Comments Regarding the HMMH Reports

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Sound Metrics in Laymen’s Terms

- When you take a sample with a sound meter, the meter reports more than one value.
- $L_{90}$ is close to the lowest sound level recorded and is used to represent the background sound level.
- $L_{10}$ is close to the highest sound level recorded and is used to represent the intrusive sound level.
- $L_{50}$ & $Leq$ represent more of an average sound level.
- $L_{10}$ is close to the highest sound level recorded and is used to represent the intrusive sound level.

Please note that $L_{10} > L_{50} > L_{90}$ for the same sound or noise.
What’s wrong with this picture?

• Shows 10 dBA increase at low wind speeds
• Shows no increase at high wind speeds
• The Problem – this is the exact opposite of what neighbors have experienced
• The noise from Wind 1 is very annoying at low wind speeds
• The noise is intolerable at high wind speeds
• So I asked myself: What’s wrong with this picture?
A Possible Explanation
Use of the Incorrect Wind Shear Factor

• Winds were low during the study. HMMH relied on background sound level measurements reported in the March 2008 Epsilon report for the NOTUS turbine.

• Epsilon utilized the OTIS 10 meter wind speed and a 0.15 wind shear factor to calculate the 80 meter hub wind speed.

• By comparing the wind speed data collected by HMMH at Wind 1, with the corresponding data collected at OTIS, I calculated the actual wind shear factor using this formula:

\[
\text{Wind shear factor} = \frac{\ln(V_2 / V_1)}{\ln(H_2 / H_1)}
\]

• The OTIS 10 m / Wind 1 80 m wind shear factor is 0.39.

• The 80 meter NOTUS wind speed was recalculated using the 0.39 wind shear factor:
  - OTIS 10 m wind speeds were 9.5 m/s & 10.5 m/s
  - 80 m speed using 0.15 factor (Epsilon) 12.8 m/s & 14.7 m/s
  - 80 m speed using 0.39 factor (Actual) 21.2 m/s & 23.4 m/s

• This results in a substantial increase to the estimated wind speeds for the NOTUS data.
The background sound level (blue line) was adjusted using the two recalculated wind speeds for the 2 NOTUS data points.

- At low wind speeds the increase is approximately 10 dB.
- At medium wind speeds the increase is approximately 6 dB.
- At high wind speeds the increase approaches 10 dB again.
Verify Background L90

The nighttime background L90 measurements taken by HMMH were plotted on the chart (light blue triangles).

All of the actual measurements should be above the blue line.

Background sound level is verified below 10 m/s.

There are no measurements available to verify the background sound level at higher wind speeds.
Verify Model at Low Wind Speed

- The nighttime Leq measurements with wind speeds less than 6 m/s, were plotted (pink triangles).

- All of the actual measurements should be below the red line (worst case scenario).

- The measurements appear to verify the predictions of the model, but.....

- Only Wind 1 was operating.

- The predominante wind direction was South, Southwest.

- Site LT-1 was upwind of the turbine for most of the study period (best case scenario).
Verify Model at Medium Wind Speed

- The nighttime Leq measurements @ wind speeds between 6 – 10 m/s, were plotted on the chart (green triangles).

- All of the actual measurements should be below the red line.

- 2/3 of the measurements are above the worst case prediction with both turbines operating.

- The model appears to grossly underestimate the actual condition at site LT-1.

- Many measurements exceed the 40 dBA Town Windmill zoning bylaw.
Verify Model at High Wind Speed

- There are no night time measurements available to verify the predictions of the model at higher wind speeds.

- Only two points were calculated by me.

- All I have done in this analysis is plot the actual measurements from one spreadsheet with the predicted measurements from the model.

- I don’t think you need to be a certified noise expert to see that there is something seriously wrong with this picture.
Are We Asking the Right Questions?

• Is the model making accurate predictions of the noise from the turbines?

• In a March 14, 2011 memo, MassDEP stated, “Many of the parameters for the study are not consistent with what MassDEP would have recommended had we been involved in the initial study scoping.” If this is the case, should another study be performed which is consistent with the guidelines?

• Noise has been the main source of complaints from wind turbines for many years. The 2005 Feasibility Study estimated a noise impact of 42-44 dBA (2-4 dBA above the Town bylaw). If the experts new this: Why wasn’t a noise study conducted before the Town decided to build these turbines?

• If the 40 dBA threshold set by the Town’s Windmill Bylaw is being exceeded: Do we even need to ask any more questions?