

BIALA WIND FARM

ADDRESS TO PLANNING ASSESSMENT COMMISSION

2nd Feb., 2017

1. PERSONAL DETAILS.

1.1: My name is MALCOLM BARLOW, and my wife and I run a small cattle fattening property north of Crookwell.

1.2: I speak as a long-time resident and ratepayer, as a past Councillor, and as a member of three local Landscape Guardian groups.

2. SOME INTRODUCTORY REMARKS.

2.1: like most rural landowners with experience and knowledge of wind farms, I oppose not only this proposal but almost all wind farms because of the multitude of negative local impacts they are known to produce: They

- (a) Restrict aerial agricultural practices.
- (b) Increase fire hazard, but reduce aerial fire-fighting capacity.
- (c) Reduce saleability and therefore value of neighbouring properties.
- (d) Impair the health of many near-neighbours .
- (e) Produce sickening avian carnage.
- (f) Put strains upon social cohesion in small rural communities.
- (g) Industrialise otherwise scenic rural countrysides.

2.2: Time precludes a detailed discussion here of these many real impacts, and I hope that other speakers will address them.

Nevertheless, to be safe, in relation to (c) , I refer the Panel to **Attachment A** which is part of my Presentation to the first Collector Wind Farm P.A.C. meeting in which I showed quite clearly the negative impact of wind farms on nearby land values. I also point out to the Panel that both the Danish and

Dutch governments recognise this fact, and so have mandatory compensation schemes in place.

Also, again to be safe, in relation to (d) I refer the Panel to **Attachment B**, which is an 11-page summary by David Brooks of some 24 peer-reviewed research articles and papers by world-class academics all of which suggest a definite health impact upon many near-neighbours of wind farms caused by the sound energy waves that emanate from them.

However, on this occasion I wish to address three other matters in some detail.

3. OBJECTION ONE – NON-COMPLIANCE WITH COUNCIL’S DEVELOPMENT CONTROL PLAN FOR WIND FARMS.

3.1: I am well aware that because this proposal is deemed to be “State Significant” the developer only has to satisfy State Government conditions for consent, and can virtually ignore local Council requirements. However, one can debate the economic basis of this “State Significance” given that:

- * More than half of the income generated by wind farms is really a subsidy from the state’s electricity consumers.
- * In most cases, profits will be remitted overseas.
- * They pay no royalty-type return to State Treasury.
- * Most of the plant and equipment is imported.
- * They create virtually no ongoing local employment.

What is NOT debateable, however, is the significant impact huge wind farms have upon the rural shires where they are built. Therefore, I argue that a consent tribunal, such as this Panel, should give significant consideration to the degree to which a proposal fails to comply with the host Shire’s D.C.P. – especially one that is well-researched and well-supported. To illustrate:

3.2: In October, 2015, Council received a detailed Report from its Director of Planning and Environment assessing the degree to which this proposal complied with some 21 controls in the Wind Farm D.C.P.

A copy of this 8-page Report is provided for the Panel as **Attachment C**.

3.3: Without going into detail of the whole Report, I would just draw the Panelists' attention to a few of the controls that the developer failed to meet.

* **Controls C and H** deal with measures to mitigate visual impacts. In this case, Newtricity fell back on the utterly futile measure of tree-screening particularly suggesting it along Gunning Road which is one of the busiest in the Shire. Council firmly answered that its D.C.P. does not support roadside tree planting as a screening measure, and that given the 185m height of these ridge-top turbines such a measure would be ineffective.

Newtricity claimed that there are no non-associated residences within 2.0km of its turbines, but there are 12 such homes just beyond that limit. Given the huge height and greater power of the proposed turbines, the old 2.0km buffer zone is quite inadequate anyway, and a reasonable developer would have conceded this and provided a greater set-back.

* **Control G** stipulates a set-back distance of twice tip-height of a turbine (in this case 370m) from a boundary fence with a non-associated property. The Report points out that 11 of the 31 turbines ignore this safety measure and that one is only 94m from such a boundary.

* **Controls L to R** deal with various road and traffic matters, and the Report highlights a number of shortcomings in these areas, particularly Newtricity's massive understatement of traffic generation by the project as well as some unsatisfactory entrance sighting distances off a main road.

Thank goodness for Council and its Development Control Plan.

4. OBJECTION TWO – CONNECTION TO THE GRID?

4.1: In an unusual and worrying move Newtricity has not included in this proposal any firm details of a transmission line route to connect the wind farm to the high voltage electricity grid. Rather, it proposes that this will be a separate submission to be assessed under Part 5 of the E.P. & A. Act.

I say "worrying" because this unusual strategy has significant implications.

4.2: First, until recently, transmission line access to the grid was an integral part of any wind farm application, and under that regime wind farm projects

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were largely confined to areas within some proximity to the grid lines within the Shire.

Now, under this looser regime, wind farms can be proposed anywhere in the Shire where a few landholders can be persuaded to sign up as hosts-to-be. Then, with the approval of the wind farm as a so-called "State Significant" project, pressure can be mounted on other landholders and Council to agree to connection easements across their properties and along (even under) Council roads to join to what may be the closest but still distant grid. We could then have many kilometres of really unwanted wide line easements across the Shire, all with their usage restrictions and inherent access problems.

4.3: Second, this unusual two-part application by Newtricity, I have no doubt, is designed to influence approval of its later transmission line application. If this Wind Farm application is approved without any connection line, that will of itself exert subtle but real pressure on the later Consent Authority to grant approval for the line so that their assessment would be less than objective and impartial.

It makes no sense to consider a wind farm proposal that lacks a confirmed access line to the grid. Imagine approving a giant irrigation project that had no planned access to a distant water supply source!

4.4: Third, because the transmission line proposal will no doubt cost less than \$30m, it would be considered for approval by a local Joint Regional Planning Panel (JRPP). These panels are not as well-resourced as are P.A.C. panels that adjudicate on larger projects.

In addition, from my own experience on a JRPP, there is a subtle but nevertheless real pressure on its Council members, because if the application is refused and the developer appeals to the Court, then it is the local Council that has to defend the case and bear the costs – whatever they may turn out to be.

I suspect that it is for these reasons that Newtricity has made the more contentious transmission-line part of its project a separate application to a different tribunal.

4.5: From the above (4.2, 4.3, 4.4), I suggest that this ploy by Newtricity should not be rewarded by approval, and this P.A.C. Panel should reject this first-part

proposal on the grounds that it is incomplete – go away and come back with a complete proposal for an operational project.

5. OBJECTION THREE – UNDEFINED TREE CLEARING.

5.1: Construction of 31 giant turbines, many hardstands, kilometres of access tracks, and some associated buildings will obviously require the felling of some trees. However, it seems that the degree of such clearing is not really quantified in the project E.I.S. The Office of Environment & Heritage, in its report, does mention “off-sets” as a compensatory measure for this clearing.

5.2: Local information, not just gossip but information confirmed by direct conversations with involved parties, is that Newtricity has called for tenders from contractors to **remove 600 trees**. And these are not poor quality scrub specimens, but full-grown snow gums, peppermints, and so on.

One of the tendering contractors has confirmed this (and has tendered) to two local landholders and it has been reported to the local Progress Association.

5.3: It would be easy but in my opinion derelict to dismiss this matter as mere hearsay, so I ask this Panel to at least put questions to the developer such as:

- *How many mature trees are to be removed?
- *Have you called for tenders for this work?
- *Are you using so-called “off-sets” as a mitigating measure?
- *If so, please specify these “off-sets”.

