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DPTI:scapreps

From: Sarah Laurie <sarah@waubrafoundation.org.au>
Sent: Friday, 29 June 2018 4:24 PM
To: DPTI:scapreps
Subject: Waubra Foundation Written submission, and Request to be Heard in support of submission, Re Development Number 354/V003/18 (Applicant Neoen Australia)
Attachments: Final_WF_submission_to_SCAP_re_NEOEN_Crystal_Brook_Wind_Power_Facility.PDF; ATT00001.htm; WF_Submission_to_CCA_Review_of_Wind_Farm_Commissioner.PDF; ATT00002.htm

Attention Lee Webb

Dear Lee,

I include 4 documents as my written Submission regarding the Neoen development (4 pdf files, my Submission on behalf of the Waubra Foundation and its 3 attachments following in two subsequent emails).

I also request to be heard by appearing personally in support of the Waubra Foundation's submission and to answer any questions from SCAP members.

As I cannot scan the formal document with my details on the request to be heard document, I reproduce them below

My name: Sarah Laurie
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Primary method of contact: sarah@waubrafoundation.org.au

Postal Address: c/- PO Box Banyule, VICTORIA 3084

The specific aspects of the application to which I make comments on are related to wind turbine noise and vibration.

Could you please acknowledge receipt of this email and the four attachments including my submission.

Thank you

Sarah Laurie



The Waubra Foundation.
PO Box 7112
Banyule
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29th June, 2018

Submission to SCAP re NEOEN's proposed industrial wind power facility – a component of the Proposed Crystal Brook Energy Park

Background to this Submission

I was requested in my current capacity as the CEO of the Waubra Foundation by numerous concerned local residents to put in a submission to the SCAP commenting on the potential for adverse health effects resulting from wind turbine noise from the proposed wind power facility in the proposed location and to reference the relevant provisions of the Port Pirie Development Plan, October 2017 (cons).

I was asked specifically to mention the following to assist the SCAP members, and the Minister for Planning, to make a properly informed decision with respect to the provisions of the Port Pirie Development Plan;

- The general accepted evidence relating to adverse health effects from noise, including night time noise in a manner that can be understood by people without a background in health care
- The recent judgment by Federal Court Judge Justice White and Administrative Appeals Tribunal (AAT) Deputy President Bean,^{1 2} and any other relevant judgments
- My first hand knowledge from the last eight years of the experiences of residents living near existing wind power facilities who have become noise sensitized and/or suffered adverse health effects; and the known clinical science explaining why this is happening, particularly to those with conditions such as autism and Post Traumatic Stress Disorder (PTSD);
- Provide information in language that non-experts could understand about the most recent relevant Australian and International field and laboratory research, particularly that relating to amplitude modulation and its adverse effects.

Consistent with the Waubra Foundation's longstanding practice of not charging for our services or advice, this information is provided pro bono, specifically at the request of concerned members of the community.

Personal Disclosure

I was formerly a vocationally registered Rural General Practitioner, and an accredited Visiting Local Medical Officer to the Crystal Brook Hospital, between 1998 and 2002. I was also a clinical examiner for, and member of, the Royal Australian College of General Practitioners, and a member of the Australian College of Remote and Rural Medicine prior to leaving my clinical work due to unexpected sudden illness in April 2002.

My husband has owned property in Beetaloo Valley since 1984, and I have either been a permanent resident in the area, or visited regularly, since 1991. The property located in Beetaloo Valley owned by my husband is 1.3km from the nearest proposed wind turbine.

¹ <http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/AATA/2017/2424.html>

² <https://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/>

Background to the Waubra Foundation

I have worked in a voluntary capacity for the Waubra Foundation for almost eight years since July/August 2010, first as its Medical Director and then as its CEO. We are a charity, currently registered with the Australian Charities and Not for Profit Commission.

The objectives of the Waubra Foundation³ are twofold:

“To promote human health and well being through the prevention and control of diseases and other adverse health effects due to industrial sound and vibration” and

“To promote and protect human rights where those human rights are, or may be, adversely affected because of industrial sound and vibration.”

Our objectives are not inconsistent with the Code of Ethics of the Australian Acoustical Society (AAS) relating to responsibility of its members. The first provision of the AAS code states the following:

“The welfare, health and safety of the community shall at all times take precedence over sectional, professional and private interests.”⁴

It is our experience in the eight years since our formation that the conduct of some acoustic consultants, (especially those earning large incomes from their work for the wind industry)⁵ **does not, at all times, place the welfare, health and safety of the community above sectional, professional and private interests.** This is an international problem. We do, however, have excellent working relationships with numerous ethical acoustic consultants, including some who work as consultants for industry, including at times, the wind industry.

Emeritus Professor Colin Hansen, a highly regarded Mechanical Engineer, and educator from Adelaide University, and recipient of ARC funding grants to investigate Wind Turbine Noise, has repeatedly expressed identical concerns about the conduct of his acoustic colleagues with respect to their code of ethics.^{6 7}

The Proposal & Scope of this Submission

NEOEN have submitted an application to *inter alia* construct and operate a wind power facility as part of a larger energy park comprising solar panels and battery storage. The proposal submitted for consideration by the SCAP and current Planning Minister includes a proposal for up to 26 wind turbines, with a possible total height of 240 metres, up to a total capacity of 125 MW, ie individual wind turbines could be up to 4.8MW.

This submission solely addresses the potential for adverse health effects from **wind turbine noise and vibration.**

Basis for Opinions, Knowledge and Relevant Expertise

The opinions expressed by me are based on the existing knowledge available from first hand field reports & observations gathered over the last eight years, independent field research and laboratory studies conducted by others of the effects and acoustic emissions from existing, much smaller and less powerful wind turbines,

³ <https://waubrafoundation.org.au/about/objectives/>

⁴ <http://www.acoustics.asn.au/code-ethics>

⁵ See AAAC answers to questions on Notice in the third Federal Senate Inquiry (No 60 at https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Wind_Turbines/Wind_Turbines/Additional_Documents) for a list of the different wind power developments some members of the AAAC have received funds. In the case of SONUS there were some 60 wind power developments as at June 2015.

⁶ <https://waubrafoundation.org.au/resources/hansen-c-collateral-damage-engineering-ethics-and-wind-farms/>

⁷ <https://waubrafoundation.org.au/resources/hansen-c-whats-our-ethical-responsibility/>

and knowledge gained from close collaboration with expert health and acoustic colleagues and researchers in Australia and internationally over the last eight years.

I have given evidence in court proceedings in both Australia and in Canada and in some of those proceedings, my knowledge and expertise in this specific area has been accepted by the courts as expert evidence. I have also been invited to give evidence to three Federal Senate inquiries in Australia in 2011,⁸ 2012,⁹ and 2015,¹⁰ and was invited by the past Director of Acoustics Standards in America, Dr Paul Schomer, to present to the American Society of Acoustics conference in May 2015 and to contribute to the Wind Turbine Noise Working Group workshop.¹¹

My knowledge and expertise and the work of the Waubra Foundation has been recognised by my medically trained colleagues working in this area internationally including Professor Robert McMurtry (former Adviser to the Canadian Health Minister),¹² and Dr Chris Hanning (retired consultant sleep physician) in the United Kingdom.¹³

