

Cape Bridgewater Wind Farm Noise Survey

(Pacific Hydro Pty Ltd and Cape Bridgewater Community Consultative Committee)

Residents in proximity to the Cape Bridgewater Wind Farm have lodged complaints with Pacific Hydro that the operation of the wind farm gives rise to noise and sleep disturbance that are not experienced when those residents are located at positions removed from the subject wind farm.

Pacific Hydro has identified that extensive acoustic monitoring external to residential receivers reveals compliance with the noise permit conditions that are expressed as an averaged A weighted noise level versus the hub height wind speed.

Pacific Hydro in conjunction with the Cape Bridgewater Community Consultation Committee have commenced noise monitoring at three residential dwellings where equipment is to be utilised to measure noise levels external to and inside the dwelling. Noise logging equipment records the A-weighted level and 1/3 octave bands.

The noise logging is to be conducted over an eight week period (subject to weather) that includes a two week period during which there may be potential shutdown or partial shutdown of the wind farm, as result of work being undertaken on the electrical cabling distribution system.

As part of the noise monitoring, the occupants have been requested to provide comments in a diary format as to any disturbance/perception that may be experienced during the monitoring program.

These diary comments are an essential component in an attempt to correlate the disturbances with respect to the operation of the wind farm in terms of general acoustic criteria, and/or any modification of such criteria that may arise from the monitoring results.

Separate to the overall noise logging and monitoring a more detailed acoustical analysis/instrumentation is to be used in the three houses to assist in identifying/qualifying the acoustic environment and the transmission loss of the building envelopes from outside to inside.

A daily journal concept was originally proposed to utilise the format prepared by the South Australian EPA with respect to the Waterloo wind farm study.

Prior to conducting the subject testing, initial use by residents of the SA EPA diary format found the diary notation to be confusing/difficult. This was particularly so with the description as to the occurrence of the noise, which in some respects becomes irrelevant if persons are not there all the time. The residents felt the SA EPA method would lead to some people abandoning the use of the diary.

A review and discussion of the preliminary noise diaries with the residents lead to a modified format to be used for the subject exercise.

In discussing the impacts from the wind farm perceived by residents it has been identified that for some residents there are three different types of impacts which now been nominated as occurring under a heading of “Noise”, “Vibration” and “Sensation”.

Providing a classification in the three groupings will overcome an issue in the SA EPA concept of only identifying in the noise diary matters relating to audible noise.

A review of the diary observations versus the noise measurements reveals all the residents (who have experienced wind farm “noise” over a number of years) were observing changes in the impact and not identifying the impact during the remainder of the time. The instructions for observations is to identify any changes in impact + providing observations of the impacts/perception on a regular basis (if possible 1 hour 2 hourly).

Noise monitoring diary

The diary filled in by the residents sets out the perception of disturbance and provides a record of all disturbances perceived by the residents during the course of the noise monitoring.

As the diaries are to operate throughout the entire period it is noted that residents may not be present for the entire 24 hours and therefore the diary comments do not necessarily identify the entire impact that may occur during the survey period.

The intent of the diary is to provide a ranking of noise, vibration and sensation with respect to a simplified code that will then be correlated with the noise results and the analysis to determine if there are any repeatable patterns and/or disturbance relevant to the operation of the wind farm, prevailing weather conditions etc.

With the acknowledgement all the AECOM Wind Farm Noise Complaint Methodology (in NANR 277 Defra April 2011) the following severity rankings with respect to noise are set out below:

1. **No impact (No noise)**
2. **Slight impact (Non intrusive)** Noise can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly effect character of the area but not such that there is a perceived change in the quality of life.
3. **Moderate Impact (Intrusive)** Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television: speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such as there is a perceived change in the quality of life.
4. **Substantial Impact (Disruptive)** Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty getting back to sleep. Quality of life diminished due to change in character of the area.
5. **Severe Impact (Physically Harmful)** Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening: loss of appetite, significant, medically definable harm, e.g. noise induced hearing loss.

NB In some case residents relate severity 5 to be equivalent to having to leave their premises and go somewhere else because of the noise.

In utilising the same ranking methodology for vibration one would substitute the word “noise” with “vibration”, e.g. for slight impact “ the vibration can be felt, but does not cause any change in behavioural attitude...”

Similarly in relation to sensation in the ranking table “noise” is substituted with sensation, e.g. for 1 slight impact (Non intrusive) “Sensation can be felt, but does not cause any change in behavioural attitude....”

In dealing with sensation (as reported by residents) there is a wider range of effects than that associated with the general concept of noise.

Residents subject to operational wind farms have identified a range of sensations that can vary from individuals to individuals. Residents have in some cases attributed “sensation” to “noise” complaints where the sensations as felt by residents can include such things as:

- Headache
- Pulsating pressure in the head
- Pressure in the ears
- Ringing in the ears
- Drowsiness (or heaviness)
- Pressure in the chest
- Effect like heart racing

The critical component (noise assessment wise) for the diary entries involves the date, the time and the severity classification for noise, vibration and sensitivity with column for comments that may be an explanation for any of the three parameters being diarised. The residents have been requested where possible to provide diary entries on a continuous basis (on a 1 hour or 2 hourly basis) and not just on changes in impacts.

Additional comments provided as to weather, wind strength and direction and operation of the wind farm together with any supplementary comments such as the resident’s BP and pulse or any other observations that may be associated with the reporting may be of assistance with the study.

Adopting the SA EPA classification for wind does not appear to be an issue:

1. still/calm
2. light breeze (wind can be felt on face, leaves in trees rustle)
3. medium breeze (leaves in constant motion)
4. moderate wind (raises dust, loose paper will blow around)
5. strong wind (large tree branches move, difficult to use umbrella)

The attached handwritten sketch indicates the suggested format/columns in the diary. The first few columns are in relation to the severity and the comments on the left-hand page. The additional comments in relation to the weather turbines etc. are to be on the right-hand page

As the diary comments are to be electronically scanned and forwarded for correlation it is essential that the bottom of each page has a notation as to the page number and should include a reference letter/number allocated for the house for the purpose of a correlation of data but not in identifying the actual house.