

Members

Ron DiPippo, Chairman

Ed Iacaponi, Ex-Officio

Nathalie Dias

Kevern Joyce

Arthur Larrivee

Paul Lopes

Ray Medeiros

Roger Race

Saul Raposo

Joseph Sousa

MINUTES
ALTERNATIVE ENERGY COMMITTEE
MEETING OF JULY 1, 2009

Committee members present: Ron DiPippo (Chair), Arthur Larrivee, Kevern Joyce, Roger Race

Committee members absent: Nathalie Dias, Paul Lopes, Raymond Medeiros, Saul Raposo, Joseph Sousa.

Others: David Hickox (DPW), Wendy Henderson (BOH), Diane Gilbert, Kathryn Carvalho, Jean & Jaime Salgado, Martha Keating, Roseanne O'Connell, Margo Moore, John & Jennifer Brindisi and Bridget Earle. Chairman DiPippo called the meeting to order at 7:03 P.M. on Wednesday July 1, 2009.

1. Approval of Minutes.

A motion was made and seconded; it was voted unanimously to accept and approve the Alternative Energy Meeting Minutes of June 26, 2008.

Recess.

2. Presentation and Discussion of Progress by Atlantic Design Engineers on the Town-funded Feasibility Study

Chairman DiPippo presented a Powerpoint presentation that gave the status of studies on (1) noise, (2) shadow-flicker (S-F), (3) balloon tests-photosimulation, (4) FAA application, and (5) preliminary site plans. On each topic, the visitors asked many questions which the members attempted to answer. Among the questions were: What standards exist in Germany for S-F? Why doesn't the town get a financial analysis from an outsider, instead of just the AEC, the ADE and the FinCom's analysis? How can a resident know what impact will occur from noise or S-F.

Later research by the AEC after the meeting showed that there are no actual S-F standards, but one case in Germany went before a judge who ruled that 30 hours per year or greater was unacceptable. Since the financial study is a straightforward application of well-known equations, since all calculations give the same general conclusions, and lastly since the FinCom analysis used multiple sets of assumptions covering the range for very pessimistic to realistic, the AEC sees no reason to spend additional town money to redo the same work again. Residents can request that their property be included as a potential receptor of S-F, and in fact two of the visitors to the meeting made such a request and their addresses have been added to the ADE database.

After a motion was made and seconded, it was voted to adopt the ADE suggested receptor sites with the addition of any others wishing to have their residences included.

(continued)

3. June 3, 2009 letter from Wendy Henderson

The letter from Wendy Henderson was presented along with a reply letter from the Chairman. A brief discussion followed.

After a motion was made and seconded, it was voted to adjourn the Alternative Energy Committee meeting. With no further business to discuss, the Chairman declared the regular meeting adjourned at 9:00 p.m.

Attest:

A handwritten signature in blue ink, appearing to read 'R. DiPippo', with a stylized flourish at the end.

Ronald DiPippo, Chairman

UPDATE ON ADE FEASIBILITY STUDY JULY 29, 2009

- **Noise**
- **Shadow-Flicker**
- **Balloon Test/Photosimulations**
- **FAA & MAC Applications**
- **Preliminary Site Plans**

