

Renewable Energy Approvals

Technical Bulletin Six

Required Setbacks for Wind Turbines

as part of an application
under O.Reg.359/09

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Disclaimer: This technical bulletin should not be construed as legal advice. Please review Ontario Regulation 359/09. If you have any questions about the application or interpretation of this regulation you should consult a lawyer

Contents

1. Purpose of this Technical Bulletin	1
2. Noise-Based Setbacks	1
2.1. Minimum Setbacks	1
2.2. Definition of Noise Receptors	2
2.3. Multiple/Louder Turbines	2
2.4. Exception when Ambient Noise is >40 dBA due to Road Traffic	4
3. Setbacks from Property Lines	4
4. Setbacks from Roads and Railways	5
5. Setbacks for Associated Transformers	5
6. Off-shore Wind	5
7. Guidance for Demonstrating Adherence to Setbacks	5

1. Purpose of this Technical Bulletin

The purpose of this update is to clarify the requirements for setbacks under the Renewable Energy Approval Regulation (O. Reg. 359/09) as they apply to locating wind turbines. Setbacks are specified minimum horizontal separation distances between the base of a turbine and the planning feature of interest such as a noise receptor, property line, or road or railway right of way. Setbacks have been established to protect the environment, through conservative, science-based calculations. This enhances transparency and clarifies expectations while reducing burden on applicants to perform separate assessments for every project.

2. Noise-Based Setbacks

Setbacks for noise have been defined for all wind facilities not located in direct contact with surface water generating $\geq 50\text{kW}$ and using one or more turbines with a sound power level ≥ 102 dBA (subsection 54(1) of O.Reg. 359/09). Facilities that have a lower name plate capacity or use turbines with lower sound power levels are not subject to minimum setbacks, though they may still require a Renewable Energy Approval (REA). Applications in respect of small wind projects will still be considered for their potential to cause adverse effects.

2.1. Minimum Setbacks

All wind turbines that meet the criteria of 54(1) of O.Reg 359/09 must be located at least 550 m from the nearest noise receptor. The only exception to this is if a turbine is located near a noise receptor where the ambient noise from road traffic is consistently greater than 40 dBA. This exception is discussed in Section 2.4 of this bulletin.

The minimum setback of 550 m was developed by modeling propagation of turbine noise towards a receptor. Wind conditions and other factors affecting sound propagation were selected to represent a worst-case scenario to give a conservative estimate of setbacks. Further detail on the rationale and modeling methodology used to arrive at noise setbacks is provided in the Ministry of the Environment’s 2009 publication “Development of Noise Setbacks for Wind Farms”.

2.2. Definition of Noise Receptors

Noise receptors are defined in O.Reg. 359/09 as the centre of buildings or structures used for overnight accommodation or those used as an educational facility, day nursery, or place of worship. Examples of structures that the MOE would consider overnight accommodations include permanent or seasonal residences, hospitals, hotels/motels, and nursing/retirement homes.

Public or privately owned campsites or campgrounds are included in the definition of noise receptors requiring setback distances.

For calculation of setback distances, the centre of the building is used to locate the position of the noise receptor.

In addition to existing buildings or structures, those that are planned for construction and have been issued a building permit under the *Building Code Act* are also considered to be noise receptors.

All noise receptors should be identified by the proponent through reasonable inquiry prior to submitting the application.

Setback distances apply to noise receptors if they are located on land owned by a non-participating land owner. Noise receptors on land owned by a proponent of a wind energy facility or by someone who has entered into an agreement to permit all or part of the facility on their land are not considered noise receptors for the purposes of determining noise setbacks.

REA setbacks also protect future use of vacant land where that land is zoned to allow construction of potential noise receptors. Noise receptors on vacant lots are identified as the centre of the lot as defined in O.Reg.359/09

2.3. Multiple/Louder Turbines

Certain noise receptors may face cumulative effects from the siting of multiple specified turbines (those specified according to the criteria of section 54(1) of O.Reg. 359/09). Increased setback distances have been calculated to reflect this combined effect based on the number of turbines proposed within a 3 km radius of a noise receptor. Greater numbers of turbines within the 3 km radius result in higher required setback distances applied to the nearest turbine.