Like many, I have a problem with “off-sets” as a mitigating measure for large-scale tree removal. First, mere make-up planting of replacement trees has a long waiting period – 10 or 20 years -- before habitat is restored! Second, I fail to see how preserving tree stands that already exist elsewhere in any way makes up for destroying tree stands in the project area – all “smoke and mirrors” stuff to me.


6. TO SUMMARISE AND CONCLUDE.

Finally, and to summarise, I ask you to reject this application on the grounds that:

1. It ignores a number of controls in the Shire's Wind Farm D.C.P.
2. The two-part application is a ploy that has significant and unwanted implications.
3. The Wind Farm application, by itself, is incomplete because as it stands the proposal is for an inoperative piece of industrial infrastructure.
4. It appears the developer may not have been forthcoming about the amount of tree clearing to be undertaken, and mitigating measures are questionable.

5.

Thank you Commissioners, and I look forward to your rejection of this gigantic project in an already wind farm overloaded Shire.


(Malcolm Barlow, B.A.[Hons], M.A., Dip.Ed.[P-G], F.N.G.S.)

5. Because of the huge size and greater power of the proposed turbines, the adverse health effects of this project will be more severe and widespread than that of existing wind farms.

Peer-reviewed Studies on Health Impacts of Wind Turbines

Preliminary Remarks

1. The term "peer-reviewed" is ambiguous. Strictly speaking, it refers to the process that occurs *after* publication, when scientists try to duplicate another scientist's results by carrying out similar investigations. The purpose is to discover whether the results are generally true, or whether they have been influenced by contingent factors. This sense of "peer-reviewed" has nothing to do with what is usually meant when commentators say, "there are no peer-reviewed studies of adverse health impacts from wind turbines."

What is meant by the term in such claims is that the publications concerned have been *refereed*. All that means is that the study has been read by experts in the speciality, and approved as satisfying standards of professional discourse, and being worthy of consideration. It does not mean that the referees agree with what the study says, or that what the study says is true.

However, journal articles are not the only academic/professional studies that are refereed. Conference papers are refereed. So are scholarly/scientific books. So are PhD theses. So are some publications by professional consultancies. Journal articles are not necessarily more worthy than these other forms. To suggest that they are is disingenuous.

2. Before it can be determined whether there are adverse health impacts from wind turbines, the term "health" needs to be defined. The relevant sense for the consideration of wind turbine impacts on neighbours is that of the World Health Organization, which defines health as:

A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (WHO, 1948)

From the standpoint of this concept the WHO regards both "annoyance" and sleep disturbance from excessive and intrusive noise as adverse health effects. See:

- *Guidelines for Community Noise*, ed. Berglund, B., Lindvall, T., Schwela, D. H., World Health Organization, 1999, sections 3.1, 3.3, 3.7

It should be noted that "annoyance" in this context does not just mean a passing irritation, but also "anger, disappointment, dissatisfaction, withdrawal, helplessness, depression, anxiety, distraction, agitation, or exhaustion" (WHO, 1999, section 3.7)

Griefahn and Basner testify that noise-induced sleep disturbances are regarded as adverse health effects by medical researchers, and that they can lead to impairment of performance, and in the long term contribute to multi-factorial diseases. See:

- Griefahn, B., and Basner, M., Disturbances of sleep by noise, Paper 107, Proceedings of ACOUSTICS 2011, 2-4 November 2011, Gold Coast, Australia, pp. 1-2 [This is a refereed conference paper.]

Since it is indisputable that wind turbine noise causes both annoyance and sleep disturbance for at least some neighbours, and since both annoyance and sleep disturbance from noise are regarded by the medical community as adverse health effects, *it follows necessarily that wind turbine noise causes adverse health effects*. This *general fact* does not have to be proved. It is already established. What is in question is the extent to which this phenomenon has been researched. This brings us to the topic of past, present and future research.

3. It must be observed that there is far more research on wind turbine noise impacts by acousticians and noise engineers than by medical researchers. Why this should be so itself deserves to be investigated. One thing is certain. The explanation for the paucity of medical research is not because there are no adverse health effects to be investigated. As we have just seen, there is no doubt that there are such adverse health effects. The explanation must therefore be sought in a different direction. That topic cannot be pursued here.

According to Griefahn and Basner, systematic research into noise-induced sleep disturbances started at the end of the 1960s. But, most studies have focussed on transportation noise (aircraft, railways, road traffic) (Griefahn and Basner, 2011, p. 2). The bibliography to their conference paper lists 41 studies relating to noise-induced sleep disturbances, but none of them is focussed on wind turbine noise. They do, however, say:

*According to the studies performed so far, noise-induced sleep disturbances are to be considered as a health risk. The majority of noise-induced sleep disturbances is undoubtedly caused by transportation noise, and most studies focussed accordingly on these noises. As the extents and patterns of the respective effects were related to various acoustic features (such as maximum levels, rise times, duration, noise-free intervals, frequency spectra) as well as to situational conditions (such as time of night), it is possible to transfer some knowledge to other noises that are not, or less intensively studied. These are industrial noises that are significant on a rather regional level, and construction noises with a rather temporal significance. **Rather uniform noises are known to disturb sleep as well, namely church bells and wind turbines. With the increasing use of renewable energy the latter become more important, and need to be investigated more intensively.*** (Griefahn and Basner, 2011, p. 6) [bold added]

Barbara Griefahn is a medical researcher specialising in the health effects of noise at the Leibniz Research Centre for Working Environment and Human Factors in Dortmund, Germany. Mathias Basner is a medical researcher specialising in noise-induced sleep disturbances at the Unit for Experimental Psychiatry, Division of Sleep and Chronobiology, University of Pennsylvania School of Medicine, Philadelphia, PA, USA. As the above quotation shows, they are calling for more intensive research on sleep disturbances caused by wind turbine noise. They do not feel obliged to prove that this is

happening. It is obvious to them that it is happening, and so needs to be researched, just as sleep disturbances caused by transportation noise have already been researched.

The following account of existing research does not claim to be comprehensive. But, it should be sufficient to disprove the claim that there is no "peer-reviewed" research on the adverse health effects of wind turbines.

N.B. The following account concerns only the noise impacts of wind turbines. It is well established that the visual effect of shadow flicker can be dangerous to health, and it is regulated by planning authorities. See:

- McBride, D., and Rapley, B., Blade Flicker, Shadow Flicker, Glint: Potential Hazards of Wind Turbines, pp. 79-92 of Rapley and Bakker eds, 2010 [see below]

McBride and Rapley conclude that the potential dangers from blade flicker and shadow flicker can be eliminated by siting wind farms more than 2.5 km from human habitation. They add that blade glint may require a greater setback distance. (McBride and Rapley, 2010, p. 91)

Medical Research

It is necessary to distinguish between three questions:

- (i) Can wind turbine noise cause adverse health effects, if turbines are inappropriately located, too close to neighbours' residences?
- (ii) What are the precise circumstances in which adverse health effects are, or are not caused by wind turbine noise?
- (iii) If there are adverse health effects from the noise from inappropriately located wind turbines, what are the physiological mechanisms that mediate them?

The answer to the first question is, yes, and this assertion no longer requires proof. The reason for this is simply that wind turbine noise is a form of industrial noise, and it is recognized by both medical researchers and acousticians that industrial noise generally does have the potential to cause, at least, sleep disturbance, with a long-term risk of contribution to multi-factorial diseases. Consequently, it is recognised that industrial noise requires environmental regulation. As we have seen, most medical research into noise-induced sleep disturbance has hitherto concerned transportation noise, but Griefahn and Basner call for intensive research into sleep disturbance induced by wind turbine noise, as government policy to promote renewable energy has led, and will continue to lead to the spread of wind farms (probably with larger and noisier turbines) (see above).

