TECH environmental

FOCUSED KNOWLEDGE. REAL SOLUTIONS.

www.techenv.com

TECH environmental

FOCUSED KNOWLEDGE. REAL SOLUTIONS.

Sound Permitting for Small-Scale Wind Projects

Howard Quin, PhD, INCE

Importance of Sound Issues

- *Vary from project to project*
- *Can have significant effect on project planning*
- *Require study, regardless of turbine size*
- *If unaddressed, can lead to legal action*

Typical Decibel Sound Levels

- *Quiet Rural Neighborhood - 40 dBA*
- *Suburban Neighborhood - 50 dBA*
- *Noisy Highway - 65 dBA at 50 feet*
- *Construction equipment - 80 dBA at 50 feet*

When are wind turbines annoying?

- *Perception varies by person – usually 35-50 dBA*
- *Varies according to background; more noticeable with quiet background*
- *Generally more annoying than steady sound, due to time-varying character*

State Noise Regulations

- NH, RI, PA – *none*
- Maine – *50 dBA and 45 dBA in quiet areas*
- Connecticut – *45 dBA residential, 55 commercial*
- New Jersey- *Octave Band (50 dBA total)*
- New York – *SEQR guideline Leq +6 dBA*
- Vermont – *Act 250 guideline 55 Lmax*

Local Noise Regulations

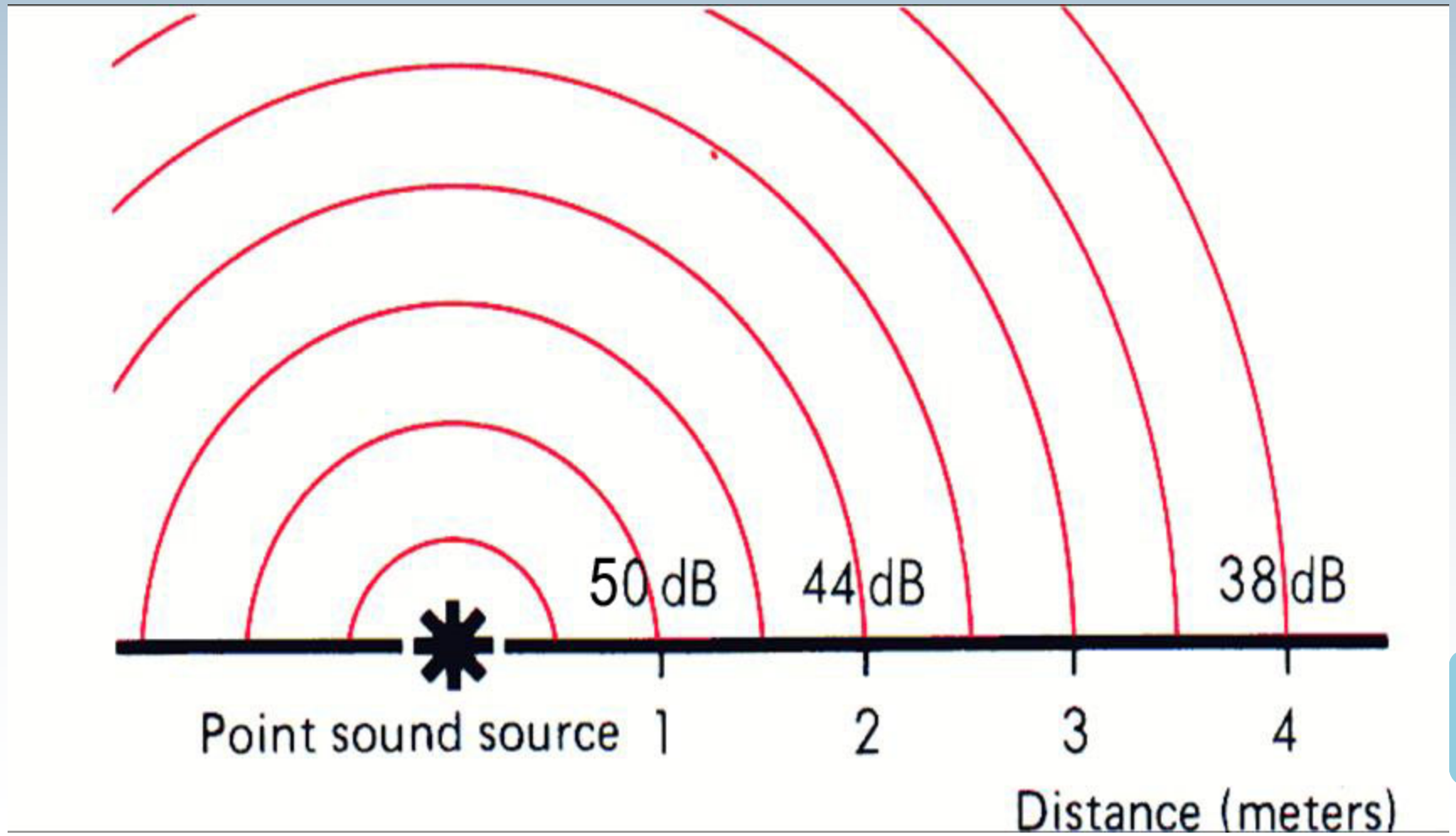
- ***Vary from municipality to municipality; often none in place***
- ***Specific sound threshold or increase***
- ***Local board uncertainty on procedures***
- ***Can change during permitting***

