

Request for a By-Law - Wind Turbine Shadow Flicker

Delegation to Loyalist Township - May 14th, 2012

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

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

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 8 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; the 8 diameter setback is conservative.

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

We need help from Loyalist Township to protect islanders from shadow flicker. We would like to see a municipal shadow flicker by-law worded as follows;

Part 1: 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.

Part 2: There shall be no shadow flicker on public roads.

Note the following from the Municipal Act of Ontario (2001 with up-dates):

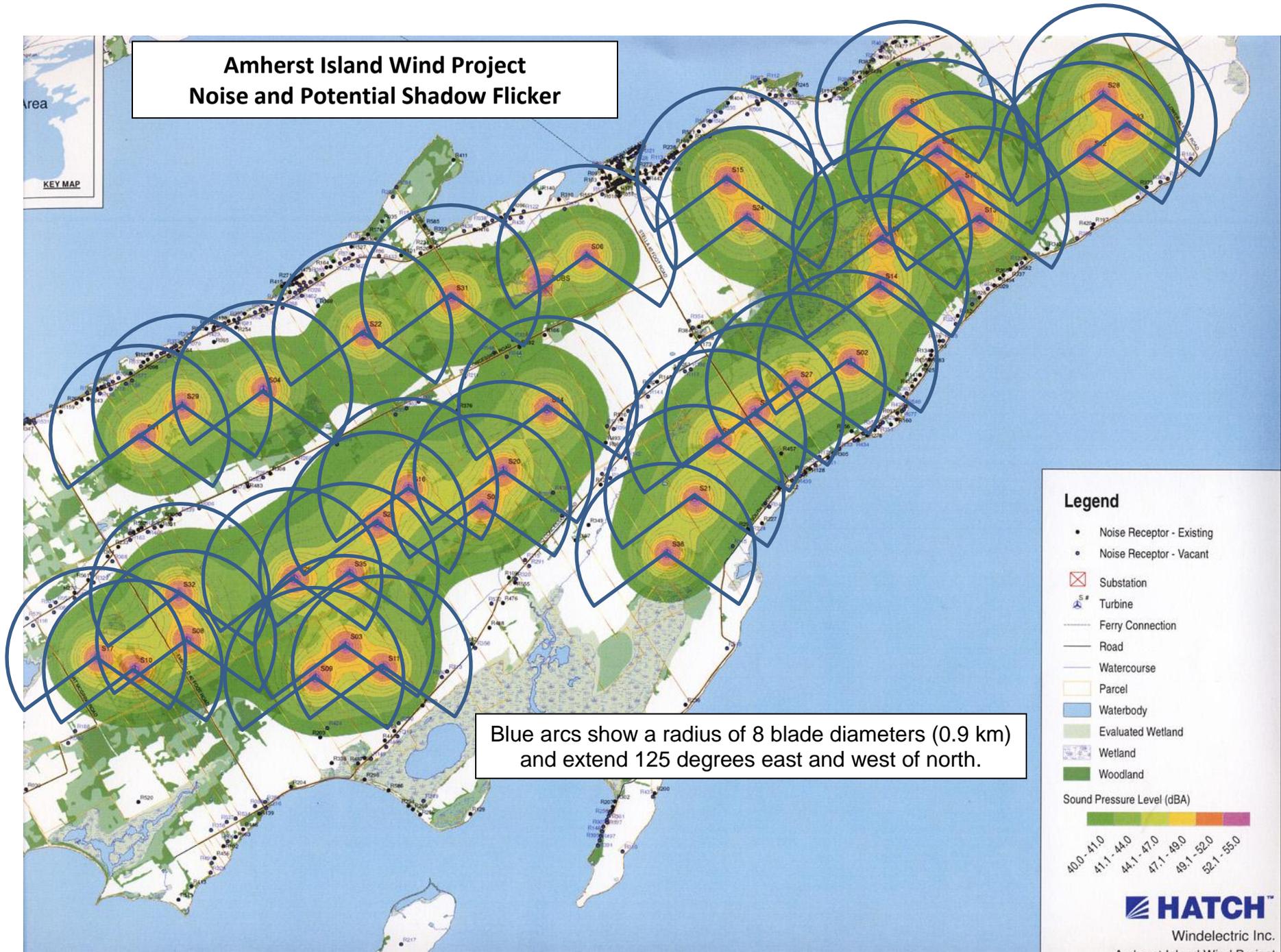
Health, Safety and Nuisance

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.

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. Part I is in concordance with internationally accepted standards and less constrictive than some.

Amherst Island Wind Project Noise and Potential Shadow Flicker



Blue arcs show a radius of 8 blade diameters (0.9 km) and extend 125 degrees east and west of north.

Legend

- Noise Receptor - Existing
- Noise Receptor - Vacant
- ⊠ Substation
- ⊙ Turbine
- Ferry Connection
- Road
- Watercourse
- ▭ Parcel
- Waterbody
- Evaluated Wetland
- Wetland
- Woodland