It is the second and third questions above that still require research. However, it needs to be said that acousticians have already provided an abundance of evidence in relation to the second question, i.e. what are the precise circumstances in which adverse health effects are, or are not caused by wind turbine noise? What is already known about sound levels, sound character, and the influence of wind speed, temperature, and terrain helps to determine markers for the probable occurrence of sleep disturbance and noise-induced stress.

It is in relation to the third question above, where very little research has been done. That is, very few medical researchers have taken up the challenge of determining the precise physiological mechanisms that mediate adverse health effects from wind turbine noise.

Before we proceed to a list of studies, one more preliminary observation is in order. The adverse health effects attributed to wind turbine noise by neighbours include not only annoyance and sleep disturbance, but also the cluster of symptoms that have been called Wind Turbine Syndrome. These symptoms include (apart from sleep disturbance) headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering that arise while awake or asleep (Pierpont, 2009, p. 26 – see below). It is these symptoms that have aroused most controversy, since supporters of wind farms, including their hired consultants, assert that these symptoms are not due directly to turbine noise, but are rather the effect of negative feelings aroused by failure to stop a wind farm development, or not sharing in the revenue of a wind farm. Both the acoustic research that has been done, and the little medical research suggest that these claims have no validity.

Articles in refereed journals

- (i) Salt, A. N., and Hullar, T. E., 2010. Responses of the ear to low frequency sounds, infrasound, and wind turbines. *Hearing Research*, 268 (1-2): 12-21

Professor Alec Salt and Assistant Professor Timothy Hullar are medical researchers in the Department of Otolaryngology, School of Medicine, Washington University, St Louis, Missouri, USA. In this paper Salt and Hullar show that infrasound from wind turbines (or any other source) can impact on the human hearing system, even though it is inaudible. Inaudible infrasound stimulates the Outer Hair Cells in the Cochlea at 60 dBG. They conclude: “The concept that an infrasonic sound that cannot be heard can have no influence on inner ear physiology is incorrect.”

- (ii) Salt, A. N., and Kaltenbach, J. A., 2011. Infrasound from Wind Turbines Could Affect Humans. *Bulletin of Science, Technology & Society* 31: 296-302

James A. Kaltenbach is a medical researcher at the Lerner Research Institute/Head and Neck Institute, Cleveland, Ohio, USA. In this paper Salt and Kaltenbach develop the thesis that

inaudible wind turbine infrasound could impact upon the human hearing system by pointing out: "Responses to infrasound reach the brain through pathways that do not involve conscious hearing but instead may produce sensations of fullness, pressure, or tinnitus, or have no sensation. Activation of subconscious pathways by infrasound could disturb sleep." (Abstract) They state: "We can conclude that based on well-documented knowledge of the physiology of the ear and its connections to the brain, it is scientifically possible that infrasound from wind turbines could affect people living nearby." (p. 301)

(iii) Bronzaft, A. L., 2011. The Noise from Wind Turbines: Potential Adverse Impacts on Children's Well-Being. *Bulletin of Science, Technology & Society* 31: 291-295

Arline L. Bronzaft, Ph.D. is Professor Emerita at the City University, New York, and a consultant in environmental psychology. In this paper she rehearses the research findings that "many studies have demonstrated that intrusive noises such as those from passing road traffic, nearby rail systems, and overhead aircraft can adversely affect children's cardiovascular system, memory, language development, and learning acquisition." On the basis of this research into the adverse health effects of transportation noise she argues the need for research into the potential adverse health effects of industrial wind turbines on children's health, and on the health of their parents. (Abstract)

(iv) Phillips, C. V., 2011. Properly Interpreting the Epidemiologic Evidence about the Health Effects of Industrial Wind Turbines on Nearby Residents. *Bulletin of Science, Technology & Society* 31: 303-315

Carl V. Phillips is an epidemiologist, currently Director of the epiPhi Consulting Group, and Director and Chief Scientist of the laboratory TobaccoHarmReduction.org., and formerly Associate Professor in the Department of Public Health Sciences at the University of Alberta, Edmonton, Alberta. In this paper Dr Phillips states firmly: "There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-disorder-type diseases, at a nontrivial rate." He argues: "The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problems and of causation in this case because of their volume, the ease of observing exposure and outcome incidence, and case-crossover data." He rebuts the claims of wind energy supporters that this evidence does not "count", that the outcomes are not "real" diseases, etc. He concludes: "The attempts to deny the evidence cannot be seen as honest scientific disagreement and represent either gross incompetence or intentional bias." (Abstract)

(v) McMurtry, R. Y., 2011. Toward a Case Definition of Adverse Health Effects in the Environs of Industrial Wind Turbines: Facilitating a Clinical Diagnosis. *Bulletin of Science, Technology & Society* 31: 316-320

Robert Y. McMurtry, M.D., F.R.C.S.(C), F.A.C.S. is Orthopedic Consultant at St Joseph's Health Centre, London, Ontario, Professor of Surgery at the University of Western Ontario, Member of the Health Council of Canada, and Member of the Canadian Index of Wellbeing Research Group. In this paper he comments: "Internationally, there are reports of adverse health effects (AHE) in the environs of industrial wind turbines The symptoms being reported are consistent internationally and are characterized by crossover findings or a predictable appearance of signs and symptoms present with exposure to IWT [industrial wind turbines] sound energy and amelioration when the exposure ceases. There is also a revealed preference of victims to seek restoration away from their homes." McMurtry proposes a case definition "that identifies the sine qua non diagnostic criteria for a diagnosis of adverse health effects in the environs of industrial wind turbines." (Abstract)

(vi) Shepherd, D., McBride, D., Welch, D., Dirks, K. N., and Hill, E. M., 2011. Evaluating the Impact of Wind Turbine Noise on Health-related Quality of Life. *Noise Health* 13: 333-339

Daniel Shepherd is a researcher in the Department of Psychology, School of Public Health, Auckland University of Technology, Auckland, New Zealand. David McBride is a researcher in the Department of Preventive and Social Medicine, University of Otago, Dunedin, New Zealand. David Welch and Kim N. Dirks are researchers in the School of Population Health, University of Auckland. In this paper Shepherd, McBride, Welch, Dirks and Hill report a "cross-sectional study comparing the health-related quality of life (HRQOL) of individuals residing in the proximity of a wind farm to those residing in a demographically matched area sufficiently displaced from wind turbines." They find: "Statistically significant differences were noted in some HRQOL domain scores, with residents living within 2 km of a turbine installation reporting lower overall quality of life, physical quality of life, and environmental quality of life. Those exposed to turbine noise also reported significantly lower sleep quality, and rated their environment as less restful." They conclude: "Our data suggest that wind farm noise can negatively impact facets of HRQOL." (Abstract)

(vii) Rand, R. W., Ambrose, S. E., and Krogh, C. M. E., 2011. Occupational Health and Industrial Wind Turbines: A Case Study. Published online before print August 22, 2011, doi: 10.1177/0270467611417849, *Bulletin of Science, Technology & Society*, August 22, 2011

(viii) Shepherd, D., and Billington, R., 2011. Mitigating the Acoustic Impacts of Modern Technologies: Acoustic, Health, and Psychosocial Factors Informing Wind Farm Placement. Published online before print August 22, 2011, doi: 10.1177/0270467611417841, *Bulletin of Science, Technology & Society*, August 22, 2011

(ix) Havas, M., and Collig, D., 2011. Wind Turbines Make Waves: Why Some Residents Near Wind Turbines Become Ill. Published online before print September 30, 2011, doi: 10.1177/0270467611417852, *Bulletin of Science, Technology & Society*, September 30, 2011

- (x) Pedersen, E., and Persson Waye, K., 2004. Perception and Annoyance due to Wind Turbine Noise: a Dose-response Relationship. *Journal of the Acoustical Society of America* 116 (6): 3460-70

Pedersen and Persson Waye are Scandinavian acousticians who have published much on wind turbine noise in the last decade. The above paper is now well-known, and much cited because it shows that wind turbine noise is more annoying than transportation noise (aircraft, railways, road traffic). N.B. It is in relation to transportation noise that most studies of noise-induced sleep disturbance have been carried out since the end of the 1960s (see Griefahn and Basner, 2011).