Key Documents relied upon in the subsequent commentary

1. Volume 1 & 2 of NEOEN's proposal with particular reference to what NEOEN / GHD refer to as the "NOISE IMPACT ASSESSMENT" but which SONUS (more accurately) call an "Environmental Noise Assessment", in Volume 2, pp 173 - 208
2. Port Pirie Regional Development Plan, 31 October 2017, consolidated.
3. Dr Bob Thorne's Review of the SONUS Environmental Noise Assessment, commissioned by Ian Peterson, 20th June, 2018 (also attached)
4. Documents and correspondence cited in the Waubra Foundation submission to the RET review panel, especially those relating to evidence of the lax regulatory environment for wind turbine noise and planning in Australia with respect to wind turbine separation distances and the predictable consequences of wake turbulence, known to acousticians. The RET Review submission itself is available from <https://waubrafoundation.org.au/resources/renewable-energy-target-review-waubra-foundation-submission-2014/>
5. A range of Australian Population Noise Impact Surveys at existing Wind Power Facilities, available from <https://waubrafoundation.org.au/library/community-noise-impact-surveys/>
6. Judgment by Justice White and Deputy President Bean dated 4 December, 2017 in <http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/AATA/2017/2424.html> and associated evidence and documents from that court case including court transcripts and expert evidence statements.
7. Comments made by Justice Borthwick in her Judgment in the NZ Environment Court in 2017 with respect to amplitude modulation in a quiet background noise environment that disturbed the sleep of residents <https://docs.wind-watch.org/NZ-Pickering-v-Christchurch-2017-05-10.pdf>, and the unusually successful application for costs by the noise impacted neighbour <https://docs.wind-watch.org/NZ-Pickering-v-Christchurch-2017-08-09.pdf>
8. Swedish Laboratory Research by Smith, M et al 2016, <https://waubrafoundation.org.au/resources/smith-m-g-et-al-physiological-effects-wind-turbine-noise-sleep/>

⁸ <https://waubrafoundation.org.au/wp-content/uploads/2013/07/Hansard-Melbourne-March-2911-1st-InquiryS13806.pdf>

⁹ <https://waubrafoundation.org.au/2012/ceo-gives-evidence-at-senate-inquiry/>

¹⁰ <https://www.masterresource.org/windpower-health-effects/au-testimony-laurie-ii/> and also at <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;db=COMMITTEES;id=committees%2Fcommsen%2Fb1a80440-3bf3-438c-8a68-471db69711a3%2F0008;query=Id%3A%22committees%2Fcommsen%2Fb1a80440-3bf3-438c-8a68-471db69711a3%2F0000%22>

¹¹ <https://waubrafoundation.org.au/resources/acoustical-society-america-conference-2015-waubra-foundation-presentation-notes/>

¹² <https://waubrafoundation.org.au/resources/letters-support-for-waubra-ceo/>

¹³ <https://waubrafoundation.org.au/resources/wind-turbine-amplitude-modulation-planning-control-study-inwg/>

9. Australian Acoustic Laboratory Research by Cooper, S & Chan, C presented at the American Society of Acoustics Conference in New Orleans in December 2017 <https://asa.scitation.org/doi/pdf/10.1121/2.0000653> and subsequently by Cooper, S as an invited presenter to Euronoise in Crete, May 2018 http://www.euronoise2018.eu/docs/papers/395_Euronoise2018.pdf
10. Presentation by Cooper, S on behalf of Dr Bob Thorne and myself to the American Acoustical Society Conference in New Orleans, December 2017 <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>
11. Presentation by Professor Robert Mc Murtry on behalf of myself to the American Acoustical Society Conference in Pittsburgh, May 2015 <https://waubrafoundation.org.au/resources/acoustical-society-america-conference-2015-waubra-foundation-presentation-notes/>

Simplified Description of some of the Wind Turbine Noise induced Health Problems¹⁴

Excessive noise levels, and noise with intrusive characteristics (such as impulsive noise, lower frequency noise, and amplitude modulating noise where the volume is changing up and down relatively rapidly), has long been known to cause sleep disturbance and “annoyance” symptoms for neighbours. That is why there are noise level limits enshrined in government regulations, and it is why environmental noise with intrusive characteristics such as low frequency, tonality and amplitude modulation usually attract an acoustic penalty.

UK based Low frequency noise expert Dr Geoff Leventhall, used frequently by the wind industry as an expert witness, has long publically accepted that “annoyance” symptoms and “wind turbine syndrome” symptoms are identical, and have been known to him for years.¹⁵

More recently, objective scientific evidence is emerging that noise can induce annoyance symptoms and even a startle response – known in lay terms as the “fight flight response”. This biological fact already has clinical applications – for example that knowledge has been used in psychiatric research in the military, to determine the existence, and severity, of PTSD (post traumatic stress disorder) in veterans in response to a specific audible acoustic stimulus.¹⁶

Recent groundbreaking laboratory research by Australian Acoustician Steven Cooper has shown that noise sensitized people will react, with 100% accuracy, to an **inaudible** acoustic stimulus of strongly amplitude modulated wind turbine noise recorded from a bedroom 1.7km away from the nearest wind turbine at Cape Bridgewater, at levels at or just below their thresholds of hearing. In other words, the sound is inaudible, but can be perceived.¹⁷ The particular sound file he used did not contain infrasound – the frequencies were above 30 Hz.

The frequent descriptions from the residents exposed to wind turbine noise of “waking up repeatedly in an anxious frightened panicked state”, is useful observational clinical evidence suggestive that wind turbine noise, both audible and inaudible, is also inducing an involuntary physiological stress response (startle response), evidenced by a sudden and concurrent acceleration of heart rate¹⁸ and potentially numerous other symptoms.

¹⁴ see the recent New Orleans presentation for more detail <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>

¹⁵ <https://waubrafoundation.org.au/resources/leventhall-g-comments-nhmrc-june-2011-wind-turbine-syndrome-symptoms-same-as-noise-annoyance/>

¹⁶ this review article from 2010 by one of the worlds leading experts in PTSD provides extensive information and references <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2816923/> and this research paper provides the specific evidence about PTSD research using the acoustic startle reflex for clinical research: <https://www.sciencedirect.com/science/article/pii/S0022395613002938>

¹⁷ http://www.euronoise2018.eu/docs/papers/395_Euronoise2018.pdf

¹⁸ <https://waubrafoundation.org.au/resources/rapley-et-al-case-report-cross-sensitisation-infrasound-low-frequency-noise/>

Multiple animal studies in both domesticated and wild animals exposed to wind turbine noise have shown an enhanced physiological stress response using objective biological markers such as serum and faecal cortisol levels.^{19 20 21 22} The strength of the objectively measured biological stress response in these animals has been shown to depend on distance away from wind turbines, in other words **distance from the closest wind turbine acts as a crude proxy for the cumulative exposure dose**. These animal studies provide evidence further rebutting the erroneous explanation that all the symptoms reported by nearby human residents are due to scaremongering, referred to as a “nocebo” effect rather than due to an involuntary physiological stress response.

There are some people who have an enhanced vulnerability ie risk of reacting at lower thresholds with a startle / physiological stress response. For example people with an enhanced startle response to sound include those with autism,²³ and those with PTSD (Post Traumatic Stress Disorder) as previously discussed. These people will react more quickly and strongly to the same acoustic stimulus that others may not initially react to, at all.

When this physiological stress response happens repeatedly from exposure to impulsive sound, mammalian studies have shown that the animals become sensitized, even when the sound levels are the same.²⁴ It is the pulsing / impulsive nature of the noise that is implicated in the sensitization. Sensitisation is the opposite to “habituation” – where people/animals get used to the sound with repeated exposure, and do not react at lower and lower threshold sound levels with repeated exposure.

When the acoustic startle response is also combined with a response to a concurrent pressure stimulus, and an acute response from the vestibular (balance) system is also triggered as is thought to be happening with exposure to wind turbine noise / pressure pulses then the total combined startle response (via stimulation of acoustic sensors, tactile pressure sensors and vestibular motion sensors concurrently) is increased.²⁵

The World Health Organisation’s numerous publications on noise²⁶ accept that sleep disturbance and stress are caused by “annoyance” to noise, and that sleep deprivation and chronic stress are detrimental to health. However there has historically been a distinction made between direct and indirect effects of noise on the stress response via “annoyance”. The emerging objective biological and acoustic science especially resulting from exposure to strong amplitude modulation suggests that this distinction is no longer valid because of the evidence of a direct causal relationship between the stimulus (strongly amplitude modulated noise) and the powerful involuntary biological response.