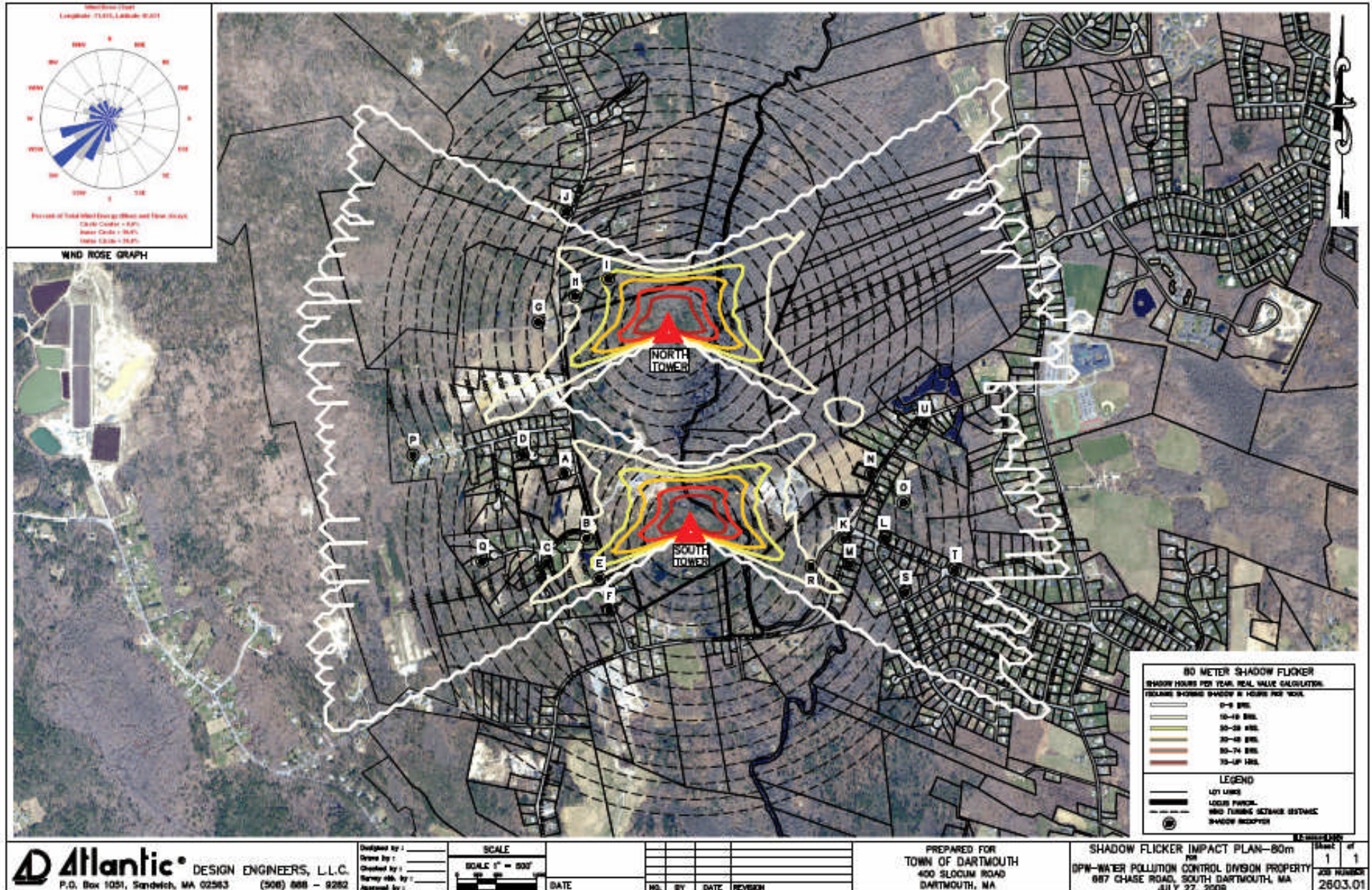
Noise

ADE took ambient noise measurements at three locations near the western boundary of the DPW property. They are seeking wind data for the time period of the measurements to correlate the ambient noise with wind speed. UMD MET tower data is being sought. This is needed because the WT noise must be compared to background (no more than 10 dBA above) and the WT noise also depends on the wind speed.

Shadow-Flicker

ADE has finished the WindPro calculations for the 80-m and 100-m heights (final results were received July 27). The number of hours per year of possible S-F impact have been determined for specific receptor locations.