- (xi) Pedersen, E. And Persson Waye, K., 2007. Wind Turbine Noise, Annoyance and Self-reported Health and Well-being in different living environments. *Occupational and Environmental Medicine* 64(7): 480-486

In this paper Pedersen and Persson Waye report that the risk of perceiving wind turbine noise, and the risk of being annoyed by it both increase with increasing sound pressure levels. Also a rural area increased the risk of perception and annoyance in comparison with a suburban area. And in a rural area complex ground (hilly or rocky terrain) increased the risk compared with flat ground. They conclude: "There is a need to take the unique environment into account when planning a new wind farm so that adverse health effects are avoided." (Abstract)

- (xii) Pedersen, E. And Larsman, P., 2008. The impact of visual factors on noise annoyance among people living in the vicinity of wind turbines. *Journal of Environmental Psychology* 28: 379-389

This paper has been much cited by supporters of the wind energy industry, because it finds a strong correlation between attitude to the visual appearance of wind turbines and the risk of noise annoyance. However, those supporters of the wind energy industry who cite it do not reveal that the authors state explicitly: "The proposed model was based on theoretical assumptions about causality and on the assumption that attitude towards the source influences noise annoyance. *However, we cannot exclude the possibility that the causality is directed the opposite way so that annoyance causes a negative attitude towards the source. Being annoyed by wind turbine noise in the home environment could initiate a negative attitude towards wind turbines.* There may also be a feedback loop between these variables." (italics added) What Pedersen and Larsman are admitting here is that their research establishes only a correlation, and proves nothing about the direction of causality.

- (xiii) Pedersen, E., 2010. Health aspects associated with wind turbine noise – Results from three field studies. *Noise Control Engineering Journal* 59(1): 47-53

From studies made in relation to three sets of wind turbine noise data Pedersen establishes an association between wind turbine noise and both annoyance and sleep disturbance. Annoyance was associated with A-weighted sound pressure levels. Sleep disturbance was

more common in rural areas than in suburban areas. She recommends adequate setback distances, and calls for further research.

- (xiv) Pedersen, E., and Persson Waye, K., 2008. Wind turbines – low level noise sources interfering with restoration? *Environmental Research Letters* 3 (January-March 2008) 015002 doi: 10.1088/1748-9326/3/1/015002 [published online]

Pedersen and Persson Waye state: “It is hypothesized that low and moderate stressors such as wind turbine noise could have an impact on health. The risk seems to be higher if restoration is, or is perceived to be, impaired and also for certain groups of individuals.” (Abstract) Inevitably, they call for further research.

Refereed conference papers

- (i) Salt, A. N., and Lichtenhan, J. T., 2011. Responses of the Inner Ear to Infrasound. *Fourth International Meeting on Wind Turbine Noise*, Rome, Italy, 12-14 April 2011

Jeffery Lichtenhan is a medical researcher at the Eaton-Peabody Laboratory, Massachusetts Eye & Ear Infirmary, Boston, MA, and at the Department of Otology & Laryngology, Harvard Medical School, Boston, MA. In this paper Salt and Lichtenhan develop Salt’s work on infrasound by showing, amongst other things, how an inaudible infrasonic signal can cause an audible signal of higher frequency to amplitude-modulate *within the human nervous system*. This is a kind of amplitude modulation that is *biological*, and internal to the human nervous system, and thus quite distinct from the external *acoustic* amplitude modulation that occurs as a result of the peculiar methods of sound generation at the rotor of a wind turbine. They write: “These findings are relevant to the perception of the “amplitude modulation” of sounds, and represent a biological form of modulation by low frequency sounds *that cannot be measured with a sound level meter.*” (italics added) They conclude: “The complexity of the ear’s response to infrasound leads us to the conclusion that there are many aspects that need to be better understood before the influence of wind turbine noise on the ear can be dismissed as insignificant.” (Abstract)

- (ii) Alves-Pereira, M., and Castelo Branco, N. A. A., 2007. In-home wind turbine noise is conducive to vibroacoustic disease. *Second International Meeting on Wind Turbine Noise*, Lyon, France, September 20-21, 2007

Alves-Pereira and Castelo Branco are Portugese medical researchers who have been studying the effects of infrasound and low frequency noise (ILFN) since 1980. In this study they compare two cases of ILFN impact. In the first case, documented instances of vibroacoustic disease (VAD) were ascribed to ILFN generated by a port grain terminal. In the second case higher levels of ILFN were found in a home neighbouring a wind farm. They observe: “ILFN levels contaminating the home of Case 2 are sufficient to cause VAD.” They conclude:

“ILFN generated by WT [wind turbine] blades can lead to severe health problems, specifically, VAD.” (Abstract)

(iii) Griefahn, B., and Basner, M., 2011. Disturbances of sleep by noise. Paper Number 107, *Proceedings of ACOUSTICS 2011*, 2-4 November 2011, Gold Coast, Australia

I have already discussed this paper. See above, under **Preliminary Remarks**.

(iv) Thorne, R., and Shepherd, D., 2011. Wind turbine noise: why accurate prediction and measurement matter. Paper Number 73, *Proceedings of ACOUSTICS 2011*, 2-4 November 2011, Gold Coast, Australia

Robert Thorne is principal of the environmental consultancy Noise Measurement Services Pty Ltd. He holds a PhD in health science from Massey University, New Zealand. Daniel Shepherd is Senior Lecturer in the Faculty of Health, and Head of Postgraduate Studies in the School of Public Health and Psychosocial Studies, Auckland University of Technology. This paper discusses methodological issues connected with the measurement and prediction of wind turbine noise, from the standpoint of public health.

Other refereed studies

(i) Pierpont, N., 2009. *Wind Turbine Syndrome: A Report on a Natural Experiment*, K-Selected Books, Santa Fe, NM

Contrary to the claims of the wind energy industry and its supporters, this book *is* refereed. The referees are named in the book, and their reviews are printed in the book (pp. 287-292). There can be no doubt of the distinction of the referees. They are:

- Jerome S. Haller, MD, Professor of Neurology and Pediatrics (retired 2008), Albany Medical College, Albany, New York
- Joel F. Lehrer, MD, Fellow of the American College of Surgeons, Clinical Professor of Otolaryngology, University of Medicine & Dentistry of New Jersey.
- Ralph V. Katz, DMD, MPH, PhD, Fellow of the American College of Epidemiology, Professor and Chair, Department of Epidemiology & Health Promotion, New York University College of Dentistry, New York
- Henry S. Horn, PhD, Professor of Ecology and Evolutionary Biology, and Associate of the Princeton Environmental Institute, Princeton University, Princeton, New Jersey

This is not the place to quote the whole of their reviews, but the following passage from Professor Horn’s review is representative:

Dr Pierpont has gathered a strong series of case studies of deleterious effects on the health and well being of many people living near large wind turbines. Furthermore, she has reviewed medical studies that support a plausible physiological mechanism directly linking low frequency noise and vibration, like that produced by wind turbines, which may not in itself be reported as irritating, to potentially debilitating effects on the inner ear and other sensory systems associated with balance and sense of position. Thus the effects are likely to have a physiological component, rather than being exclusively psychological. (p. 291)

- (ii) Rapley, B., & Bakker, H. (eds), 2010. *Sound, Noise, Flicker and the Human Perception of Wind Farm Activity*, Atkinson & Rapley Consulting Ltd (Palmerston North, New Zealand), in association with Noise Measurement Services Pty Ltd (NMS) (Brisbane, Australia)

This volume of essays on wind turbine impacts, including health impacts, is refereed. On the title page the "Head of Peer Review" is stated to be John Podd, BSc, PhD.