Accuracy of Pre Construction Predictions of Noise IMPACTS for this project

As there are currently no comparable wind power facilities with wind turbines this size (4.8 MW) in Australia, **it is not possible for anyone to accurately predict the distance, or severity of adverse health effects including sleep disturbance and “annoyance” (Wind Turbine Syndrome) symptoms.**²⁷ No one knows what

¹⁹ <https://waubrafoundation.org.au/resources/mikolajczak-j-et-al-preliminary-studies-growing-geese-proximity-wind-turbines/>

²⁰ <https://docs.wind-watch.org/Lopucki-et-al-2018-corticosterone-animals-wind-turbines.pdf>

²¹ <https://docs.wind-watch.org/aoas-2015-0051-pigs.pdf>

²² <https://docs.wind-watch.org/Agnew-wind-turbine-stress-badgers.pdf>

²³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4008133/>

²⁴ <https://waubrafoundation.org.au/resources/bmc-neuroscience-repeated-elicitation-acoustic-startle-reflex/>

²⁵ <https://waubrafoundation.org.au/resources/yeomans-et-al-tactile-acoustic-vestibular-systems-sum-elicite-startle-reflex/>

²⁶ <https://waubrafoundation.org.au/information/acousticicians-noise-regulators/literature-reviews/>

²⁷ UK low frequency noise expert Dr Geoff Leventhall has accepted that Wind Turbine Syndrome Symptoms as described by Dr Nina Pierpont in her 2009 study are the same as what he refers to as “annoyance” symptoms, and did so at the NHMRC workshop in Canberra in June 2011. More information including a transcript and video clip of Leventhall’s CEO Mobile: 61 + 0474 050 463 E: info@waubrafoundation.org.au www.waubrafoundation.org.au

the actual noise and vibration emissions will be under different wind and weather conditions at each of the dwellings “receptor locations” until the project is built and operating. In addition as there is a cumulative dose effect via sensitisation, some people who are not initially affected will find that after a few years they start to develop symptoms correlating with exposure to operating wind turbines. That has certainly been the experience in Australia and internationally to date, including amongst wind turbine host families.

The noise predictions from any of the models used are gross averages of predicted sound levels. They do not, and cannot, account for the second by second changes in power outputs, noise and vibration outputs, or the changes in noise characteristics. It is these transient changes in noise characteristics that the human and animal brains respond to, and that are known to disturb people’s sleep and trigger annoyance symptoms, if individual stimulus thresholds are exceeded, even transiently.

Nor can these modeled noise predictions such as those in both the SONUS and THORNE reports accurately reflect, in detail, how wind turbine wakes will interact with each other in different weather conditions and wind speeds in the complex terrain / topography in this particular location, and how that then can affect noise at the dwellings and workplaces of those within the acoustic impact zone – itself yet to be determined.

It is critical for SCAP members and the Minister for Planning to understand that from a physiological perspective, the brain responds to these acoustic environment changes, in real time, and not to the “averages” or noise predictions / computer models that are relied upon by proponents and their acoustic consultants for the purposes of obtaining planning approvals for their projects. Pre construction predictions can be significantly lower than the post construction reality, eg at Waterloo Wind Farm, conducted by Dr Norm Broner,²⁸ that substantially under predicted the subsequent noise from the wind farm when reassessed post construction by Marshall Day Acoustics.^{29 30}

Steven Cooper’s latest laboratory study, reported recently in Crete at the Eurnoise conference at which he was an invited speaker, illustrates that people who become noise sensitized as a result of chronic exposure will react to amplitude modulated sound reproduced in a laboratory, with 100% accuracy.³¹ In other words, it is the noise, and its specific characteristics, that are triggering the “annoyance” symptoms, and not a nocebo effect as various parties including acoustic consultants, including from SONUS, have claimed.³²

It is also critical that SCAP members and the Planning Minister understand there is a cumulative effect from wind turbine noise exposure, and that ongoing exposure results in progressive sensitization to wind turbine noise for some neighbours. If noise-sensitization occurs there are predictable, resultant serious adverse effects for those individuals with respect to their ability to sleep, and for their longterm health as their noise thresholds continue to reduce with ongoing exposure.^{33 34}

The only improvement in health and sleep with reduction or cessation of symptoms will come with reduction in the exposure dose and duration.

comments is available here: <https://waubrafoundation.org.au/resources/leventhall-g-comments-nhmrc-june-2011-wind-turbine-syndrome-symptoms-same-as-noise-annoyance/>

²⁸ <https://waubrafoundation.org.au/resources/skm-waterloo-stage-1-environmental-noise-modelling-may-2009-main-report-2/>

²⁹ <https://waubrafoundation.org.au/resources/morris-m-charts-comparing-pre-construction-modeling-vs-post-construction-noise-at-waterloo-wind-development/>

³⁰ <https://waubrafoundation.org.au/resources/morris-m-development-assessment-commission-hearing-ceres-south-australia/>

³¹ http://www.eurnoise2018.eu/docs/papers/395_Eurnoise2018.pdf

³² see for example the 2010 Clean Energy Council commissioned SONUS Technical Paper, unavailable on the SONUS or CEC websites as at 28 June, 2018 but sourced from the AGL website on 28 June, 2018 [https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-\(2\).pdf?la=en&hash=D7A399E8E60412ADAAAC9C959805C56A626FBE1EC](https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-(2).pdf?la=en&hash=D7A399E8E60412ADAAAC9C959805C56A626FBE1EC)

³³ http://www.eurnoise2018.eu/docs/papers/395_Eurnoise2018.pdf

³⁴ <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>

In Australia if you live near a wind farm, that means leaving your home.

As wind turbines have never been turned off overnight, or pulled down, in Australia, in large part due to the widespread regulatory capture³⁵ of noise pollution and planning authorities by the wind industry (now being revealed in both litigation and FOI documents), and the expense of litigation for noise nuisance that is beyond the financial reach of most people, people are forced to leave their homes, and farms, or to endure intolerable suffering and ill health that would cease or reduce if the noise and vibration ceased, and indeed does cease or reduce when they leave the noise source to reduce their exposure.

Many are unaware that historically the wind industry bought out some badly affected parties, and silenced them with gag clauses.^{36 37} Slater and Gordon's then General Manager, James Higgins, confirmed the existence of such agreements in a letter to the Australian on 4th May, 2012. In that letter Higgins stated:³⁸

"James Delingpole asserts that Slater and Gordon have been responsible for "rigorous gagging orders" in favour of wind farm operators. This is wrong. We have acted for landowners who have been affected by the operation of nearby wind farms.

Any confidentiality clauses associated with some compensation claims have not been made at our direction. Such clauses are required by the wind farm operators and are typically required in these types of settlements. It is a decision for our clients as to whether they accept such clauses."

The same gagging of noise-sensitized people is not confined to the wind industry, and has also occurred at other industrial developments such as gas-fired power stations, as part of property buy out agreements (eg Uranquinty in NSW)³⁹ and in Queensland near coal seam gas facilities near Chinchilla.⁴⁰

More recently so called Good Neighbour agreements are used to gag neighbours to proposed wind power facilities in advance, before they become affected, with clauses that prevent them or anyone living at the same address from complaining in the future to any regulatory authorities about the noise.⁴¹

Summaries of the Relevant Evidence

There is a detailed explanation of the known consequences of chronic sleep deprivation and chronic stress and the then available research into wind turbine noise in my expert opinion for the Stony Gap Appeal to the ERD Court in 2014.⁴² The science has not changed my opinion in the intervening period – rather there is more evidence to support my opinion that the sound is directly causing the effects described by residents.

