



**association to protect
AMHERST ISLAND**

PO Box 4, 5695 Front Road, Stella, ON K0H2S0.

March 6th, 2011

Mayor Bill Lowry and Councillors,
Loyalist Township,
Odessa, ON K0H 2S0

Dear Mayor Lowry and Councillors,

At the Algonquin Power Company Open House yesterday, the consulting company Hatch presented its own analysis of wind-turbine shadow-flicker to be expected at homes on Amherst Island if the wind development is approved and goes ahead. The Hatch report confirms our own analysis and also confirms the dilemma that we face on the island.

The attached report gives some background to the problem of shadow-flicker on the island..

Earlier APAI/SaveAI had requested a shadow-flicker by-law. Although received favourably by Council, it went nowhere. We are asking that Council restart the process, given

- the very large number of island homes that will exceed the European regulations for shadow flicker and the internationally accepted guideline for shadow flicker (30 hours/year under optimal conditions);
- the signals coming from the new Ontario government that there should be more local input into energy infrastructure development.

The requested by-law reads as follows:

Shadow-flicker at receptors from wind turbines shall be limited to 30 hours per year and 30 minutes per day, calculated for ideal conditions: no cloud cover or intervening vegetation; operating turbines; the plane of the rotating turbine facing the receptor.

As you know, we are in the final stages of the Renewable Energy Approval process and therefore there is some urgency to this request.

On behalf of APAI/SaveAI

John Harrison, Vice President, APAI
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Attachment: Request for a By-Law - Wind Turbine Shadow Flicker

Resubmissions with Revisions

Request for a By-Law - Wind Turbine Shadow Flicker

March, 6th, 2013

Shadow flicker is the flickering shadow that results when the sun passes behind a rotating wind turbine. It is most disturbing and nearly impossible to mask with blinds or curtains. Modern turbines are unlikely to induce epilepsy because the blade rotation rate is too slow. Many jurisdictions have recognized shadow flicker as an annoyance and as a distraction when driving.

A recent, although undated, report on shadow flicker was written for the UK Department of Energy and Climate Change¹. The report reviews the current regulations for a number of countries, guidelines for others and recommendations from a number of planning authorities, developers and consultants. Many regulations are based upon an academic survey by a University of Kiel psychologist in the 1990's. The recommendation was for a maximum of 30 hours per year and 30 minutes per day for optimal conditions for shadow flicker². These conditions are full sun, the turbine operating and the plane of the turbine facing the receptor.

Germany has adopted this recommendation, together with an alternate regulation of 8 hours per year calculated on the basis of realistic cloud cover and wind direction. Belgium, England and Northern Ireland have adopted the 30 hour regulation. Ireland has adopted the combined 30 hours and 30 minutes per day, stating also that a setback of 10 blade diameters is generally sufficient. The general rule in Scotland is a setback of 10 blade diameters. Spain has no regulation claiming that turbines are located far from populated settlement. The Netherlands has a strict limit of 5h 40min with a clear sky. Denmark has a limit of 10 hours per year with average cloud cover. The USA has no regulation; generally, the regulation of wind turbines is left to local municipalities. Ontario has no regulation or guideline on shadow flicker.

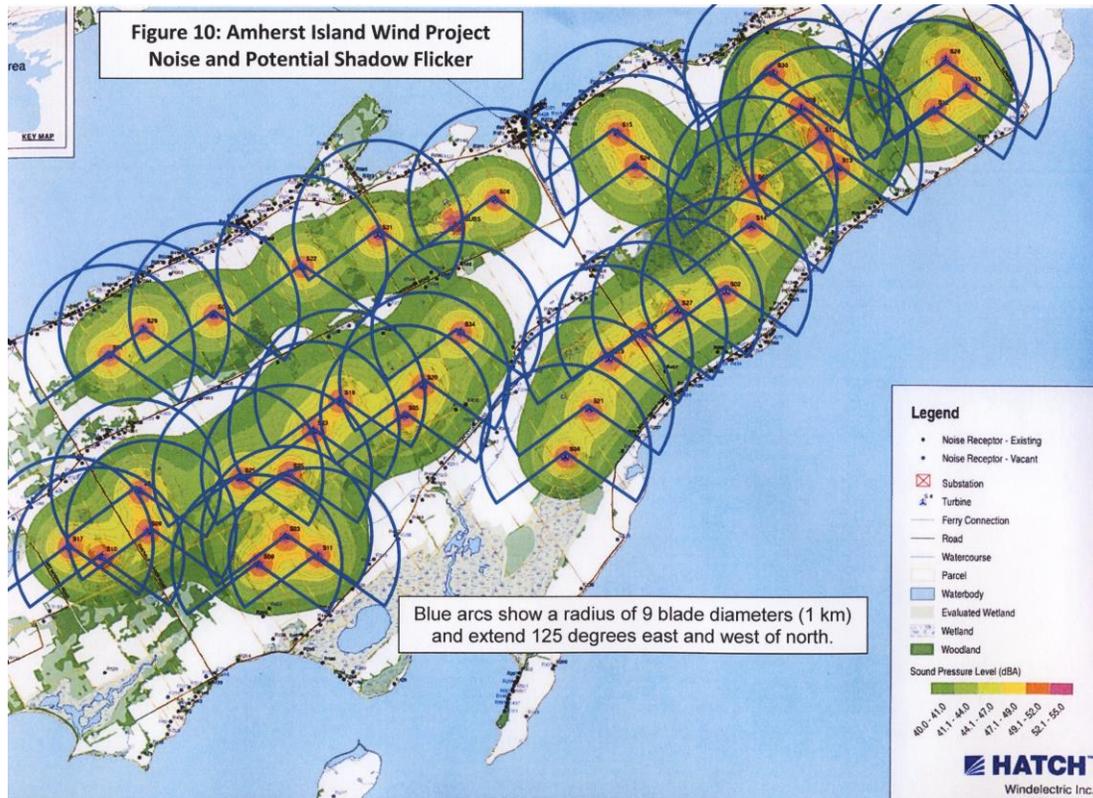
From the survey of developers and planners a common rule of thumb was to use a setback of 10 blade diameters, extending from 130 degrees east to 130 degrees west, or if that was not possible to perform an assessment for homes within 10 blade diameters. A typical blade diameter is 90 metres.