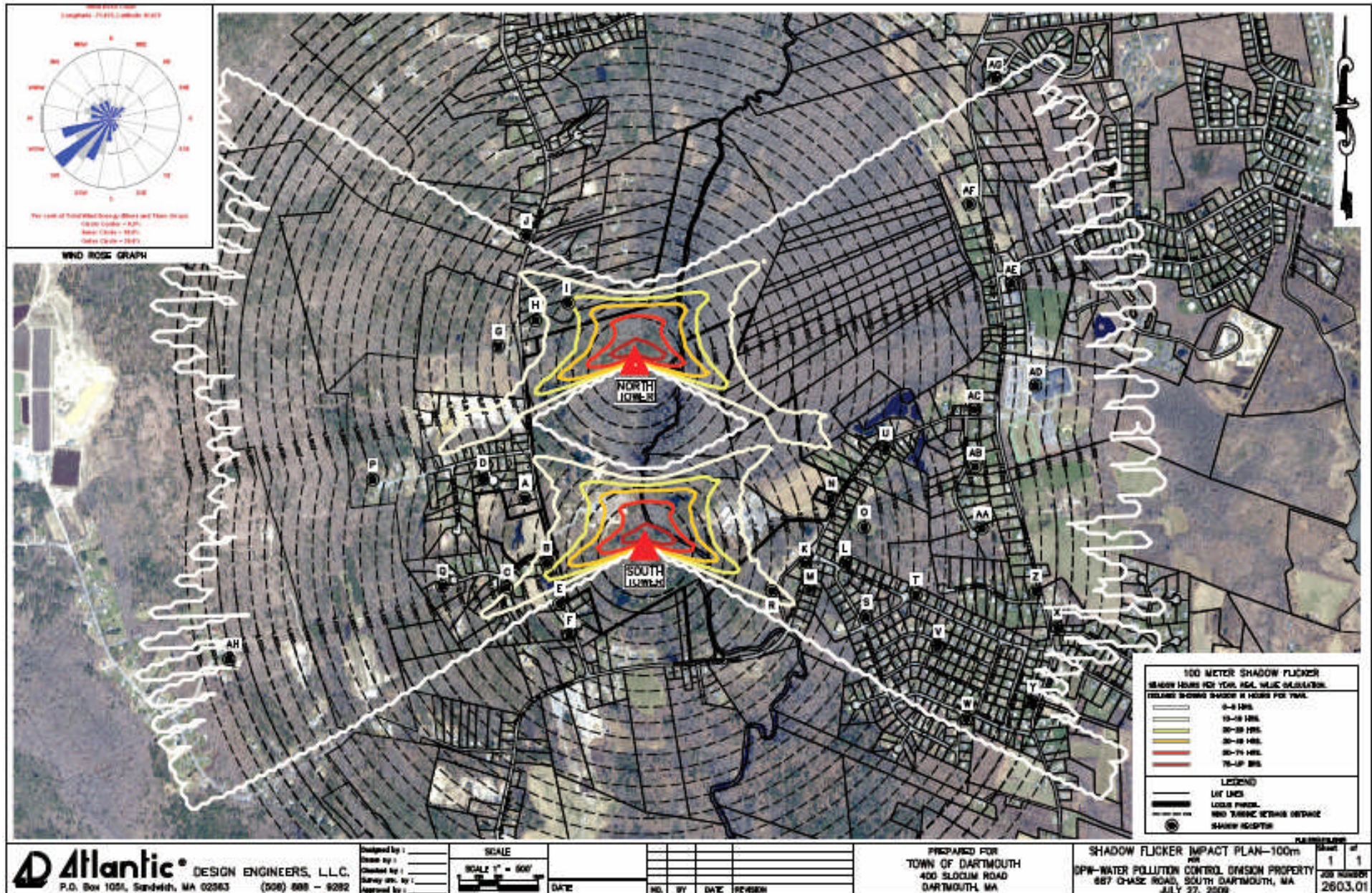
80-m SHADOW-FLICKER RESULTS



80-m SHADOW-FLICKER RECEPTORS

SHADOW RECEPTOR	ESTIMATED SHADOW FLICKER
Receptor Name	Expected (Real Value Calculations)
A - 660 Chase Road	6:00 hours/year
B - 4 Longmeadow Rd	10:23 hours/year
C - 3 Fieldstone Ln	6:17 hours/year
D - 4 Purdue Ln	3:26 hours/year
E - 726 Chase Rd	9:00 hours/year
F - 742 Chase Rd	0:00 hours/year
G - 592 Chase Rd	5:55 hours/year
H - 589 Chase Rd	10:10 hours/year
I - 581 Chase Rd	24:16 hours/year
J - 536 Chase Rd	0:00 hours/year
K - 789 Russells Mills Rd	4:38 hours/year
L - 437 Gulf Road West	2:46 hours/year
M - 804 Russells Mills Rd	4:43 hours/year
N - 743 Russells Mills Rd	3:11 hours/year
O - 720 Russells Mills Rd	2:11 hours/year
P - 98 Pembroke Ln	3:31 hours/year
Q - 24 Longmeadow Rd	2:23 hours/year
R - 801 Russells Mills Road	11:33 hours/year
S - 39 Meadowood Dr	2:32 hours/year
T - 41 Gulf Road West	1:12 hours/year
U - 696 Russells Mills Road	3:29 hours/year