Much of that same evidence in the Stony Gap Expert Opinion, including from the World Health Organisation's various publications into Environmental, Night time, and Community Noise, was brought to the court's

³⁵ <https://www.economicshelp.org/blog/141040/economics/regulatory-capture/>

³⁶ see evidence given at the Melbourne hearing of the third Federal Senate Inquiry by Trish Godfrey, on 9th June, 2015 <http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;db=COMMITTEES;id=committees%2Fcommsen%2F494c9081-d6b1-4ad4-9fbc-cb2d706eec76%2F0003;query=Id%3A%22committees%2Fcommsen%2F494c9081-d6b1-4ad4-9fbc-cb2d706eec76%2F0000%22>

³⁷ see contracts and extracts from contracts with non disclosure clauses <https://stopthesethings.com/2013/02/26/did-two-senior-wind-energy-executives-lie-to-the-senate/>

³⁸ <https://www.theaustralian.com.au/opinion/letters/wind-power-a-blessing-or-a-scam/news-story/4df0cb54bed7b2db199257fe27f38aae?sv=10264000b8841a2191753f42e3b08c86>

³⁹ <https://waubrafoundation.org.au/2009/uranquinty-families-bought-out-and-silenced-with-non-disclosure-clauses-by-origin-energy/>

⁴⁰ personal communication with local residents, subsequently gagged along with neighbours after being bought out by the operator of the gas plant facilities nearby

⁴¹ eg <https://waubrafoundation.org.au/resources/neighbour-deed-palmer-wind-farm-south-australia/>

⁴² <https://docs.wind-watch.org/Stony-Gap-Expert-Opinion-Laurie.pdf>

attention by a range of acoustic, psychoacoustic, and medical experts in the Waubra Foundation case against the Australian Charity & Not for Profit Commission “the ACNC” to challenge the ACNC’s “in house” erroneous ruling that noise, including wind turbine noise, was not a pathway to disease in humans. The Waubra Foundation won that part of the appeal against the ACNC’s decision, which at the time sparked international outrage amongst health and acoustics professionals as well as adversely affected citizens.⁴³

Rather than repeat that evidence here, it is suggested that those interested can read the AAT Judgment by Federal Court Judge Justice White and Deputy President Bean with reference to their consensus with respect to the expert evidence, and with reference to the extensive evidence base upon which they relied.⁴⁴

The new scientific evidence available **since the AAT case was heard in September 2016** has addressed some of the gaps in the existing scientific knowledge that the Judges had identified. Two crucial studies are listed below:

1. A direct causal relationship is now scientifically established between strongly amplitude modulated wind turbine noise and sleep in the Swedish laboratory study by Smith et al (in young fit people with only short term exposure);⁴⁵ and
2. A direct causal relationship has been established between amplitude modulated recorded wind turbine noise (30 – 1200 Hz) and triggering of the characteristic annoyance/wind turbine syndrome symptoms established by Steven Cooper’s latest laboratory research.⁴⁶

In other words, amplitude modulation has since been confirmed as a critically important and scientifically established trigger for adverse health effects for neighbours to industrial noise emitters, including particularly wind turbines.

Amplitude modulation has also been specifically highlighted as an issue with respect to sleep disturbance from wind turbine noise in a case in the NZ Environment Court, where Justice Borthwick made it clear in her judgment that the penalty for amplitude modulation alone, when applied, would not protect the sleep of neighbours, because of the low background noise environment in that case.⁴⁷ This issue of amplitude modulation occurring in the context of a very quiet background noise environment is highly likely to be a problem at times for residents neighbouring the proposed Crystal Brook Wind Farm, where it is the norm to have very quiet background noise environments, especially at night.

Finally, the World Health Organisation are reviewing their guidelines for Environmental Noise for the European region to include more recent research and these new guidelines are due to be issued in September, 2018. Wind turbine noise will be included as a source of environmental noise.⁴⁸ It remains to be seen how relevant these new guidelines will be for the Australian context, where wind turbines are usually more powerful than those used to date in Europe, and sited closer together than recommended by manufacturers and industry standards, and where the background noise environments in much of rural Australia are quieter.

⁴³ <https://waubrafoundation.org.au/resources/acnc-appeal-responses-from-professionals-citizens-and-impacted-residents-re-loss-health-promotion-charity-status/>

⁴⁴ <https://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/>

⁴⁵ <https://waubrafoundation.org.au/resources/smith-m-g-et-al-physiological-effects-wind-turbine-noise-sleep/>

⁴⁶ http://www.euronoise2018.eu/docs/papers/395_Euronoise2018.pdf

⁴⁷ <https://docs.wind-watch.org/NZ-Pickering-v-Christchurch-2017-05-10.pdf>

⁴⁸ <https://www.wind-watch.org/documents/development-of-the-who-environmental-noise-guidelines-for-the-european-region-an-introduction/>

Historical Knowledge of Amplitude Modulation, Impulsive & Low Frequency Noise

There are some Acousticians, especially those working in the field of Low Frequency Noise, who were aware of the importance of amplitude modulation and other noise characteristics in triggering “annoyance” symptoms many years ago. One of these experts is Dr Geoffrey Leventhall, UK Low Frequency Noise Expert⁴⁹ and another is Dr Norm Broner, from Australia.⁵⁰

Dr Leventhall told the third Australian Federal Senate inquiry that

“I think that the most important aspect of wind turbine noise-which I said in the paper I published nearly 10 years ago-is the amplitude modulation. Work is now developing on that, and I believe that is where the main answer should be given, in amplitude modulation, because this is what upsets people.”⁵¹

Leventhall was part of a team of researchers in 1997 who reported upon an experiment that used a low frequency noise stimulus, (amplitude modulating at an infrasound rate of 2 Hz), that caused disturbances and annoyance symptoms and adversely affected work performances.⁵² Wind turbine noise modulates at an infrasound rate of around 1 Hz depending on the size of the turbine – at the blade pass frequency.

With respect to wind turbine noise, SONUS specifically acknowledged in a Technical Paper written by them in 2010 that amplitude modulation is an inherent characteristic of wind turbine noise.⁵³

It is therefore curious, and of concern, that there is no mention of Amplitude Modulation with respect to this particular application in SONUS’s Noise Assessment for NEOEN’s proposed Crystal Brook Wind Farm, and no application of the 5 dB penalty. This is even more concerning in the light of the latest important scientific evidence about the way strongly amplitude modulated wind turbine noise is triggering sleep disturbance⁵⁴ and annoyance (wind turbine syndrome) symptoms.

The omission of consideration of amplitude modulation, and avoidance of any discussion about a penalty by SONUS as acoustic consultants to NEOEN is even more concerning when reading the very specific advice from SONUS contained in its Technical Paper to the Clean Energy Council (November 2010) regarding the consequences of adding a 5 dB penalty for amplitude modulation. According to SONUS in 2010,

“A 5 dB(A) penalty is a significant acoustic impost. To reduce a noise source by 5 dB(A) requires either the distance between the source and the receiver to be approximately doubled, or the noise source to reduce its output by two thirds. In wind farm terms, this means the distance between the farm and the nearest dwellings might need to be doubled, or up to two thirds of the total turbine numbers would need to be removed, compared to a wind farm not subject to such a penalty.”

Why has the 5 dB penalty for amplitude modulation been omitted & ignored by SONUS in their Noise Assessment?