- (iii) Shepherd, D., 2010. Wind Turbine Noise and Health in the New Zealand Context, pp. 15-68 of Rapley and Bakker (eds), 2010

- (iv) Thorne, Bob, 2010. Hearing and Personal Response to Sound, pp. 69-78 of Rapley and Bakker (eds), 2010

- (v) Thorne, Bob, 2010. Health, Wellbeing, Annoyance and Amenity, pp. 93-101 of Rapley and Bakker (eds), 2010

- (vi) Thorne, Bob, 2010. Synopsis of Assessing Intrusive Noise and Low Amplitude Sound, pp. 111-125 of Rapley and Bakker (eds), 2010

- (vii) Thorne, Bob, 2010. Wind Farms: The Potential for Annoyance, pp. 127-133 of Rapley and Bakker (eds), 2010

In this study Thorne remarks: "Considering my own research I conclude that a proposed wind farm will have a significant adverse effect on approximately 10% of the exposed population and a moderate adverse effect on approximately 20% of the exposed population. The adverse effects to some will be sleep disturbance and stress. To others it will be annoyance. The exposures are an adverse effect that is more than minor." (p. 132)

He also concludes: "Considering my own research, I conclude that a wind farm development has a high potential to cause adverse amenity, annoyance, sleep disturbance or health effects that are more than minor to residents within 3500 metres of the proposed wind farm."

"The effects may not extend to all persons within the locale and may extend approximately 3500 metres depending on wind farm design, weather conditions, ground conditions and topography." (p. 133)

Acoustic Research

[UNFINISHED]

David Brooks
Chair
Parkesbourne/Mummel Landscape Guardians Inc.
Vice-president
New South Wales Landscape Guardians Inc.

BIALA WIND FARM –P.A.C. ADDRESS (02.02.2017)

ADDENDUM TO ATTACHMENT B

On the matter of Industrial Wind Turbines and their impact on human health, the Panelists are also referred to:

" Wind Turbine Noise and Health: A Four-Decade History of Evidence

That Wind Turbines Pose Risks", by Jeremy Punch and Richard James,

some 72 pages, revised Oct., 2016.

The Abstract closes with the sentence:

"The reviewed evidence overwhelmingly supports the notion that acoustic emissions from industrial wind turbines is a leading cause of adverse health effects in a substantial segment of the population"

180 p's

reason), then all the properties that are not devalued will have to bear an increase in their annual rates bill (to compensate for the lower rates to be paid by the devalued properties)."

4. WIND "FARMS" AND NEARBY PROPERTY VALUES

4.1: Whether property value impacts is in the Panel's brief or not, I urge the Panel as an independent-of-government Commission to include it because it is a matter of very real and great concern to scores if not 100's of local families.

4.2: Of course, the developer will deny there is such an impact, and will probably trot out the flawed 2009 study by the N.S.W. Valuer-General or even the much-touted but equally questionable Berkeley Studies from the U.S. in support. I will refer to these later in my presentation, but now will provide both **overseas and local studies and cases** as evidence of this impact.

4.3: In Denmark, since 2009, it has been government policy, decreed in the "Promotion of Renewable Energy Act (Act 1392)" of 27.12.2008, that:

"... developers to pay compensation for loss of value of real property following erection of wind turbines."

If no agreement is reached, the loss of value is to be determined by an Appraisal Panel (**see Attachment 2**).

From 2009 to 2012 some 551 compensation claims were awarded totalling 31.2M kroner, and averaging 57,000kroner per claim. Recipients and their agents, however, claim the awards are inadequate and tokenistic. For example, Mr Torben Tornvig from near the town of Bande in Jutland received 75,000kroner, but his agent says the nearby turbine (630m) has devalued the property by 500,000kroner and has probably made it unsaleable (see 'Copenhagen Post', 12.11.2012).

My point is that, regardless of the actual loss of value, here we have probably the most pro-wind government in the world conceding that there is a loss in value and legislating to compensate for it.

4.4: The study by Gardner Appraisal Group Inc. of wind farms and property values in Taylor County in south Texas in 2007 is quite telling. The 45-page

study used a “paired sales” methodology (the second most favoured method of the U.S. Appraisal Institute) and in summary found that:

a property within sight and sound (0.2-0.4 miles) of a wind turbine sold for between 17% and 35% less than 4 comparable properties elsewhere.

a property within sight but less sound (about 1.8 miles away) sold for between 15% and 34% less than 4 comparable properties elsewhere.

Indeed, the study also found that the turbine host property sold for 37% less than other comparable non-host properties (see **Attachment 3** and refer to www.gardnerappraisalgroup.com).

4.5: The study by Lansink Appraisals & Consulting of the effects of wind “farms” on property values in both the Clear Creek and Melancthon areas of Ontario, Canada, in 2012 is another study of merit.

The 71-page report shows a price diminution of between 22% and 55% with an average of 36% for those sold properties near the 18-turbine Clear Creek project, and between 23% and 58% with an average diminution of 39% for those near the 133-turbine Melancthon wind “farm” (see **Attachment 4**).

It is of interest here that there are currently about 10 lawsuits before the courts in Ontario on this value-loss issue, some of which are using Lansink’s studies as evidence. Note also, the U.K. Valuation Office Agency has recently ruled that homes near wind turbines should be placed in a lower rating band. (see www.lansinkappraisals.com).

4.6: Briefly, two other overseas studies illustrating this value-loss impact are worth mentioning.

The study by Sunak and Madlener in Germany in 2012 assessed 1405 residential property sales in the towns of Reine and Neuenkirchen near a 9-turbine project. A quote from the Abstract to the 32-page report states

“Focusing on proximity and visibility effects caused by wind farm sites, we find ... significant negative impacts on surrounding property values.”

Specifically, the study found that:

“Loss in value increases the nearer the turbine -- under 1.5 km prices fell 21.5% to 29.7%; beyond 3.5 km loss is statistically negligible.

Note that this study is by academics, not specialist real estate appraisers, and that it uses the Regression Analysis Method much favoured by academic researchers in this field. (see www.eonerc.rwth-aachen.de/fen)

The study by Chris Luxemburger in 2008, titled *“Living With the Impact of Windmills”*. Luxemburger was the Chair of Brampton Real Estate By-Laws Committee, and published his paper after a 3-year study of 600 property sales around the town of Shellburne in Ontario. Briefly, he found that:

“Properties near turbines lost 20-40% (average \$48,000) compared to similar properties elsewhere.”

“Properties near turbines took more than twice as long to sell compared to properties elsewhere.”

“Four times as many properties near turbines could not be sold at all compared to others elsewhere.”

Following are a number of local cases that again illustrate the awful negative impact that these industrial projects have upon, particularly, good rural folk.