100-m SHADOW-FLICKER RESULTS



100-m SHADOW-FLICKER RECEPTORS

SHADOW RECEPTOR	ESTIMATED SHADOW FLICKER
Receptor Name	Expected (Real Value Calculations)
A - 660 Chase Road	6:22 hours/year
B - 4 Longmeadow Rd	14:02 hours/year
C - 3 Fieldstone Ln	8:36 hours/year
D - 4 Purdue Ln	3:45 hours/year
E - 726 Chase Rd	0:00 hours/year
F - 742 Chase Rd	0:00 hours/year
G - 592 Chase Rd	5:15 hours/year
H - 589 Chase Rd	8:43 hours/year
I - 581 Chase Rd	19:59 hours/year
J - 536 Chase Rd	0:00 hours/year
K - 789 Russells Mills Rd	4:30 hours/year
L - 437 Gulf Road West	2:47 hours/year
M - 804 Russells Mills Rd	4:52 hours/year
N - 743 Russells Mills Rd	3:02 hours/year
O - 720 Russells Mills Rd	2:14 hours/year
P - 98 Pembroke Ln	4:08 hours/year
Q - 24 Longmeadow Rd	3:00 hours/year
R - 801 Russells Mills Road	13:31 hours/year
S - 39 Meadowood Dr	2:52 hours/year
T - 41 Gulf Road West	1:32 hours/year
U - 696 Russells Mills Road	4:22 hours/year
V - 14 Seth Davis Way	1:25 hours/year
W - 1 Brightman Ln	1:46 hours/year
X - 39 Beechwood Dr	0:17 hours/year
Y - 326 Bakerville Rd	0:29 hours/year
Z - 394 Bakerville Rd	0:33 hours/year
AA - 35 Rebecca Rd	2:17 hours/year
AB - 11 Rebecca Rd	1:34 hours/year
AC - 633 Russells Mills Rd	1:42 hours/year
AD - 555 Russells Mills Rd	0:58 hours/year
AE - 532 Russells Mills Rd	1:57 hours/year
AF - 620 Tucker Rd	0:50 hours/year
AG - 18 Farmers Circle	0:00 hours/year
AH - 7 Nathan Dr	0:15 hours/year

Shadow-Flicker Comparison

Number of residences or businesses potentially impacted by shadow-flicker.
 Trees, bushes or other structures may prevent shadows from reaching locations.
 West and East refer to locations relative to the North-South axis of the turbines.

80-m TOWERS			100-m TOWERS		
0-9 hours per year (0-0.10% of year)					
West	East	Total	West	East	Total
64	180	244	69	279	348
10-19 hours per year (0.10-0.22% of year)					
West	East	Total	West	East	Total
5	3	8	11	7	18
20-29 hours per year (0.23-0.33% of year)					
West	East	Total	West	East	Total
1	0	1	1	0	1
>30 hours per year (>0.34% of year)					
West	East	Total	West	East	Total
0	0	0	0	0	0
Total		253	Total		367

Revised based on plots dated July 27, 2009 developed by Atlantic Design Engineers.
 Counts made by R. DiPippo - Accuracy estimate: about +/- 2

Shadow-Flicker Elimination

If S-F would be a problem at a particular residence or cluster of residences, after taking into account all the mitigating effects, a control system on the wind turbine will command it to shut down whenever it determines that the sun is shining, the blades are turning, and the wind direction is such that S-F would otherwise occur at the particular site(s).

BalloonTest/Photosimulations

The balloontest was done on July 10.

Preliminary results were received on July 28, 2009.

ADE PHOTOSIMULATION BALLOON TESTS: July 10, 2009

Witness: Ron DiPippo

Visit No.	Site No.	Location	Time	Visible?	
				North	South
1	3	UMD Running Track	10:05	No	No
2	2	Chase & 21 Lucy Little	10:20	Yes	No
3	New	620 Chase – Medeiros Sand	10:30	Yes	No
4	12	39 Pembroke - near rotary	10:38	Yes	No
5	New	36 Pembroke	10:47	Yes	Yes
6	New	23 Longmeadow	11:00	Yes	No
7	New	Corner Longmeadow & Fieldstone	11:05	Yes	Yes
8	New	941 Russells Mills	11:15	No	Yes
9	6	441 Gulf W near Russells Mills	11:23	No	Yes
10	7a	Bakerville & Gulf (Motha Sq.)	11:35	Yes	No
11	7b	Bakerville & 392 Gulf W	11:35	No	Yes
12	6B	779 Russells Mills - Salgado	11:44	No	No
13	4	Hawthorne CC	11:55	Yes	Yes
	1	Chase & Pembroke	---	Replace by Medeiros Sand	
	5	Allen @ water tank	---	Obstructed by trees	
	6A	771 Russells Mills - Carvalho	---	Obstructed by trees	
	8	Padanaram Bridge	---	Not visible	
	9	Russells Mills @ Davol's	---	Not visible	
	10	Ray Peck Drive	---	---	
	11	Little River Road	---	---	
	13	Smith Neck & Rock O'Dundee	---	---	
	14	4 Longmeadow	---	Partial tree obstruction	