⁴⁹ <https://waubrafoundation.org.au/resources/review-published-research-low-frequency-noise-leventhall/>

⁵⁰ <https://waubrafoundation.org.au/resources/bronner-n-effects-low-frequency-noise-people-review/>

⁵¹

<http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;db=COMMITTEES;id=committees%2Fcommsen%2F076b72db-0da0-4ca6-bffe-b0a0cea05550%2F0002;query=id%3A%22committees%2Fcommsen%2F076b72db-0da0-4ca6-bffe-b0a0cea05550%2F0000%22>

⁵² <https://waubrafoundation.org.au/resources/effects-performance-due-lfn-sick-building-syndrome-leventhall/>

⁵³ this document was unavailable on the SONUS or CEC websites as at 28 June, 2018 but was sourced from the AGL website on 28 June, 2018 https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-2.pdf?la=en&hash=D7A399E8E60412ADAAC9C959805C56A626FBE1EC . The document is now also available here:

⁵⁴ http://www.euronoise2018.eu/docs/papers/395_Euronoise2018.pdf

Is it because SONUS and perhaps also GHD / NEOEN were well aware that the wind farm part of this project would not be viable due to the increased distance / removal of turbines that would inevitably be required, based on SONUS's own advice about the consequences of imposing a 5 dB penalty for Amplitude Modulation, to the Clean Energy Council in 2010?

Commentary on Relevant Sections of the Port Pirie Council Development Plan October 2017 (consolidated), and material omissions by SONUS / NEOEN / GHD

EXTRACT from page 51 (59 of electronic version) of the Port Pirie Council Development Plan, 2017 (cons)

"INTERFACE BETWEEN LAND USES

OBJECTIVES

1. Development located and designed to minimise adverse impact and conflict between land uses.
2. Protect community health and amenity from adverse impacts of development.
3. Protect desired land uses from the encroachment of incompatible development.

PRINCIPLES OF DEVELOPMENT CONTROL

1. Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:
 1. (a) the emission of effluent, odour, smoke, fumes, dust or other airborne pollutants
 2. (b) noise
 3. (c) vibration
 4. (d) electrical interference
 5. (e) light spill
 6. (f) glare
 7. (g) hours of operation
 8. (h) traffic impacts.
2. Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality.
3. Development adjacent to a **Residential Zone** or residential area within a **Township Zone** should be designed to minimise overlooking and overshadowing of adjacent dwellings and private open space.
4. Residential development adjacent to non-residential zones and land uses should be located, designed and/or sited to protect residents from potential adverse impacts from non-residential activities.
5. Sensitive uses likely to conflict with the continuation of lawfully existing developments and land uses desired for the zone should be designed to minimise negative impacts.
6. Non-residential development on land abutting a residential zone should be designed to minimise noise impacts to achieve adequate levels of compatibility between existing and proposed uses.

Noise Generating Activities

7. Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant Environment Protection (Noise) Policy criteria when assessed at the nearest existing noise sensitive premises.
8. Development with the potential to emit significant noise (e.g. industry) should incorporate noise attenuation measures that prevent noise from causing unreasonable interference with the amenity of noise sensitive premises."

Specific Omissions from the SONUS Environmental Noise Assessment of key aspects of the Port Pirie Development Plan

SONUS omit any reference to Objective 3 of the Port Pirie Development Plan that is to “*Protect desired land uses from the encroachment of incompatible development.*”

In my opinion, this is precisely the key problem with this proposal to place this wind power facility in this particular location, especially given the proximity to the township of Crystal Brook in the context of such large industrial wind turbines, with as yet unknown but likely significant noise and vibration impacts on the surrounding population. **It is therefore an incompatible development, due to the potential for negative acoustic impacts to a significant population centre as well as surrounding residents, and the consequent potential for harm (including permanent harm) to the health of the surrounding population. This particular development, if approved and built, will inevitably encroach upon existing and desired land uses and users within the likely acoustic impact zone, to their detriment, over the lifetime of this project.**

The likely Acoustic Impact Zone is unknown given the lack of data relating to wind turbines standing 240 metres tall and with a power generation capacity of up to 4.8 MW. However, wind turbines at Waterloo that are 3 MW, and 135 metres tall have an acoustic impact zone of ***at least 10km*** based on existing field research^{55 56 57} and objective acoustic measurements by acoustic researchers operating independently of the wind industry, and independently of the South Australian Environment Protection Authority.⁵⁸

Critical evaluations of the SA EPA’s own Waterloo Noise survey in 2013 presented at an international conference by Steven Cooper and Mrs Mary Morris. The analysis shows a relationship between power generation and annoyance symptoms of residents identical to that found by Cooper at Cape Bridgewater, but also shows repeated errors and omissions in the SA EPA study and data analysis, all of which benefited the wind industry operator at Waterloo, yet again resulting in the SA EPA’s ongoing failure to protect the Waterloo residents from further harm.⁵⁹

By way of further background about the SA EPA, relevant to the lack of regulatory protection Crystal Brook residents can expect to receive if this project is approved, the SA EPA via its officers and employees has demonstrated consistent bias suggestive of regulatory capture in its behaviour (with respect to regulation of wind turbine noise), and an ongoing abject failure to protect the health and sleep of rural South Australians. The first evidence of this was the personal and public attack by the then SA EPA Noise Expert, Valeri Lenchine, on long suffering sleep deprived Mt Bryan farmer Andy Thomas, at a meeting in Port Pirie in September 2010. The SA EPA as an organisation has since shown an arrogant refusal to engage with a number of independent acoustics researchers, and a refusal to conduct acoustic monitoring at severely impacted homes (including wind turbine hosts) and a refusal to answer critical comments in relation to its own work and practices in this field. Evidence of extensive industry influence (via wind industry acousticians) has been obtained under FOI and is now in the hands of relevant current Ministers. One example of this industry influence concerns the suggested alterations to the draft 2008 Wind Turbine Noise Guidelines by a group of wind industry affiliated acousticians including SONUS that in all cases benefiting the wind industry and not protecting South Australian Rural Residents, and a copy of one of these FOI documents is attached for the SCAP members information.

In summary an industrial wind power facility emits audible and inaudible noise and vibration that can detrimentally affect those who live, work, and sleep in its acoustic zone of impact. The size of that zone of impact will depend on the size of the turbines, their power generation capacity, the cumulative impact of multiple wind turbines, the interaction between the turbines and the consequent increase in noise emissions

⁵⁵ <https://waubrafoundation.org.au/resources/evaluation-wind-farm-noise-policies-south-australia/>

⁵⁶ <https://waubrafoundation.org.au/resources/waterloo-wind-farm-survey-2012/>

⁵⁷ <https://waubrafoundation.org.au/resources/morris-m-waterloo-case-series-preliminary-report/>

⁵⁸ <https://waubrafoundation.org.au/resources/hansen-zajamsek-hansen-noise-monitoring-waterloo-wind-farm/>

⁵⁹ <https://stopthesethings.com/2018/01/07/why-pulsing-wind-turbine-noise-causes-nightmares-for-neighbours/>

if wind turbines are located too close together resulting in additional turbulence and therefore noise including intrusive low frequency noise. It will also depend on the topography, the weather, and the wind speed and direction. The effects on individuals will depend upon their risk factors, their exposure doses and the durations of exposure.

The time it will take for the detrimental effects manifest will depend upon individual risk factors and exposure "dose" including noise characteristics during the exposure period, as well as the exposure duration. For example, someone who is previously noise sensitised, or who has pre existing post traumatic stress disorder will be likely to experience adverse effects including activation of the fight flight response or startle reflex within minutes to hours of initial exposure depending on the severity of their noise sensitisation or PTSD, and the strength and duration of the exposure.⁶⁰ For others it may take days, weeks, months, or even years, before the adverse effects correlating directly with exposure are noticed.

