,750
	Subtotal	**8,235**
Other Watershed (No Phosphorus Calcs Req.)		
		234
		405
		218
		1,580
	Subtotal	**2,437**
	Total	**61,429**
Trans Line Access		4,000
	Total	65,429

Redington Wind Farm Project
Phosphorus Calculations for Flagstaff Lake
Buffer Areas to Flagstaff Lake

Buffer #	Road Length (	Road Width (feet)	Area (acre)	Export Rate (lbs/acre)	Phosphorus Export (lbs) Without Treatment	Treatment Factor	Phosphorus Export (lbs) WithTreatment
1	100	12	0.028	1.75	0.05	0.6	0.03
2	500	12	0.138	1.75	0.24	0.7	0.17
3	750	12	0.207	1.75	0.36	0.6	0.22
4	1100	12	0.303	1.75	0.53	0.6	0.32
5	250	12	0.069	1.75	0.12	0.6	0.07
6	150	12	0.041	1.75	0.07	0.5	0.04
7	150	12	0.041	1.75	0.07	0.6	0.04
8	900	12	0.248	1.75	0.43	0.6	0.26
9	600	12	0.165	1.75	0.29	0.6	0.17
10	700	12	0.193	1.75	0.34	0.6	0.20
11	650	12	0.179	1.75	0.31	0.8	0.25
12	1650	12	0.455	1.75	0.80	0.7	0.56
13	400	12	0.110	1.75	0.19	0.6	0.12
14	300	12	0.083	1.75	0.14	0.7	0.10
15	400	12	0.110	1.75	0.19	0.7	0.13
16	650	12	0.179	1.75	0.31	0.85	0.27
17	600	12	0.165	1.75	0.29	0.7	0.20
18	350	12	0.096	1.75	0.17	0.7	0.12
19	350	12	0.096	1.75	0.17	0.7	0.12
20	300	12	0.083	1.75	0.14	0.8	0.12
21	350	12	0.096	1.75	0.17	0.6	0.10
22	700	12	0.193	1.75	0.34	0.85	0.29
				Totals	5.74		3.89
				Phosphorus Export Reduced by Buffers by:			1.85

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- AIRPORT ENGINEERING
- CONSTRUCTION ADMINISTRATION
- TRAFFIC STUDIES AND MANAGEMENT

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.

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[1].

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[1] 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