Ronald DiPippo

July 10, 2009

Date

View
looking
ENE along
Pembroke

No turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'D'-39 CORNELL DRIVE (LOOKING EAST)

PRELIMINARY SIMULATION

View
looking
ENE along
Pembroke

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,516 FT (0.66 MILE)
DISTANCE TO SOUTH TURBINE 2 3,387 FT (0.64 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH NORTH TOWER 100m
LOCATION 'D'-39 CORNELL DRIVE
(LOOKING EAST)

 Atlantic
www.atlanticcompanies.com

PRELIMINARY SIMULATION

View
looking
ENE along
Pembroke

With
80-m
turbine



DISTANCE TO NORTH TURBINE 1 3,087 FT (0.58 MILE)
DISTANCE TO SOUTH TURBINE 2 3,481 FT (0.66 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M NORTH TOWER
LOCATION 'D'-39 CORNELL DRIVE
(LOOKING EAST)



View
looking
ESE along
Pembroke

No turbine

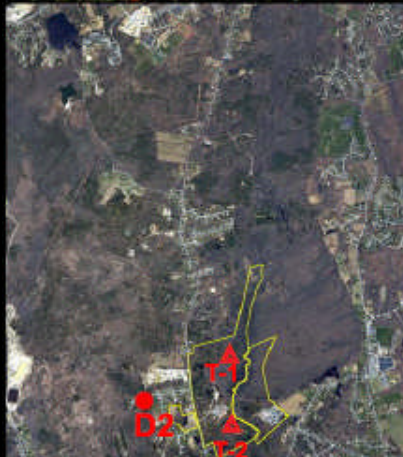


DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'D2'-36 CORNELL DRIVE (LOOKING EAST)

PRELIMINARY SIMULATION

View
looking
ESE along
Pembroke

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,516 FT (0.66 MILE)
DISTANCE TO SOUTH TURBINE 2 3,387 FT (0.64 MILE)



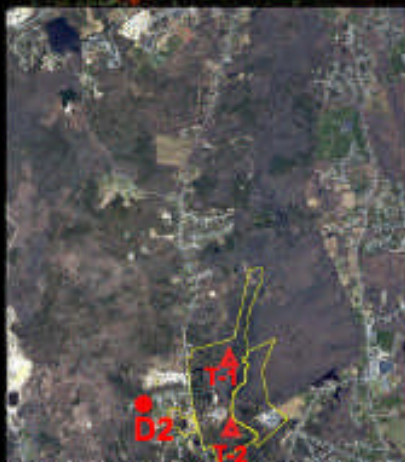
DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M SOUTH TOWER
LOCATION 'D2'-36 CORNELL DRIVE
(LOOKING EAST)

 Atlantic
www.atlanticcompanies.com

PRELIMINARY SIMULATION

View
looking
ESE along
Pembroke

With
80-m
turbine



DISTANCE TO NORTH TURBINE 1 3,251 FT (0.62 MILE)
DISTANCE TO SOUTH TURBINE 2 3,280 FT (0.62 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M SOUTH TOWER
LOCATION 'D2'-36 CORNELL DRIVE
(LOOKING EAST)



View
looking
NE along
Long-
meadow

With
no
turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'E'-23 PEMBROKE DRIVE (LOOKING NORTH EAST)

PRELIMINARY SIMULATION

View
looking
NE along
Long-
meadow

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,490 FT (0.66 MILE)
DISTANCE TO SOUTH TURBINE 2 2,366 FT (0.45 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M NORTH TOWER
LOCATION 'E'-23 PEMBROKE DRIVE
(LOOKING NORTH EAST)


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PRELIMINARY SIMULATION

View
looking
NE along
Long-
meadow

With
80-m
turbine



DISTANCE TO NORTH TURBINE 1 3,516 FT (0.67 MILE)
DISTANCE TO SOUTH TURBINE 2 2,429 FT (0.46 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M NORTH TOWER
LOCATION 'E'-23 PEMBROKE DRIVE
(LOOKING NORTH EAST)



View
looking E
along
Long-
meadow

With
no
turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'E'-23 PEMBROKE DRIVE (LOOKING EAST)