The Port Pirie Development Plan clearly states in the section titled "**Principles of Development Control at section 1** that

*"Development should not **detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following**"(bold my emphasis)*

2 (b) noise;

3 (c) vibration; and

7(g) hours of operation

SONUS only refer to noise in the above section of the development plan, and not to **vibration, or hours of operation. These are both material omissions by SONUS, and by NEOEN/GHD.**

Firstly, with respect to noise, the SONUS report infers that compliance with the SA EPA guidelines as per the SONUS modeling predictions will mean there are no adverse impacts for neighbours.

Nothing could be further from the reality for South Australian residents at existing Wind Power facilities, deemed compliant by the SA EPA.

For example, at Waterloo, there have been multiple home abandonments due to severe adverse health impacts, excessive noise and sleep disturbance measured out to nearly 10km. Information about these noise impacts has been captured in numerous pieces of useful field research including the population noise impact surveys of Masters student Frank Wang (2011),⁶¹ Mrs Mary Morris (2012)⁶² included as the only Australian study in the NHMRC Literature Review, the cross over data collected by Mrs Morris immediately after the SA EPA Survey when the wind turbines were off for a week due to a cabling fault⁶³ and acoustic data collected at the same time as the SA EPA Survey by the Adelaide University Research Team⁶⁴ whose detailed report was predictably subsequently ignored by the SA EPA. There are also many examples of testimony from long-suffering Waterloo residents to state and federal parliamentary inquiries and to court cases, describing their experiences in detail.

It is therefore misleading for NEOEN and GHD to use the descriptor / title of Noise **IMPACT** Assessment in the proposal when any discussion about, or data relating to, reported adverse impacts from wind turbine noise,

⁶⁰ see presentation by Laurie, Thorne and Cooper to American Society of Acoustics conference in New Orleans for further information about the existing scientific knowledge <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>

⁶¹ <https://waubrafoundation.org.au/resources/evaluation-wind-farm-noise-policies-south-australia/>

⁶² <https://waubrafoundation.org.au/resources/waterloo-wind-farm-survey-2012/>

⁶³ <https://waubrafoundation.org.au/resources/morris-m-waterloo-case-series-preliminary-report/>

⁶⁴ <https://waubrafoundation.org.au/resources/hansen-zajamsek-hansen-noise-monitoring-waterloo-wind-farm/>

or noise characteristics known to cause adverse impacts such as tonality, low frequency noise, and amplitude modulation, appears to have been carefully avoided in the SONUS report for this project.⁶⁵

SONUS are clearly well aware of reports of adverse impacts from neighbours to wind turbines, and some of the relevant research literature including the study by American population biology scientist and specialist paediatrician Dr Nina Pierpont⁶⁶ that identified some of the risk factors for developing symptoms in response to operating wind turbines. Dr Pierpont's study is specifically mentioned in the SONUS Technical report to the wind industry lobby group the Clean Energy Council in November 2010.⁶⁷

SONUS are also aware that wind turbine noise characteristics include amplitude modulation, tonality and low frequency noise, indeed from the SONUS website it appears that one of the SONUS engineers wrote the SA Environmental Noise Policy 2007.⁶⁸ That Policy specifically includes mention of penalties for amplitude modulation.

So, SONUS clearly know that Amplitude Modulation attracts a penalty with environmental noise, and that wind turbine noise includes Amplitude Modulation characteristics. SONUS stated on p 45 of their 2010 Technical Paper for the Clean Energy Council that:

"Amplitude modulation is an inherent noise character associated with wind farms. It should be noted that the ambient environment modulates in noise level by a significantly greater margin and over a significantly greater time period than that which would be audible from a wind farm at a typical separation distance. Notwithstanding, the South Australian Guidelines (2003 & 2009) note that the objective standards include a 5 dB(A) penalty for this fundamental and inherent character of amplitude modulation."⁶⁹

Regardless of SONUS's failure to acknowledge in 2010 that the amplitude modulated wind turbine noise is also dynamically pulsed at the rate of the blade pass frequency, and that that pulsing does not occur in the natural environment so that comparison with noise in the ambient environment in the above passage is irrelevant and misleading, why has the SONUS report for this development, for NEOEN, failed to apply that penalty for amplitude modulation?

It is my opinion that the explanation lies in the next paragraph of the 2010 SONUS document for the Clean Energy Council.

"A 5 dB(A) penalty is a significant acoustic impost. To reduce a noise source by 5 dB(A) requires either the distance between the source and the receiver to be approximately doubled, or the noise source to reduce its output by two thirds. In wind farm terms, this means the distance between the farm and the nearest dwellings might need to be doubled, or up to two thirds of the total turbine numbers would need to be removed, compared to a wind farm not subject to such a penalty."

It would appear that the failure of SONUS to make any reference to amplitude modulation is precisely because SONUS know that the 5dB penalty would make this proposed wind farm unviable in this location

⁶⁵ <http://www.sonus.com.au/people.html> - see the entry relating to the experience of Jason Turner

⁶⁶ <https://waubrafoundation.org.au/resources/dr-nina-pierpont-submission-australian-senate-inquiry/>

⁶⁷ this document was unavailable on the SONUS or CEC websites as at 28 June, 2018 but was sourced from the AGL website on 28 June, 2018 [https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-\(2\).pdf?la=en&hash=D7A399E8E60412ADAAC9C959805C56A626FBE1EC](https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-(2).pdf?la=en&hash=D7A399E8E60412ADAAC9C959805C56A626FBE1EC)

⁶⁸ <http://www.sonus.com.au/people.html>

⁶⁹ this document was unavailable on the SONUS or CEC websites as at 28 June, 2018 but was sourced from the AGL website on 28 June, 2018 [https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-\(2\).pdf?la=en&hash=D7A399E8E60412ADAAC9C959805C56A626FBE1EC](https://www.agl.com.au/-/media/agl/about-agl/documents/how-we-source-energy/wind_farms/macarthur_2014_update/7_sonus-wind-farms-technical-paper-november-2010-(2).pdf?la=en&hash=D7A399E8E60412ADAAC9C959805C56A626FBE1EC)

because separation distances between wind turbines and dwellings would need to be doubled, or up to two thirds of the wind turbines will need to be removed.

As mentioned previously, the project is on the boundaries of financially viable, as per NEOEN's own admission in Volume 1, p 14, because of the removal of access to land north of the Wilkins Highway and consequent necessary reduction in wind turbines.

Application of the 5 dB penalty would therefore make the project unviable.

SONUS engineers (as members of the AAS) have an overriding ethical obligation to protect the health and safety of the community, above the commercial interests of their clients ie NEOEN. Specifically, as previously stated, the Code of Ethics for the Australian Acoustical Society states that:

"The welfare, health and safety of the community shall at all times take precedence over sectional, professional and private interests" at point 1 under the heading RESPONSIBILITY; and

"Members shall act at all times in a fair and honest manner" at point 5 under REPUTATION.

Given the emerging scientific evidence about the effect of strong amplitude modulation on sleep,⁷⁰ and the fact that strong amplitude modulated wind turbine noise between 30 and 1200 Hz can induce the characteristic "annoyance" (Wind Turbine Syndrome) symptoms with 100% reliability;^{71 72} and admissions made about longstanding knowledge of the consequences of amplitude modulation by acousticians working for the wind industry as experts, this omission from the SONUS report appears to be a good example of unethical, dishonest and deceptive conduct, inconsistent with both of the above requirements of the Australian Acoustical Society's Code of Ethics.