4.7: Mr John Benjamin of Storriers Lane, Bannister, near Crookwell now has two 150m tall turbines less than 900 m from his home and another dozen or so within two km. Already, in trial runs, the audible noise from the machines is unbearable, their siting completely ignores Council’s D.C.P. requirements, as well as the State Government’s “draft” guidelines.

Now, instead of living out his time on his beautiful and highly-improved farm, he may have to move – but already two local estate agents have told him that his property value has been reduced by up to 60%, and even then it might still not attract a buyer (**see Attachment 5**).

4.8: Richard and Sally Bird of Woodhouselee, near Crookwell, will have 7 or 8 turbines of the Crookwell III wind “farm” (still awaiting approval) within 1 and 2 km of their cottage and one-acre garden where they had hoped to spend their retirement years. Having their dreams dashed, two years ago they put

their property on the market, but found the mere potential of the turbines deterred buyers.

Interestingly, one undeterred couple found however that various lending institutions would not provide finance because of:

"...property devaluation over time because of the wind farm proximity"

Late in 2013, the Birds found a buyer by dropping the price by \$30,000 (**see Attachment 6**).

4.9: Steven and Kylie Ward of Pejar, near Crookwell, will also have a turbine of the Crookwell III development less than one km from their home and another 8 within 2km. Their property has been on the market since 2009, with many "lookers" eager at first to buy (given its glorious views), but all backed off once they learned of the proximity of the turbines.

They did, however, have two firm buyers who were undeterred, but both made offers more than 25% below the market price the Wards were asking, so the property is now off the market and the family has moved home at some financial stress to Crookwell (**see Attachment 7**).

4.10: Wilfred and Jean Dooley, also of Pejar, have had their property on the market since 2004 when they first learned that they would have numerous turbines on their western boundary from the Crookwell II wind "farm" and then more on their eastern side from the Crookwell III project. Over these years, 8 agents have brought scores of potential buyers to this choice property but all have withdrawn, despite several reductions in the asking price, upon learning of the turbines.

In late-2013, they at last found a buyer only after once again reducing the price to 42% below their asking amount and at a level 20% below the Valuer-General's Unimproved Value (**see Attachment 8**).

These four cases show that real families, real people, have their hard-earned assets and financial security diminished if not wiped out by wind "farm" developers pushing ahead with their projects regardless in order to reap their consumer-subsidised millions.

6

Might I add, it is common practice for the wind industry to dismiss this sort of evidence as “merely anecdotal”. This is an absurdity because it is the collection of such real life cases – such “anecdotes” -- that makes up the raw data which is the basis of proper empirical studies. That is, research based upon observation of what is actually happening in the real world, not research based upon desk-top theorising.

5 . TWO OFT-QUOTED PRO-WIND FARM STUDIES IN THIS MATTER .

The wind industry uses, amongst some others, two recent overseas studies.

5.1: The Crystal Rig – Dunbar Study, 2011, carried out by the Edinburgh Solicitors Property Centre (ESPC), looked at land sales near the Crystal Rig wind “farm” in Scotland. It found no evidence of a negative impact, and indeed prices had risen in the town of Dunbar since the project began operating in 2007.

However, locals point out that the wind “farm” is nestled in hill country 7.5 miles from Dunbar and cannot be seen from anywhere in it. Also Dunbar is coming into demand as a commuter “suburb” for the nearby city of Edinburgh.

5.2: The Lawrence Berkeley National Laboratory Study by Hoen and Wiser, titled *“The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis”*.

The first study was undertaken in 2009, and it was updated in 2013. The recent study included data from over 50,000 home sales in 27 Counties spread across 9 States. All homes were within 10 miles of a turbine, and 1198 homes were within only one mile. The finding used by the wind industry was:

“... we find no statistical evidence that home values near turbines were effected in the post-construction period or post-announcement/pre-construction periods.”

However, to a large extent, the same criticisms can be made of this later Berkeley study as Michael McCann (principal McCann Appraisals LLC) made of the 2009 work.

Partiality: The study was again funded by the U.S. Department of Energy, which along with the University of California, is vigorously and publicly “pro-

wind". Given this repeated funding from a biased source one cannot be blamed for a degree of scepticism as to its impartiality.

The "Swamping" Effect. The authors chose a 10-mile radius, and barely 2% of the homes were within one mile of a turbine. Despite their claims to have accounted for this by complex mathematical means, it is difficult to believe that in the averaging process the loss results of the fewer sales close to the turbines were not outweighed by the tens of thousands of unaffected sales in the more distant zones – especially, given Sunak's findings above.

The "Pooling" Effect. By lumping together the results of over 50,000 sales in 27 different Counties over 9 States, there is a strong possibility that the study did not adequately take into account the myriad of highly local factors – a new factory or shopping centre, school, hospital, etc nearby, or a change in local taxes, ethnic mix, planning laws, etc – that may have impacted on local prices as well as the proximity to turbines.

Subjectivity. The U.S. Appraisal Institute favours Case Studies and Paired Sales as the two most reliable methods of assessing value impacts because their results compare like with like and actual pre- and post- values. The Institute ranks Regression Analysis – the method used in this study – in only third place and as less reliable because in seeking "statistical soundness" subjective decisions have to be made that may distort the result. For example, they exclude properties that did not sell, relative times taken to sell is not a factor, I doubt that developer buy-outs and discounted re-sales are included, and in the 2009 study the authors omitted many sales that "...deviated too far from the mean".

6. FINALLY

Should the Panel, despite the weight of evidence produced here, approve this project, I ask of you the following:

6.1: Follow the Danish example and stipulate significant and realistic compensation for near-neighbours impacted by loss of property value and rural amenity.

Environment and Planning - 15 October 2015

ITEM 9.6 **Proposed Biala Wind Farm - SSD 13_6039**

FILE REFERENCE **I15/385**

AUTHOR **Director of Environment and Planning**

ISSUE

Council received notification from the NSW Department of Planning and Environment that the Environment Impact Statement for the Biala Wind Farm is on public exhibition from Friday, 21 August 2015 until Tuesday, 20 October 2015.

RECOMMENDATION That -

1. Council provide a submission to the NSW Department of Planning and Environment advising of issues relevant to Council regarding the Environmental Impact Statement for the Biala Wind Farm proposal.

BACKGROUND

Newtricity has submitted an Environmental Impact Statement (EIS) for the Biala Wind Farm. The Department of Planning and Environment is exhibiting the EIS from Friday, 21 August 2015 until Tuesday, 20 October 2015.

REPORT

Newtricity is seeking approval for the construction and operation of the Biala Wind Farm situated near the locality of Biala in the Southern Tablelands region of NSW. The Project is located approximately 14.5km south-west of Crookwell and 8.5km east of Biala and is wholly contained within the Upper Lachlan local government area.

The project will involve the following permanent components:

- Up to 31 wind turbines with a capacity of up to 3.5 megawatts(MW) each and a maximum height of up to 185m;
- A central electrical substation including transformers, switchgear, insulators and other ancillary equipment;
- Operations and maintenance facilities;
- Up to three meteorological monitoring masts;
- Underground 33kV electrical reticulation and fibre optic cabling connecting the turbines to the on-site substation; and
- Internal private access road network (up to a combined total length of approximately 27km) connecting the turbines and other proposed infrastructure to the public road network

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

The following elements will be required during construction of the project:

- Site offices, storage and car parking facilities;
- Temporary concrete batching plant;
- Earthworks for access roads, turbine platforms and foundations
- Cleared hardstand areas for construction equipment and storage;
- Temporary site buildings and facilities for construction contractors; and
- The use and storage of hazardous substances.

The project area covers approximately 1,936 ha. Project infrastructure including turbines and access roads will cover an area of approximately 42.37ha which is approximately 2% of the project area. Newtricity has entered into commercial lease arrangements with four landholders hosting project infrastructure which encompasses 37 individual land parcels.