PRELIMINARY SIMULATION

View
looking E
along
Long-
meadow

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,490 FT (0.66 MILE)
DISTANCE TO SOUTH TURBINE 2 2,366 FT (0.45 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M SOUTH TOWER
LOCATION 'E'-23 PEMBROKE DRIVE
(LOOKING EAST)

View
looking E
along
Long-
meadow

With
80-m
turbine

PRELIMINARY SIMULATION



DISTANCE TO NORTH TURBINE 1 3,516 FT (0.67 MILE)
DISTANCE TO SOUTH TURBINE 2 2,429 FT (0.46 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M SOUTH TOWER
LOCATION 'E'-23 PEMBROKE DRIVE
(LOOKING EAST)



View
looking W
along Gulf
Road W.

With
no
turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'G'-RUSSELLS MILLS AND GULF ROAD WEST

PRELIMINARY SIMULATION

View
looking W
along Gulf
Road W.

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,461 FT (0.66 MILE)
DISTANCE TO SOUTH TURBINE 2 2,316 FT (0.44 MILE)

DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M SOUTH TOWER
LOCATION 'G'-RUSSELLS MILLS AND GULF ROAD WEST
(LOOKING WEST)



PRELIMINARY SIMULATION

View
looking W
along Gulf
Road W.

With
80-m
turbine



DISTANCE TO NORTH TURBINE 1 3,596 FT (0.68 MILE)
DISTANCE TO SOUTH TURBINE 2 2,238 FT (0.42 MILE)

DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M SOUTH TOWER NOT VISIBLE
LOCATION 'G'-RUSSELLS MILLS AND GULF ROAD WEST
(LOOKING WEST)



View
looking
WNW
from
Motha
Square

With
no
turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'H'-BAKERVILLE ROAD AND GULF ROAD (LOOKING NORTHWEST)

View
looking
WNW
from
Motha
Square

With
100-m
turbine

PRELIMINARY SIMULATION

DISTANCE TO NORTH TURBINE 1 6,345 FT (1.20 MILE)
DISTANCE TO SOUTH TURBINE 2 5,284 FT (1.00 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M NORTH TOWER
LOCATION 'H'-BAKERVILLE ROAD AND GULF ROAD
(LOOKING NORTHWEST)

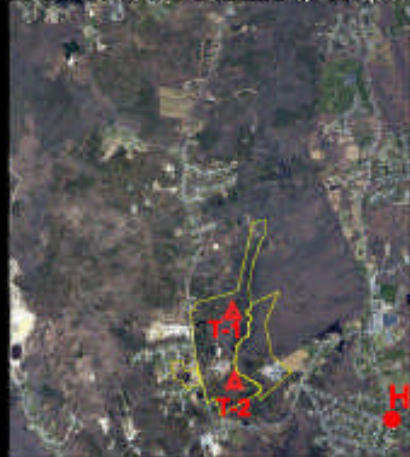
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View
looking
WNW
from
Motha
Square

With
80-m
turbine

PRELIMINARY SIMULATION

DISTANCE TO NORTH TURBINE 1 6,485 FT (1.22 MILE)
DISTANCE TO SOUTH TURBINE 2 5,192 FT (0.98 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 80M NORTH TOWER
LOCATION 'H'-BAKERVILLE ROAD AND GULF ROAD
(LOOKING NORTHWEST)



View
looking W
from 771
Russells
Mills Road

With
no
turbine



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'I'-779 PRIVATE WAY (LOOKING WEST)

View
looking W
from 771
Russells
Mills Road

With
100-m
turbine



DISTANCE TO NORTH TURBINE 1 3,363 FT (0.84 MILE)
DISTANCE TO SOUTH TURBINE 2 1,759 FT (0.33 MILE)



PRELIMINARY SIMULATION

DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH 100M SOUTH TOWER
LOCATION 1'-779 PRIVATE WAY
(LOOKING WEST)



View
looking W
from 771
Russells
Mills Road

With
80-m
turbine



View from Hawthorne CC looking SW – No turbines



DARTMOUTH WWTP WIND PROJECT
EXISTING CONDITIONS
LOCATION 'J' - HAWTHORNE COUNTY CLUB (LOOKING SOUTHWEST)

View from Hawthorne CC looking SW – With 100-m turbines

PRELIMINARY SIMULATION



DISTANCE TO NORTH TURBINE 1 8,457 FT (1.60 MILE)
DISTANCE TO SOUTH TURBINE 2 10,558 FT (1.95 MILE)

DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH TWO 100M TOWERS
LOCATION 'J' - HAWTHORNE COUNTY CLUB
(LOOKING SOUTHWEST)



View from Hawthorne CC looking SW – With 80-m turbines

PRELIMINARY SIMULATION



DISTANCE TO NORTH TURBINE 1 8,457 FT (1.60 MILE)
DISTANCE TO SOUTH TURBINE 2 10,558 FT (2.01 MILE)



DARTMOUTH WWTP WIND PROJECT
PROPOSED CONDITIONS WITH TWO 80M TOWERS
LOCATION 'J' - HAWTHORNE COUNTY CLUB
(LOOKING SOUTHWEST)

FAA& MACApplications

Both applications have been filed. The FAA decision is expected within 90 days. The MAC is expected within 3 weeks, but is a *pro forma* application and should be approved.

Preliminary Site Plans

These are required for use at the TRG pre-application conference and are underway. This will be an important piece of the final report that we expect by the end of July.

ECONOMIC COMPARISONS

0% Financing (CREBs), No Grants

Economic Assumptions		Environment Inputs	
Annual Cost per Unit	\$ 50,000	Density (k/m ³)	1.225
Number of Units	2	V Mean (m/s)	6.14
Grant money per unit	\$0	Sigma (m/s)	0.42
Machine Capacity (kW)	1,650.0		
Interest Rate	0%	Turbine Inputs	
Loan Payback (years)	15	Capacity (kW)	1650
Life Span (years)	20	Radius (m)	41
Renewable Energy Credits		Loss Factors	
Value of RECs (A)	\$20.00	Energy Cost	\$0.1578 (Current cost)
Value of RECs (B)	\$40.00	Energy Inflation	3.000%
		Availability	93%
		Icing	100%

Turbine hub Height -- 80 m; Cost per Unit -- \$ 4,444,000

Results			
Annualized Cost over payback	\$ 792,533		
Probability	P99	P90	P50
Velocity (m/s)	5.16	5.60	6.14
Cap Factor	17.86%	21.83%	26.71%
Energy Generated (kW-h/yr)	5.17E+06	6.31E+06	7.73E+06
No. of RECs per year	5165	6315	7726
Generation Cost			
Over Loan Payback Period	\$ 0.1534	\$ 0.1255	\$ 0.1026
After Loan Payback Period	\$ 0.0097	\$ 0.0079	\$ 0.0065

Turbine hub Height -- 100 m; Cost per Unit -- \$ 5,000,000

Results			
Annualized Cost over payback	\$ 866,667		
Probability	P99	P90	P50
Velocity (m/s)	5.36	5.81	6.36
Cap Factor	19.63%	23.72%	28.66%
Energy Generated (kW-h/yr)	5.68E+06	6.86E+06	8.29E+06
No. of RECs per year	5678	6861	8290
Generation Cost			
Over Loan Payback Period	\$ 0.1526	\$ 0.1263	\$ 0.1045
After Loan Payback Period	\$ 0.0088	\$ 0.0073	\$ 0.0060

NET BENEFIT = ELECTRICITY SAVINGS + RECs – BOND PAYMENTS

Year	100-m, REC @ \$20/MWh	80-m, REC @ \$20/MWh	100-m, REC @ \$40/MWh	80-m, REC @ \$40/MWh
0	\$353,194	\$330,243	\$490,411	\$456,539
1	\$385,674	\$360,137	\$522,891	\$486,433
2	\$419,127	\$390,928	\$556,344	\$517,225
3	\$453,585	\$422,643	\$590,802	\$548,940
4	\$489,076	\$455,309	\$626,293	\$581,606
5	\$525,631	\$488,956	\$662,848	\$615,252
6	\$563,284	\$523,612	\$700,501	\$649,908
7	\$602,066	\$559,307	\$739,283	\$685,604
8	\$642,011	\$596,073	\$779,228	\$722,370
9	\$683,155	\$633,943	\$820,372	\$760,239
10	\$725,533	\$672,948	\$862,750	\$799,245
11	\$769,183	\$713,124	\$906,400	\$839,420
12	\$814,142	\$754,505	\$951,359	\$880,801
13	\$860,449	\$797,127	\$997,666	\$923,423
14	\$908,146	\$841,028	\$1,045,363	\$967,324
15	\$957,274	\$886,246	\$1,094,491	\$1,012,542
16	\$1,824,542	\$1,675,353	\$1,961,760	\$1,801,650
17	\$1,876,662	\$1,723,325	\$2,013,879	\$1,849,622
18	\$1,930,346	\$1,772,736	\$2,067,563	\$1,899,032
19	\$1,985,639	\$1,823,629	\$2,122,857	\$1,949,926
20	\$2,042,592	\$1,876,049	\$2,179,809	\$2,002,346
Totals	\$19,811,311	\$18,297,221	\$22,692,870	\$20,949,447
100m – 80m	\$1,514,090		\$1,743,423	