Factors Affecting Wind Turbine Sound Levels

- ***Equipment power and age***
- ***Distance to receptors***
- ***Ground and terrain conditions***
- ***Wind and meteorological conditions***

Distance Attenuation:

-6 dB for every distance doubling



Turbine Sound Level Screening Distances

- *Beyond 1000 feet – usually not a problem*
- *500 - 1000 feet – may have problems, depending on turbine size/location*
- *200 – 500 feet – usually a problem, except for small turbines*
- *Under 200 feet – almost always a problem*

Computer Sound Level Modeling

- *Estimation of sound levels from future operations; worst-case analysis (downwind, blowing 8 m/sec)*
- *Incorporate measured turbine sound and wind operating conditions*
- *Terrain, ground effects included*
- *Can estimate effects of potential mitigation measures*

Sound Measurements

- *Short term- few nearby residences/property lines*
- *Long term one – three days under correct wind conditions*
- *Affected by seasons and weather conditions*

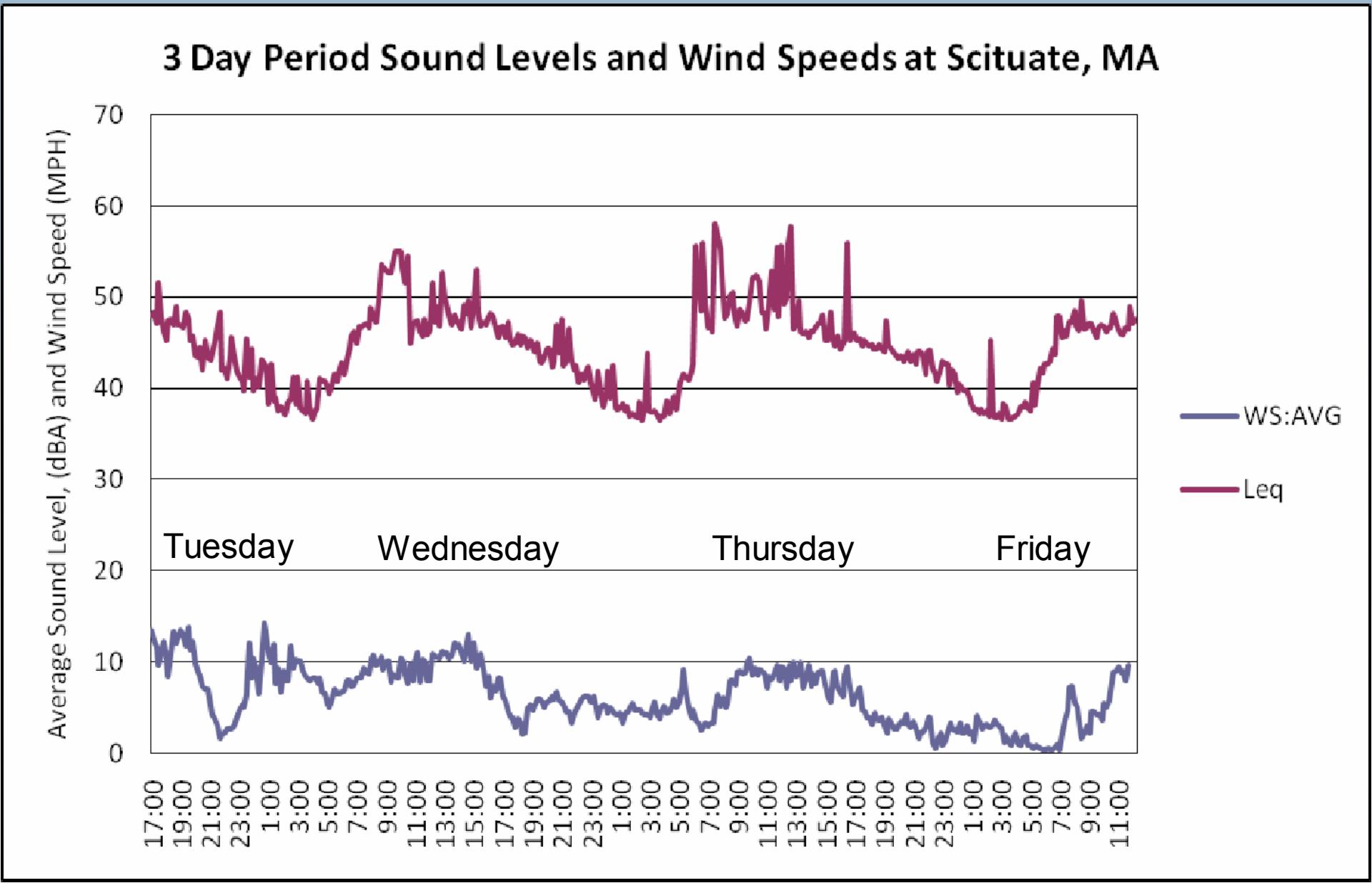
On Site Wind Monitoring

Important for determining right sound monitoring conditions