A 132 kilovolt (kV) overhead transmission line is proposed to connect the on-site substation with the project area to the existing 132kV Yass to Goulburn transmission line located approximately 22kms south of the wind farm site. Approval for the transmission line will be sought separately to the wind farm and is therefore not assessed in details in the EIS.

The project will have an expected life span of 25 years and an indicative installed capacity of 77.5MW (based on 2.5MW per turbine) – 108.5MW (based on 3.5MW per turbine).

As the project is declared to be State Significant Development (SSD) and is to be assessed under Part 4 of the EP&A Act, there is no specific statutory provision in the Secretary's Environmental Assessment Requirements (SEARs) for the project to consider Councils Development Control Plan (DCP), but the Minister may wish to take into account Councils current DCPs and or policies that specifically address the development of wind farms.

The following is a summary of Council's interpretation of the proponent's response to Clause 9.5 Wind Farm of the Upper Lachlan Development Control Plan 2010.

a. *The development should be sited and carried out to minimise impacts on, or restrictions to grazing, farming and forestry practices.*

The majority of land within the project area would be classified as Class III to Class IV (NSW Agriculture – Agricultural Land Classification, 2002) indicating that the land is primarily suited to extensive agricultural grazing, which is consistent with the current land use. The anticipated worst case disturbance footprint of the project is calculated to be 42.37ha or approximately 2% of the total project area.

b. *The development should be carried out in a way that minimises any physical adverse effects on adjoining land and the development site, including, but not limited to:*

- i. Land degradation***
- ii. Alteration to drainage patterns***
- iii. Pollution of ground water***

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

- iv. Spread of noxious plants and animals, and**
- v. Bushfire hazard**

The issues listed above have been addressed and certain components can be further commented on by the relevant government agencies.

- c. The developer must assess the visual impact of the project including an assessment of the scenic value. The developer must consult with the Council and the community on appropriate visual impact measures.**

There are no existing dwellings associated with non-involved landholders within 2km of a proposed turbine. A total of 12 dwellings have been identified within 2-3kms of a turbine. The closer the proximity of a dwelling to a turbine the higher visual impact, with the turbines becoming increasingly distinct and dominating the view frame as the viewing distances increase. The remoteness of the turbines has assisted in reducing the level of visual impact on residential dwellings in proximity to the project.

The potential visual impact of the project from selected viewpoints could be mitigated by planting vegetation close to the view locations. The location and design of screen planting used as a mitigation measure is site specific and requires detailed analysis of potential views and consultation with surrounding landowners during the detailed design phase.

Council does not support roadside tree planting as a screening mitigation measure.

- d. The developer must assess the cumulative impact of the development having regard to wind farms in existence and those approved but yet to be constructed. Council does not favour large expanses of ridgelines being covered with wind farms and turbines.**

Potential combined visual impacts from private viewpoints are largely confined to non-involved properties located on Sapphire Road and Church Lane with elevated views from Gunning and Gullen Range Wind Farms. These impacts are considered minor in nature given the distance between the impacted viewpoints and the two wind farms (14km), with turbines appearing as small features on the horizon as part of the wider panoramic view. Properties with elevated panoramic views along Church Lane may also have visual accessibility to both the project and Crookwell Wind Farm however the distance of that development from the impacted viewpoints (over 20km) will make any cumulative visual impact insignificant.

- e. Proposed wind turbines shall comply with the South Australian Environment Protection Authority Wind Farms Environmental Noise Guidelines (July 2009) or any replacement guidelines.**

The proponent has stated that they have demonstrated that the Biala Wind Farm is compliant with the required noise limited and it is unlikely that further noise mitigation measures at the site will be required if the constructed wind farm has a layout and turbine characteristics similar to those used in the assessment.

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

Council will be reliant on the relevant government agency providing critical oversight of the complete noise report.

Should the locations or turbine type be altered in any way, a revised report shall be required to be submitted.

- f. *Turbines shall not be located within 2.0km of any dwelling not associated with the development or from any lot upon which a dwelling may be constructed.***

The applicant has stated that all turbines are located a minimum of 2km from all non-involved landholder dwellings.

- g. *Turbines shall not be located within a distance two times the height of the turbine (including the tip of the blade) from a non-related property boundary.***

11 turbines do not comply with this requirement (minimum 94m from a non involved landholder boundary). The proponent has stated that the project has had appropriate regard for surrounding properties in the assessment and proposed management of potential environmental and social impacts.

- h. *Existing and proposed screenings may be used to minimise the visual impacts to non-related properties. However, due to the height of the turbines, screening is not the preferred method of minimising visual impact. Turbines shall be located in positions so as to have minimal visual impact on nearby properties, especially existing dwelling and lots on which dwellings may be constructed.***

The potential visual impact of the project from selected viewpoints could be mitigated by planting vegetation close to the view locations. The location and design of screen planting used as a mitigation measure is site specific and requires detailed analysis of potential views and consultation with surrounding landowners during the detailed design phase.

Council does not support roadside tree planting as a screening mitigation measure.

- i. *Turbine locations are to be sensitive to existing related dwellings on the subject site. Noise and shadow flicker should be minimised and turbines should not be located in close proximity to existing dwellings.***

The assessment of theoretical shadow flicker duration shows that 5 of the dwellings identified by Newtricity are predicted to experience some level of theoretical shadow flicker within 50m of the house location. Four of these dwellings are also predicted to be affected by theoretical shadow flicker durations of greater than the NSW Guidelines recommended limit of 30 hours per year within 50m of the house locations, however these are all stakeholder dwellings.

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

It is understood that Newtricity has approached the landholders of the four dwellings (fifth one yet to be constructed) where shadow flicker limits are predicted to be exceeded, and have obtained agreement from the landholders that the predicted shadow flicker durations are acceptable.

This statement will need to be substantiated.

- j. Turbine locations shall not surround a non-related property. Turbines shall be located with the specified setbacks from property boundaries to minimise the visual impact of the development on adjacent and nearby non-related property. Cumulative impacts, having regard to existing turbines and turbines approved but yet to be constructed, should be assessed.***

The Department of Planning and Environment who hold this information should be seriously considering the proposed cumulative impact of all the mentioned wind farms in the region.

- k. A communications study should identify the existing status of communications and detail the proposed method of dealing with potential communication interference.***

An EMI and EMF Assessment has been provided by the proponent. Concerns are raised as to the proponent's commitments to rectify communications issues if they arise. There is no commitment to the process or timing of any proposed mitigation measures.

- l. Construction vehicles, including concrete trucks, carriers of turbine components, and related heavy vehicles (including relevant contractors) shall only travel on an approved route.***
- m. A report detailing investigations into the impact of construction vehicles on the proposed route shall accompany the development application. Detailed road condition reports will be required as part of any consent.***
- n. Council will require road works to cope with the over size and overweight traffic movements related to the construction of a wind farm. Bonds will also be required for any potential damage to roads during the construction phase.***
- o. The construction and maintenance of internal roads (roads within the property subject to the development) shall be the responsibility of the developer. Council will require proof that they have been adequately designed and constructed for their purpose.***
- p. All infrastructure related to the wind farm should be included in the development application. Management of temporary facilities, waste, numbers of contractors/employees, etc, should be part of the Development Application information. All infrastructure should be located in low visual impact locations and interconnection cables/wiring and the like should be underground.***

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

- q. Developers shall consider and refer to the Department of Planning NSW Wind Energy Environmental Impact Assessment Guidelines, the NSW Wind Energy Handbook, Best Practice Guidelines for implementation of Wind Energy projects in Australia, South Australian Environment Protection Authority Wind Farms environmental noise guidelines (July 2009) and all other relevant policies and legislation applicable to the proposed development.**

- r. If appropriate, the development application should include details of a viewing area where safe vehicle and pedestrian movements can view the wind farm.**

See Comments below to address items l – r inclusive:

Generally

Table 4.1 figures should be doubled (rather than hiding the facts behind fine print).

