Wind Turbine Noise
Modified IPCB Limits

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2. 35 years of experience in Illinois with a major focus on environmental noise
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4. Worked 9 years in the power industry – 5 years as a consulting engineer and 4 years as a noise control product designer and installer.
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PCC
EXHIBIT
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County Zoning Code

Section VIII "Noise Levels" (pg 124)

*"Noise levels from each WECS or WECS Project shall be in compliance with applicable **Illinois Pollution Control Board (IPCB) regulations**. The Applicant, through the use of a **qualified professional**, as part of the siting approval application process, shall appropriately demonstrate compliance with the above noise requirements."*

1. Compliance should be with all sections of the code, not just the "limits,"
2. "Qualified professional, should be one certified or supervised by INCE.

Illinois Noise Code:
https://pcb.illinois.gov/SLR/IPCBandIEPAEnvironmentalRegulationsTitle35

Maximum Permissible Sound Levels in Illinois

- The IPCB regulations stipulate the maximum 1-hour time-averaged sound levels at nine frequency bands from 32 – 8000 Hz. This is to ensure that no single band becomes a dominant part of the noise.
- For simplicity, most regulations (including the EPA guidelines) use the overall A-weighted level.
- The overall, A-weighted level is a scale that gives the sum of all the frequency bands but weighs the mid- to high frequencies the most because this is where the ear is most sensitive.
- The A-weighted scale has been the most-commonly used metric for for measuring sound for over 40 years.
- The reference location is anywhere on the residential property. In practice for farmhouses, a 100' distance from the home is often used unless there is a designated area of homeowner use.

A-Weighted Equivalent Permissible Sound Levels

Common Noise Limits:

Source ▼	Receiver (Day / Night)	
	Commercial	*Residential*
Industrial	61	61/51
Commercial	60	55 / 45
Residential	55	55 / 45

Nighttime in Illinois is referred to as the hours of 10:00 PM to 7:00 AM.

However, there are city, county, and state codes that define nighttime as 9:00 PM to 6:00 AM. Based on my experience, this time-frame is a more meaningful definition of "nighttime."

Traffic Noise
The origin of noise limits

- The **55/45 dBA** limits were taken from studies in the 1960s for traffic noise that showed 5-8% of listeners were highly annoyed.

- These limits generally agree with the US EPA guidelines of 1974 which give a Day-Night Level (DNL) limit of 55 dBA. (Because of the 10 dB nighttime penalty used in the DNL metric, this means the nighttime level must be limited to 45 dB.)

- The **55/45 dBA** limit also agrees with **ANSI S12.9** and has proven to be protective for non-traffic sources such as car washes, rooftop units, air-conditioning equipment, etc. in urban and suburban areas.

Industrial Noise
More Lenient Limits

- If a resident lives near an industrial operation (like a power plant, industrial fan, large furnaces. Manufacturing facility, since there is an expectation of noise, the Illinois regulation is more lenient and allows 6 dB more noise. Hence, the limit of 61/51 dBA for Class C land.

- Class C land was intended for industrial operations on a single parcel of property where noise radiates from the source to several adjacent properties and is then dissipated at further distances.

- But wind turbine farms are a relatively recent form of power generation in Illinois. Unlike industrial plants, they are a distributed operation with multiple parcels of small parcels of property located across rural and semi-rural areas where there are multiple residential properties.

- For these reasons, the most meaningful source classification would be **Class B** not Class C. Accordingly, this means a nighttime limit of **45 dBA**, not 51 dBA.

ANSI S12.9

"Description and Measurement of Environmental Sound"

Non-profit organization with leading experts that generate consensus statements and guidelines

Since the adoption of the IPCB regulations almost 45 years ago, we have learned a lot about the effects of noise.

First,

- Certain sounds have an **adverse character** that make them more annoying when compared to traffic or other broadband noise sources of the same level.
- This prompted the American National Standards Institute (ANSI), it its ANSI Standard S12.9, to recommend a 5 dB penalty for noise that has a humming, impulsive, or low-pitched character.
- Although WTN does not fall under these categories, it too has a unique character that consists of a pulsating/fluctuating sound concentrated in the low-pitches. Studies support that this type of noise is indeed more annoying relative to traffic.