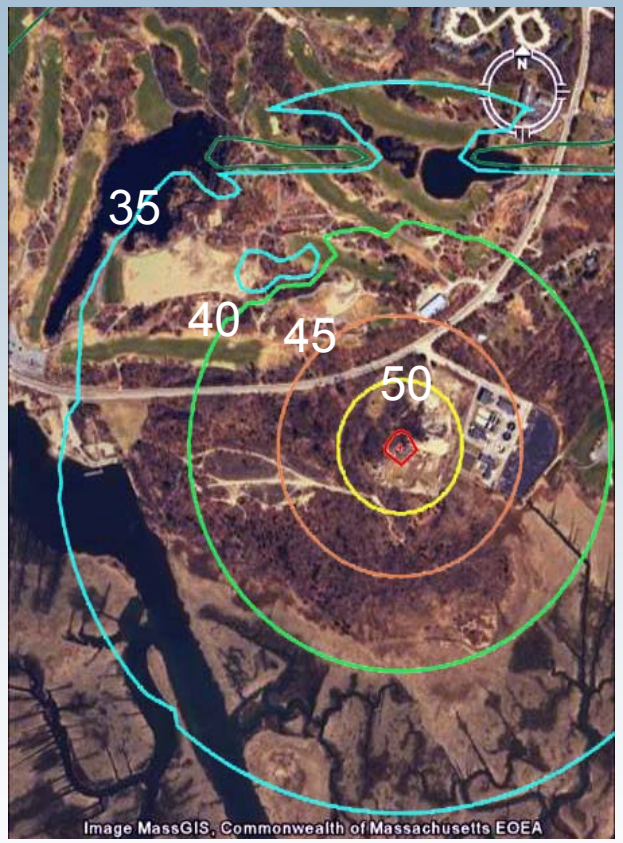
Sound Compliance Permitting Study: Scituate, MA

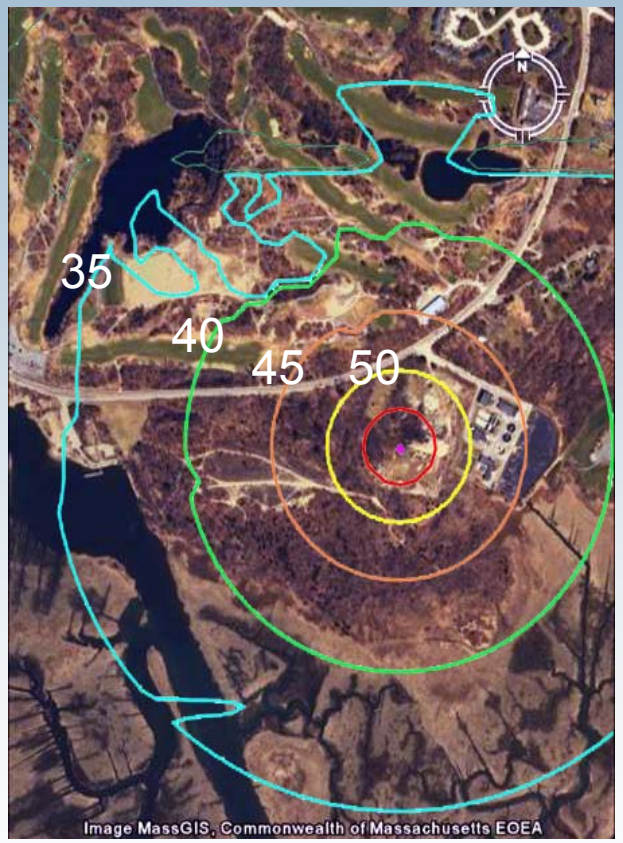
- *Two potential turbine locations on site*
- *Three turbine makes examined: which are in compliance?*
- *Background established during times with appropriate wind levels,* snow off ground*; one residence long term, other locations monitored*
- *Massachusetts limit: 10 dBA over background*
- *Local turbine sound limits enacted during program- changed to match MA DEP regulations*

Typical Background Sound Levels



Wind Turbine Sound Modeling Results





Sound Mitigation Measures

- *Moving turbine locations*
- *Specifying quieter equipment*
- *Installing double-paned windows*
- *Give abutters power from turbines*
- *Reduce number of turbines*

Sound Level Impact Implications

- *Project permitting delays/increase cost*
- *Legal action/settlements-can be expensive!*
- *Delay/halt future projects*

TECH environmental

FOCUSED KNOWLEDGE. REAL SOLUTIONS.

Thank You!

Howard Quin, PhD

hquin@techenv.com

Ph. (781) 890-2220 x102

www.techenv.com