Table 4.1 and 4.2 should provide information on the same basis i.e. over all trips/turbine or max daily trips/turbine.

Section 4.2.1 Summary – All traffic should be shown (not half) as empty trucks will still occupy space on the road and have the potential to be involved in crashes.

Section 4.5.2 Sight Distance – is substandard at the northern most and southern accesses. The proponent has suggested that a speed limit could be utilized to reduce sight distance requirements. ULSC property access standards require that an 85th percentile speed of 70km/hr exists for a sight distance of 150m. Unfortunately it is unlikely that motorists would obey such a speed limit in an isolated situation. To overcome this, the proponent must consider 'micrositing' the accesses to improve sight distance.

Section 4.5.3 – The warrants for turning lanes has been poorly dealt with in the traffic Impact Assessment. In the assessment, the traffic generated by the development appears to have not been added to the base line traffic on Grabben Gullen Road. Given that the intersections are not located in the most ideal positions, further consideration should be given to BAR/BAL treatments. Also the base line traffic value used was 50vpd –Council measured 480 AADT in 2013 (it would be more appropriate to use a baseline figure of 550vpd).

Section 13.2.1 Existing Road Network

Grabben Gullen Road (MR52) – is a Regional Road (not a State Road) and is controlled by ULSC (not RMS);

Kialla Road was only partly reconstructed for Gullen Range Windfarm – 7.7kms of it was not reconstructed and will require re-assessment before use by RAV's;

Section 13.3.1 Proposed Transport Routes

ULSC prefers the use of Route 4A for RAV's; however the following issues must be addressed by the proponent:

Part of Kialla Road that hasn't been reconstructed must be reassessed to determine if it is able to carry the loads imposed upon it. There is 7.7kms of the road that is in this condition;

ULSC will not allow Route 4A to be used for heavy construction and light vehicle traffic associated with the development. This is due to the route traversing through residential areas. To use the route for all traffic to development would introduce safety concerns and also result in many complaints from the local residents. ULSC expects the proponent to implement systems that:

- a) Identify all vehicles that are associated with the development.
- b) Ensure that all vehicles use routes that have been identified for use by the development.

There are four causeways on Kialla Road that will be impassable by SPV's carrying 70m blade segments. It should be noted that the SPV's carrying the 50m blade segments for the Gullen Range development "bottomed out" on the causeways, causing damage to the road surface;

The part of Range Road from Kialla Road to Grabben Gullen Road is not in a satisfactory condition to carry the projected overmass and overdimension traffic. The proponent will be required to drain and reconstruct the majority of this part of Range Road. The length of road involved is 7kms;

The turning circle diagrams shown on drawings 01, 06, 07, 08, and 08 contain many errors. These must be corrected and the intersection modifications redesigned. ULSC is particularly concerned that drawing 07 of 22 shows a tree to be 'trimmed' on the inside of the Grange Road / Cullen Street. This tree is a protected, rare specimen of Australian Red Cedar and must not be touched. The intersection must be redesigned to move the travel path well away from inside of the curve (and the tree);

The developer must provide design drawings for each access proposed to be constructed on MR54 to show that adequate room exists between the edge of MR 54 and the gate (or whatever other device) that regulates access into the property.

ULSC has used speed limits on roads leading to two other wind farm developments with considerable success. The imposition of the limits improved the interaction between heavy vehicles and other road users considerably. Unfortunately, the current standards for the imposition of speed limits fail to address these situations adequately, with RMS being unlikely to support the imposition of limits and also likely to direct ULSC to remove any limits that it might impose itself.

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

ULSC endorses the use of Route1 – Grabben Gullen Road for use by heavy construction traffic and light traffic. However, the following should be noted:

Route1 is not a B-Double Route;

Route1 comprises thin; old pavements that will require some strengthening prior to work commencing and will also require rehabilitation post construction.

- s. ***Developers shall consider and refer to the Department of Planning's NSW Wind Energy Environmental Impact Assessment Guidelines, the NSW Wind Energy Handbook, Best Practice Guidelines for implementation of Wind Energy projects in Australia (AusWEA), South Australian Environment Protection Authority Wind farms environmental noise guidelines and all other relevant policies and legislation applicable to the proposed development. Reference to relevant Council policies and documents shall also be made:***

Not applicable.

- t. ***Within twelve months of the wind turbine generators ceasing to operate they are to be fully dismantled and removed from the site. A security guarantee/bond is to be lodged with the consent authority (prior to work commencing on-site) in an amount determined by the consent authority to cover the cost of dismantling and removal of the turbines.***

No longer considered applicable.

- u. ***Details of the proposed connection to the electricity network shall be included as part of the Development Application Environmental Assessment.***

The proponent states that through discussions with Newtricity and Essential Energy, a decision to separate the proposed 132kV transmission line connecting the wind farm to the existing Yass to Goulburn 132kV line would be progressed separately to the wind farm by Essential Energy (the network operator) under Part 5 of the EP&A Act.

Essential Energy will therefore constitute the proponent for the transmission line, however the design and construction of the transmission line will be undertaken by the wind farm proponent, Newtricity. Following construction, the line will be gifted to Essential Energy and Essential Energy will own, operate and maintain the infrastructure as part of their existing electricity network.

Newtricity acknowledge that the transmission line connection of the wind farm to the existing grid is fundamental to the operability and viability of the project. Whilst the transmission line component will be subject to separate assessment under Part 5 of the EP&A Act, the Department has advised that it will be necessary for Newtricity to demonstrate as part of the EIS for the wind farm that there are no unreasonable constraints that would preclude the development of the transmission line, such as would affect the feasibility of or pose a restriction to the development of the wind farm.

Environment and Planning

PROPOSED BIALA WIND FARM - SSD 13_6039 cont'd

Essential Energy as the determining authority under Part 5 of the EP&A Act has the responsibility to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

Whilst the transmission line will be progressed under Part 5 of the EP&A Act it will be the responsibility of Essential Energy to determine whether the proposed transmission line connection is likely to have a significant environmental impact that would designate the activity as "State Significant Infrastructure" (SSI) under the EP&A Act. SSI developments require the preparation of an EIS that would be assessed and approval would be determined by the Department rather than Essential Energy in this instance.

Investigations into the final alignment are continuing, Newtricity anticipates that the REF for the transmission line connection will be submitted to Essential Energy in Quarter 2 of 2016.

The information contained above has highlighted issues that Council will be raising in its submission to the Department of Planning and Environment as well as any other issues that Councillors may wish to raise.

POLICY IMPACT

Non-compliance with provisions of Clause 9.5 of the Upper Lachlan Development Control Plan 2010 as highlighted throughout the report.

Non-compliance with the provisions of Clause 3.17 of the Upper Lachlan Development Control Plan 2010 as indicated in the report.

OPTIONS

Nil

FINANCIAL IMPACT OF RECOMMENDATIONS

\$77,500 per annum in direct contributions throughout the operational life of the project.

RECOMMENDATION That -

1. Council provide a submission to the NSW Department of Planning and Environment advising of issues relevant to Council regarding the Environmental Impact Statement for the Biala Wind Farm proposal.

ATTACHMENTS

Nil