With respect to **Vibration**, SONUS state on their own website that

"Vibration can cause annoyance at levels marginally above the threshold of detection".⁷³

I note that two (names redacted) Sonus Acoustical consultants were part of the group of wind industry affiliated acoustic consultants who advised the SA EPA that they were *"strongly of the opinion that requirement for prediction of vibration to the residences should be removed"*. That appears at section 3.3 in the attached FOI document. As a result, the issue of vibration post construction is not even raised as part of the planning process as per Council Development Plans.

Given that vibration impacts are a problem at some locations for some residents living near wind farms (who are generally ridiculed for raising it as an issue), the issue of vibration doesn't actually get dealt with post construction by the regulatory authorities despite the fact that, as SONUS admit on their own website,

"vibration can cause annoyance at levels marginally above the threshold of detection".

Vibration from wind turbines buffeted by wind gusts is causing additional stress and distress to residents in addition to the audible and inaudible noise and pressure pulse sensations. This is particularly the case at night if beds vibrate whilst they are sleeping, or trying to sleep. Vibration is an issue for some residents at existing Australian and New Zealand Wind Power facilities, including in South Australia, in the mid north, at Waterloo.⁷⁴

⁷⁰ <https://waubrafoundation.org.au/resources/smith-m-g-et-al-physiological-effects-wind-turbine-noise-sleep/>

⁷¹ <https://asa.scitation.org/doi/pdf/10.1121/2.0000653>

⁷² http://www.euronoise2018.eu/docs/papers/395_Euronoise2018.pdf

⁷³ <http://www.sonus.com.au/vibration.html>

⁷⁴ Report from Andreas Marciniak, former Waterloo resident driven from his home because of the adverse effects of noise and vibration in his home, approximately 3km away from the nearest wind turbine (VESTAS V 90, 135 metres high from base to blade tip)

Vibrations through the floor of their home have been perceived by noise-sensitized residents, and have been objectively measured at Cape Bridgewater and correlated with wind gusts **when wind turbines were stationary (ie the blades were not turning)**, and these findings have been publicly reported and presented at an international conference.⁷⁵

Vibration is also reported by residents to occur when wind turbines are operating.

Whether or not vibrations will be an issue for nearby residents to the proposed Crystal Brook Wind Power facility is yet to be determined, but vibration cannot be excluded by SONUS as an issue with the potential to detrimentally affect amenity, or with the potential to cause reasonable interference with the enjoyment of their home.

With respect to **“hours of operation”** wind turbines generate power, and emit noise pollution overnight as well as during the day, so the issue of hours of operation overnight (also omitted by SONUS) is of crucial importance to the sleep, and therefore health and amenity of local residents, and has the potential to cause unreasonable interference.

Indeed unreasonable interference with sleep is the most common problem with wind turbine noise in Australia and internationally. Legally this is a form of noise nuisance, and litigation for noise nuisance has been successful for residents around the world, eg in Ireland (Irish High Court),⁷⁶ in the UK (Julian and Jane Davis),⁷⁷ and the USA (Cary Shineldecker)⁷⁸ but the “win” comes at a significant personal and financial cost, and invariably the settlement agreements include binding non disclosure clauses. Most people simply cannot afford to take this sort of legal action, and the wind industry and regulatory authorities know this. In Falmouth, USA, litigation for noise nuisance was successful in having the turbines turned off.⁷⁹

If there is any doubt about the extent of generation of power from wind turbines overnight at existing Australian Wind Power facilities, the energy generation data from Aneroid Energy will provide useful objective evidence from data taken directly from AEMO.⁸⁰ Much of the power generated at many wind power developments is generated overnight when most people are trying to sleep.

Unlike airports such as Adelaide Airport, there is no effective curfew for wind turbines to prevent noise induced sleep disturbance overnight. Despite widespread and ongoing complaints of sleep disturbance that have been directly and reliably related to wind turbine noise emissions, including in South Australia⁸¹ and including from wind turbine hosts who earn \$200,000 income per annum in lease income,⁸² and despite the new scientific evidence showing that even young fit healthy people will have disturbed sleep when exposed to strongly amplitude modulated wind turbine noise with only short term exposure⁸³ no curtailment of wind

⁷⁵ Report from Melissa Ware, noise-sensitized former Cape Bridgewater resident, and Steven Cooper, independent Acoustic investigator who also perceived the vibration through the floor in Melissa’s home. Melissa presented at the American Society of Acoustics conference in New Orleans, December 2017, as did Steven Cooper

⁷⁶ <https://stopthesethings.com/2016/12/17/irish-high-court-finds-wind-turbine-maker-liable-for-noise-nuisance-7-irish-families-to-get-millions-in-punitive-damages/>

⁷⁷ <https://waubrafoundation.org.au/resources/davis-v-tinsley-noise-wind-farm-settlement-uk-july-2011/>

⁷⁸ <https://stopthesethings.com/2018/01/20/wind-turbine-noise-makes-life-a-living-hell-for-neighbours-michigan-farmers-driven-from-homes/>

⁷⁹ <https://www.lexology.com/library/detail.aspx?g=c7a2e6c7-18ce-469f-987c-00cc2844995d>

⁸⁰ <https://anero.id/energy/wind-energy>

⁸¹ see the epidemiologically powerful cross-over data obtained from Waterloo residents by Mrs Mary Morris, in the period immediately after the SA EPA study, when the wind turbines were not operating for a week, where the resident’s sleep improved dramatically when the turbines were not operating <https://waubrafoundation.org.au/resources/morris-m-waterloo-case-series-preliminary-report/>

⁸² See the testimony of Clive and Trina Gare to the third Federal Senate Inquiry into Wind Turbine Regulation on 10th June, 2015 in Adelaide <https://stopthesethings.com/2015/06/15/sa-farmers-paid-1-million-to-host-19-turbines-tell-senate-they-would-never-do-it-again-due-to-unbearable-sleep-destroying-noise/>

⁸³ <https://waubrafoundation.org.au/resources/smith-m-g-et-al-physiological-effects-wind-turbine-noise-sleep/>

turbine power generation to protect the sleep and therefore health and amenity of neighbours to wind power facilities has ever been ordered by an Australian regulatory authority. Noise investigations are rare, and as the Waterloo residents found, not to be relied upon if conducted by a government authority charged with the responsibility to protect them if it has a very cosy relationship with the wind industry and its acoustic servants.

SONUS have also omitted any reference to section of the Port Pirie Development Plan that states:

“Non-residential development on land abutting a residential zone should be designed to minimise noise impacts to achieve adequate levels of compatibility between existing and proposed uses”

Excessive and sleep disturbing night time noise is currently occurring at existing wind power facilities in South Australia out to distances close to 10km from wind turbines almost half the size of those proposed for the Crystal Brook Wind Farm. **Co-location of large industrial wind turbines close to residences in Crystal Brook and the surrounding area is incompatible with the existing (and future) residents’ requirements for an acoustic environment that enables them to have a good night’s sleep.**

Unfortunately the characteristics of wind turbine noise (including inherent characteristics such as tonality, low frequency noise and dynamically pulsed amplitude modulation) are such that they are very intrusive, and no acoustic treatments have been shown to reliably and fully protect residents inside their homes from the acoustic invasion of this sleep disturbing noise and vibration, even when noise attenuation measures have been installed.⁸⁴ **As a result the requirement for noise attenuation in the Development Plan (under Principles of Development Control - Noise Generating Activities - also omitted by SONUS) cannot be met.**

SONUS make the assumption on page 19 of their report (p 192 electronic version of Vol 2 of GHD/Neoen’s Application) that because “*Table 10 and Appendix G indicate that the wind farm complies with the 2009 Guidelines*” (referring to the SA EPA Wind Farm Noise Guidelines 2009) that this “*therefore satisfies the Development Plan at all dwellings*”.