For the purpose of calculating the number of turbines within the 3 km radius, proponents must consider existing and proposed turbines with a sound power level greater than or equal to 102 dBA. This includes:

- Turbines proposed by the applicant as part of the wind facility
- Existing turbines from other wind facilities that fall within the 3 km radius
- Turbines proposed to be constructed in other wind facilities which have either been approved with a renewable energy approval or certificate of approval

- Turbines proposed to be constructed in other wind facilities where a renewable energy approval notice of proposal has been posted to the Environmental Registry (www.ebr.gov.on.ca).

For sites where more than one project is under development, proponents are encouraged to consult with neighbouring developers to ensure projects will meet the requirements for combined effects of multiple turbines.

Setbacks have also been adjusted to account for differences in the sound power level emitted from various turbines on the market. Sound power level is a specification of turbine design determined by the manufacturer through calculation in accordance with standard CAN/CSA-C61400-11-07, “Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Technique”. Specifications for sound power level used for determining setbacks correspond to the sound emitted while operating at 95% of the name plate capacity rounded to the nearest whole number. If different turbine types are used in a wind energy facility the sound power level of the loudest turbine is used for determining noise setback distances applied to the project as a whole.

The range of setbacks for wind facilities with one or more specified turbines is given in section 55 of O.Reg.359/09 and summarized in the following table:

Table 1: Setback distances for multiple turbines and various turbine sound power levels

Sound power level	Number of turbines within 3km			
	1 to 5	6 to 10	11-25	26+
102 dBA	550 m	650 m	750 m	
103-104 dBA	600 m	700 m	850 m	
105 dBA	850 m	1000 m	1250 m	
106-107 dBA	950 m	1200 m	1500 m	
>107 dBA	Noise study required			

The table of noise setbacks are used to illustrate the closest distance the base of any turbine can be from a noise receptor. While the minimum setback of 550 m must be met in all cases, proponents are given the option of conducting a noise study to prove that siting turbines closer than the setbacks in Table 1 will not cause adverse effects. Such a study must be prepared in accordance with the Ministry of the Environment’s 2008 “Noise Guidelines for Wind Farms”. A Noise Assessment Report demonstrating that reduced setbacks comply with these guidelines must be submitted as part of the REA application.

As indicated in subsection 54(4) of O.Reg.359/09, Noise Assessment Reports prepared in accordance with the Ministry’s “Noise Guidelines for Wind Farms” are also required under any of the following circumstances:

- if a wind energy facility is comprised of 26 or more specified turbines (unless all turbines have a sound power level < 102 dBA);
- if the project would result in 26 or more specified turbines located within a 3 km radius of a noise receptor; or
- if any of the turbines in a wind energy facility have a sound power level greater than 107 dBA.

2.4. Exception when Ambient Noise is >40 dBA due to Road Traffic

Road traffic can cause ambient sound levels at noise receptors to be greater than the minimum levels used as a basis for the noise setbacks. If traffic noise causes the lowest hourly ambient sound level at a receptor to exceed 40 dBA, a reduced setback may be used.

As per subsection 54(2) of O.reg.359/09, to rely on this exception in respect of a particular noise receptor, proponents must measure or calculate hourly ambient sound levels at the receptor when wind speeds are less than 4 m/s. This analysis must be performed in accordance with the Ministry of the Environment's 1995 publication NPC-206 "Sound Levels due to Road Traffic".

If the measurements or calculations of the analysis establish that the ambient noise from road traffic is greater than 40 dBA, the proponent must determine an appropriate reduced setback distance. This is done by conducting a noise study and submitting a report in accordance with the Ministry of the Environment 2008 publication "Noise Guidelines for Wind Farms". The report must demonstrate that the wind turbine noise will not be greater than the lowest hourly ambient sound level at the receptor.

Both the analysis of ambient noise from road traffic and the noise study report in accordance with the 2008 "Noise Guidelines for Wind Farms" must be submitted as part of an application for a REA.

3. Setbacks from Property Lines

To ensure safety on neighbouring properties all wind energy facilities with a name plate capacity of 50 kW or greater (classes 3, 4, and 5 in O. Reg. 353/09) must be located a minimum setback distance from neighbouring property boundaries. This distance is equivalent to the height of the turbine which is considered as the distance from the ground to the top of the turbine hub without including the blades. As with noise setbacks, the distance is calculated from the base of the turbine to the nearest property boundary.

The property boundary setback does not apply to a boundary where the abutting property is owned by:

- the proponent of the wind energy facility; or
- a person who has entered into an agreement with the proponent that permits the location of a wind turbine closer than the turbine height. It is recommended that any agreements with landowners provide sufficient detail to meet this requirement.