The Algonquin Power Co. 2011 Draft Site Plan made it clear that we have the potential for a significant shadow flicker problem on Amherst Island. The high fixed cost of laying an underwater cable has resulted in a project larger than the island can bear. Therefore the turbines are being packed too close to each other and to homes. The marginal wind resource has resulted in Algonquin Power

¹ Parsons Brinkerhoff "Up-Date of UK Shadow Flicker Evidence Base"

² Unless otherwise stated, all hours in this report will refer to this optimal condition.

resorting to massive turbines with 113 metre blade diameters and 99.5 metre hub heights. The problem can be visualized with the attached map.



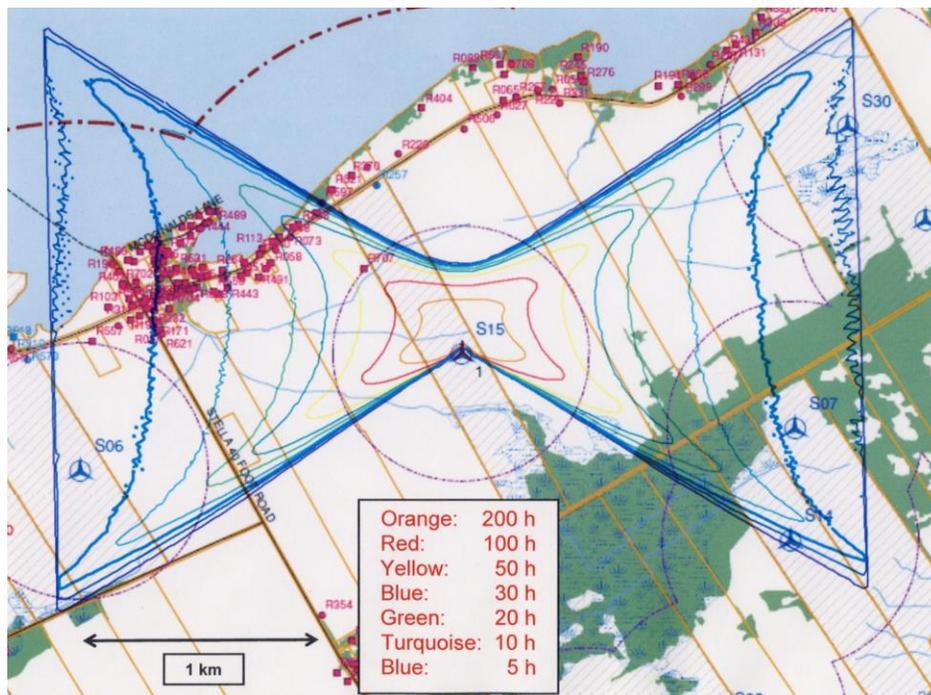
Fixed to each turbine on the map is a pie-shaped figure. It is an arc with a radius of 8 blade diameters (900 metres) extending from 125 degrees east to 125 degrees west. The suggested 10 blade diameter setback for Northern Europe has been reduced to 9 blade diameters to allow for our lower latitude (44° versus 51° for London). On the other hand, the large 99.5 metre hub height will compensate for the lower latitude in throwing a shadow.

Note: the number of homes within the arcs, in some cases well within the arcs; half the homes in Stella; the school; some homes are within two arcs; the potential impact on drivers using Front Road between the Emerald Forty and the Marshall Forty.