ECONOMIC COMPARISONS

4% Financing (Municipal Bond), No Grants

Economic Assumptions		Environment Inputs			
Annual Cost per Unit	\$ 50,000	Density (k/m ³)	1.225		
Number of Units	2	V Mean (m/s)	6.14		
Grant money per unit	\$0	Sigma (m/s)	0.42		
Machine Capacity (kW)	1,650.0				
Interest Rate	4%	Turbine Inputs		Loss Factors	
Loan Payback (years)	15	Capacity (kW)	1650	Availability	93%
Life Span (years)	20	Radius (m)	41	Icing	100%
Renewable Energy Credits		Energy			
Value of RECs (A)	\$20.00	Energy Cost	\$0.1578 (Current cost)		
Value of RECs (B)	\$40.00	Energy Inflation	3.000%		

Turbine hub Height -- 80 m; Cost per Unit -- \$ 4,444,000

Results			
Annualized Cost over payback	\$ 899,397		
Probability	P99	P90	P50
Velocity (m/s)	5.16	5.60	6.14
Cap Factor	17.86%	21.83%	26.71%
Energy Generated (kW-h/yr)	5.17E+06	6.31E+06	7.73E+06
No. of RECs per year	5165	6315	7726
Generation Cost			
Over Loan Payback Period	\$ 0.1741	\$ 0.1424	\$ 0.1164
After Loan Payback Period	\$ 0.0097	\$ 0.0079	\$ 0.0065

Turbine hub Height -- 100 m; Cost per Unit -- \$ 5,000,000

Results			
Annualized Cost over payback	\$ 999,411		
Probability	P99	P90	P50
Velocity (m/s)	5.36	5.81	6.36
Cap Factor	19.63%	23.72%	28.66%
Energy Generated (kW-h/yr)	5.68E+06	6.86E+06	8.29E+06
No. of RECs per year	5678	6861	8290
Generation Cost			
Over Loan Payback Period	\$ 0.1760	\$ 0.1457	\$ 0.1205
After Loan Payback Period	\$ 0.0088	\$ 0.0073	\$ 0.0060

NET BENEFIT = ELECTRICITY SAVINGS + RECs – BOND PAYMENTS

Year	100-m, REC @ \$20/MWh	80-m, REC @ \$20/MWh	100-m, REC @ \$40/MWh	80-m, REC @ \$40/MWh
0	\$220,450	\$223,379	\$357,667	\$349,676
1	\$252,929	\$253,274	\$390,146	\$379,570
2	\$286,383	\$284,065	\$423,600	\$410,361
3	\$320,840	\$315,780	\$458,057	\$442,076
4	\$356,331	\$348,446	\$493,548	\$474,743
5	\$392,887	\$382,093	\$530,104	\$508,389
6	\$430,539	\$416,749	\$567,757	\$543,045
7	\$469,321	\$452,444	\$606,539	\$578,740
8	\$509,267	\$489,210	\$646,484	\$615,507
9	\$550,411	\$527,080	\$687,628	\$653,376
10	\$592,789	\$566,085	\$730,006	\$692,381
11	\$636,438	\$606,261	\$773,655	\$732,557
12	\$681,397	\$647,641	\$818,614	\$773,938
13	\$727,705	\$690,264	\$864,922	\$816,560
14	\$775,402	\$734,164	\$912,619	\$860,461
15	\$824,530	\$779,382	\$961,747	\$905,679
16	\$1,824,542	\$1,675,353	\$1,961,760	\$1,801,650
17	\$1,876,662	\$1,723,325	\$2,013,879	\$1,849,622
18	\$1,930,346	\$1,772,736	\$2,067,563	\$1,899,032
19	\$1,985,639	\$1,823,629	\$2,122,857	\$1,949,926
20	\$2,042,592	\$1,876,049	\$2,179,809	\$2,002,346
Totals	\$17,687,400	\$16,587,409	\$20,568,961	\$19,239,635
100m – 80m	\$1,099,991		\$1,329,326	

DISCUSSION

80-mvs. 100-mcases

NEWBUSINESS