In the absence of an agreement with a neighbouring land owner specifically permitting a closer setback, the proponent may consider applying to reduce the property line setback to the length of the turbine blade plus 10 metres. In order to do so, the REA application must include a Property Line Setback Assessment Report. This report must be developed to demonstrate that siting the turbine in such a location will not result in any adverse impacts on neighbouring businesses, infrastructure, or land use activities. Specifically,

this assessment should evaluate the land use in the vicinity of the turbine. This should confirm the presence of structures (i.e. barns, storage buildings, stables) and if there will be any expected adverse impacts associated with the turbine being located closer than the turbine hub height setback. If there are potential adverse impacts, a description of preventative measures to address the potential adverse impacts must be included. Such an assessment must be performed separately for each turbine that is sited within the specified property line setback.

4. Setbacks from Roads and Railways

Safety setbacks from public roads and railways are also required for wind facilities 50 kW and greater (classes 3, 4, and 5 in O. Reg. 353/09). Turbines must be located a minimum distance of the blade length plus 10 m from the boundary of the right-of-way for any public road or railway. This is a requirement for which there is no exception.

5. Setbacks for Associated Transformers

Transformer stations that are part of a wind facility and are capable of operating at a nominal voltage of 50 kV or more require siting considerations to avoid impacts from transformer noise. To mitigate noise impacts transformers can be set back 1000 m from the nearest noise receptor. An alternative setback of 500 m is permitted if the transformer is surrounded by an acoustic barrier with a density of 20kg/m². The acoustic barrier must break the line of sight from top of the transformer to the nearest noise receptor.

As a further alternative, the proponent of a wind facility may opt to submit a noise study in accordance with the Ministry of the Environment's 2008 "Noise Guidelines for Wind Farms" that covers the noise from the transformer.

6. Off-shore Wind

Under O.Reg.359/09, class 5 wind facilities or "off-shore wind projects" are those where one or more turbine is located in contact with surface water other than a wetland. The regulation does not specify minimum setback distances for noise, property, or roads. If certain project components of offshore wind facilities are located onshore, such as transformers or transmission lines, these may be subject to the setback requirements that protect natural features as described in Section 5.

While O.Reg. 359/09 does not specify setback distances, turbine siting will be an important factor assessed in the Off-shore Wind Facility Report required for application for the REA. This report requires applicants to provide a comprehensive assessment of the existing environment where the project will be located, identify any negative environmental effects caused by the project, and describe measures to mitigate identified impacts. Wind turbine location will influence the assessment of environmental effects including noise and increasing setback distances from noise receptors can be used as a mitigation approach. Applicants are strongly encouraged to meet with the Environmental Assessment and Approvals Branch of the Ministry of the Environment prior to preparing this report.

7. Guidance for Demonstrating Adherence to Setbacks

To allow the Ministry of the Environment to evaluate how a proposed wind energy project meets the setback requirements described in O. Reg. 359/09, information on the project location must be included in the REA application. A Design and Operations Report required for all wind facilities with name plate capacity 50 kW and greater. This report should include information that clearly demonstrates compliance with setbacks. To do this, the following should be provided:

On the Site Plan

- The location of all turbines (including turbine identification number/code)
- The location of all transformers
- The location of all “non-participating” noise receptors (including noise receptor identification number/code)
- All property lines, public roads and rail right of ways
- The location of all other project components that comprise the wind energy facility and the project location boundary
- The outer boundaries and classification of all natural features and water bodies
- Linear representation of setback distances

The site plan must clearly show that turbines are located outside of the noise, property line, and road/railway setbacks. Setbacks from the boundary of the project location to natural features and water bodies should also be demonstrated. Where setbacks are not met through preparation of a noise, property line setback assessment, environmental impact study, water body assessment or through an agreement with a neighbouring landowner in respect of property line setbacks, this should be referenced and the studies or agreements provided.

In a Table or Tables

- A list of all turbines with identification numbers/codes
- The location of turbines in UTM coordinates
- The make and model of all turbines
- The identification number/code of the nearest noise receptor and the distance to the turbine
- Distances from the base of the turbine to the closest noise receptor, all property lines (regardless of agreements), and road and railway right of ways for each turbine

If adhering to the noise setback matrix for greater numbers of turbines, a separate table with:

- All noise receptors with identification numbers/codes
- The number of turbines within a 3 km radius of each noise receptor
- The identification number/code of the closest turbine to the noise receptor
- The distance to the nearest noise receptor

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