At the December Open House, Algonquin Power was asked to perform a formal shadow-flicker analysis to confirm or allay our worst fears. The promise to do so was made but nothing was forthcoming. By May we had lost hope that Algonquin would adhere to their promise and so APAI contracted with its own consultant, the Danish company EMD, and to use the recognized WindPRO software. Not having the financial resources for a full analysis, we asked for a single shadow-flicker contour map for a Siemens 2.3-113 turbine on flat ground at the latitude of Amherst Island. There was some correspondence back and

forth because EMD seemed not to have dealt with such a scaled back request and we had to appreciate exactly what EMD can do.

The result was exactly what was needed and we used ingenuity to compensate for our financial resources. First, Wayne Gulden added the turbines to the Google-Earth map of the island and then overlaid the EMD contour map onto every turbine on the Google-Earth image. He counted 50 homes or home-sites on lots of record (together now written as homes) with more than 30 hours/year of shadow flicker. Later John Harrison started with the latest draft site plan and had it enlarged. The EMD contour map was transferred to a transparency with the identical scale. Then it was merely a matter of moving the transparency to every turbine in turn and counting the homes. Counting conservatively he found 45 homes above 30 h/y³ and 8 with more than 50 h/y⁴. It is the view of APAI, SaveAI and many islanders that developing a plan with such large numbers of homes with more than 30 hours/year of shadow flicker is immoral!



Algonquin Power was again asked if they would be doing their own analysis and would the analysis be released during the 60 days for public consultation. The answers were yes and no respectively. At the March 5th Open House, Algonquin Power did have a full shadow-flicker analysis. They also used the Danish company EMD and again the recognized WindPRO software was used. Their

³ The Harrison number was smaller than the Gulden number because by then one turbine had been removed from the draft site plan.

⁴ The above numbers are for non-participating homes. One participant has over 100 hours/year of shadow-flicker; such is the morality of this company.

full analysis showed 48 homes with 30 or more h/y and 9 with 50 or more h/y. This confirmed the (conservative) analysis by APAI.

I have never see numbers like this. Shadow-flicker should have been addressed when developing the site plan, as was the noise analysis, not as an afterthought. Now, more than ever, we need help from Loyalist Township to protect islanders from shadow flicker. We ask Council to resubmit the earlier municipal shadow flicker by-law worded as follows⁵:

Shadow-flicker at receptors from wind turbines shall be limited to 30 hours per year and 30 minutes per day, calculated for ideal conditions: no cloud cover or intervening vegetation; operating turbines; the plane of the rotating turbine facing the receptor.

The earlier request for a by-law was favourably received by Council. However, we understand that the Ontario government did not respond to Council on the matter of approval of the by-law, despite several promptings.

It is possible that the new government will be more favourably inclined. First, we had the opportunity to bring the by-law request to the attention to Kathleen Wynne in her role as Minister of MMAH. Secondly, now Premier, Kathleen Wynne has mentioned on several occasions her desire to allow a larger voice for local government in energy infrastructure decision-making. One example is an email received yesterday by an islander (see the Appendix B):

For APAI/SaveAI
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⁵ The second part of the earlier request has been deleted; some Councillors were uncomfortable with it and I was not able to sway those Councillors; I respect their opinion.

Appendix A: Note the following from the Municipal Act of Ontario (2001 with updates):

Health, Safety and Nuisance

Public nuisances

128. (1) Without limiting sections 9, 10 and 11, **a local municipality may prohibit and regulate with respect to public nuisances**, including matters that, in the opinion of council, are or could become or cause public nuisances. 2001, c. 25, s. 128 (1); 2006, c. 32, Sched. A, s. 68.

Comment: There has been no consideration of shadow flicker in the Ministry of the Environment regulations accompanying the Green Energy Act. This by-law will therefore not contravene any MOE regulation and is in concordance with internationally accepted standards and less constrictive than some.

Appendix B: Thank you for your email to the Ministry of Health and Long-Term Care requesting clarification of the ministry response with the reference HLTC2966MC-2013-148 and the Subject Line: Email to MOHLTC, 13-148, mm. The January 25, 2013 response from the ministry was written in reply to your correspondence dated January 3, 2013, with the Subject line: Health Impact of Wind Turbines - Sworn Testimony of Dr. Jerry L. Punch before the Ohio Power Siting Board - Nov. 5th 2012.

Further to the information that was provided to you in the January 25, 2013 response, you may be interested to know that in the February 19, 2013, Ontario's Throne Speech, there was the following highlight from Premier Wynne's government, "Ensuring municipalities and families have input on the location of energy infrastructure in their communities, while continuing to protect the environment and encourage conservation". The Ministry of Health and Long-Term Care is currently awaiting further details on this implementation of the initiative.

Again, thank you for your email. I do apologize for the confusion that was caused by the ministry correspondence reference methodology.

Sincerely,

M. MacPhail, Correspondence Services
Ministry of Health and Long-Term Care