The decision by Justice White and Deputy President Bean in their judgment dated 4th December, 2017 (three months prior to the date of the SONUS report – March 2018) and the public health debacle at Waterloo Wind Farm and the lack of action by the SA EPA does not support this assertion by SONUS in their report that the Port Pirie Development Plan will be satisfied at all dwellings, merely because SONUS’s noise predictions (without the application of the 5 dB penalty for Amplitude Modulation) come in just under the limits.

Given that the Principal of SONUS Chris Turnbull gave expert evidence in the abovementioned court case for the Charities Commission (ACNC), and given that the judgment was handed down prior to the conclusion of background noise monitoring for this NEOEN project and three months prior to the issuing of this report, it raises the question of why this statement was made by SONUS when it is fair to assume that the Principal of SONUS would have been aware of the judgment. The judgment makes it very plain that the current wind turbine noise regulatory regime in Australia based upon dBA alone does not guarantee protection of the health and amenity of residents and therefore compliance with the 2009 SA EPA Wind Farm Noise guidelines cannot be relied upon to satisfy the Port Pirie Regional Development Plan.

The Omission of any penalty for Amplitude Modulation makes it a certainty that the Development Plan requirements will not be satisfied, and that if approved this Wind Farm will directly cause serious harm to the health and amenity of a non trivial number of neighbours out to distances of at least 10km, and almost certainly significantly further given the height of the turbines and the density of their location.

Finally, what are the acoustic consequences of the revised project layout with respect to

⁸⁴ see for example the detail of Clive and Trina Gare’s evidence to the third Federal Senate Inquiry on 10th June, 2015 in Adelaide where they detail their circumstances, in spite of acoustic noise attenuation treatment having been installed in their home by AGL <https://stopthesethings.com/2015/06/15/sa-farmers-paid-1-million-to-host-19-turbines-tell-senate-they-would-never-do-it-again-due-to-unbearable-sleep-destroying-noise/>

- a) increased size and power generation capacity; and
- b) increased density ie decreased inter turbine separation distances

“To keep the project financially viable after this reduction in turbine numbers, Neoen has slightly increased the density of turbine placement in the south. It has also increased the size of the remaining turbines to a maximum tip height of 240m (due to a greater ‘swept area’ and the ability to access better wind speeds found at higher altitudes, larger turbines significantly improve energy yield and therefore project economics).”⁸⁵ (bold my emphasis)

A) How does increasing size and power generation capacity of Wind Turbines affect Noise?

Neither NEOEN nor SONUS, the acoustic consultants for the proponents have mentioned or taken account of the scientific evidence from Danish Acousticians Professors Henrik Moller, and Christian Sejer Pedersen, using wind industry data from DELTA that **as wind turbine size increases, the proportion of low frequency noise increases, and so, too, the annoyance for neighbours will predictably increase.**⁸⁶

VESTAS then CEO Ditlev Engel successfully lobbied the then Danish Minister for the Environment in 2011 in order to “protect Danish jobs” ie VESTAS profits, by ensuring that the stronger low frequency noise regulations then proposed were weakened, at the expense of Danish rural citizen’s health.⁸⁷ This had the practical effect of permitting larger more powerful wind turbines to harm more people.

Annoyance to humans from Wind Turbine Noise has now been judicially recognised in Australia as a plausible pathway to disease by Justice White and Deputy President of the AAT, Ms Bean.⁸⁸

Annoyance is recognised as an adverse health effect from noise, including from wind turbine noise, by the World Health Organisation.⁸⁹

Why has this important piece of scientific evidence available since 2011 been ignored by SONUS, GHD, and NEOEN as well as the regulatory authorities in Australia?

Why have the SA EPA regulations specifically not been updated to include this information, in order to protect South Australian residents from predictable harm?

B) Inter Turbine Separation Distances and Effects on Noise and Adverse Health Effects via Turbulence

The proposed wind turbine site layout in this revised application does not meet the longstanding and accepted wind industry standard of 5 – 8 rotor diameters inter turbine separation distance. These separation distances are required in order to minimize turbulence and consequent damage to the turbines, and to prevent excessive noise and vibration to neighbours.⁹⁰

NEOEN’s own application (Vol 1, p 14) explains that this increase in density of turbines was **for financial viability reasons after access to the area north of the Wilkins Highway was denied because of the land zoning as “Ranges Protection Zone”.**

“To keep the project financially viable after this reduction in turbine numbers, Neoen has slightly increased the density of turbine placement in the south. It has also increased the size of the remaining turbines to a maximum tip height of 240m (due to a greater ‘swept area’ and the ability to access

⁸⁵ Extract from page 14 of Volume 1 of GHD’s report for NEOEN

⁸⁶ <https://waubrafoundation.org.au/resources/moller-pedersen-low-frequency-noise-from-large-wind-turbines/>

⁸⁷ <http://www.epaw.org/media.php?lang=en&article=pr6>

⁸⁸ <https://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/>

⁸⁹ <https://www.wind-watch.org/documents/development-of-the-who-environmental-noise-guidelines-for-the-european-region-an-introduction/>

⁹⁰ <https://waubrafoundation.org.au/resources/nsw-wind-energy-handbook-2002/>

better wind speeds found at higher altitudes, larger turbines significantly improve energy yield and therefore project economics)." (bold my emphasis)

The NSW Sustainable Energy Development Authority of NSW, the author of the document cited, states, at p 53 that, with respect to wind turbine layout and spacing:

"A wind-farm layout must take into account that turbines have substantial 'wakes', which interfere with each other depending on wind direction and spacing. The general rule of thumb for spacing (the '5r-8r rule') is five times rotor diameter abreast and eight times rotor diameter downwind. On very directional sites the 'abreast spacing' can be decreased by around 15 per cent, but the down-wind spacing is not as variable. Layout geometry can be primarily driven by the need to follow narrow ridgelines or to align arrays across the prevailing wind. On more complex terrain, individual sites need to be carefully evaluated to make best use of the wind resource, so the spacing may be quite variable."

The lack of consideration of the acoustic consequences of increased wake turbulence directly resulting from wind turbines sited too close together in Australia has also been queried at other locations by independent acoustic experts such as Dr Malcolm Swinbanks, and Mr Les Huson. A copy of their correspondence relating to this issue together with inter turbine separation data and their reflections on the lax regulatory regime in Australia is reproduced with their permission in the appendix of the Waubra Foundation submission to the RET review in 2014.⁹¹

Part of Dr Swinbanks correspondence with Les Huson is reproduced below:

"I was just contacted in another context in respect of wind turbine separations that in Australia they do not seem to follow the recommendations.

Two comments follow:

I observed

First, when I worked with a major aero-engine manufacturer, they were extremely concerned about ground testing of prototype engines, where inflow turbulence could compromise the results by as much as 15dB. They have to guarantee engines to very close noise tolerance, otherwise they cannot sell them. So they have to know how to account for these effects, and consequently have years of experience of taking these effects into consideration.

Wind Turbines must be separated by sensible distances, otherwise turbulent wake interaction leads to a reduced fatigue life and reduced operating power output. But the same unsteady forces on the blades lead to increased infrasound and low frequency output, just as the aero engine manufacturers, operating at smaller length scale and higher frequencies, understand.

I believe that Vestas have previously argued that when there is no dominant prevailing wind, they recommend separations of 5 blade diameters. Yet the MacArthur windfarm does not meet this standard.

Entirely by way of example, if average separations are reduced from 5 diameters to 3.5 diameters, it is possible in theory to place 2 times as many turbines on the same area of land.

Twice the number of turbines equals twice the sales revenue and twice the initial payments just for planting a wind turbine.

It may not be quite as extreme as this in practice, but there is clearly a considerable incentive to cut corners in this respect.

⁹¹ <https://waubrafoundation.org.au/resources/renewable-energy-target-review-waubra-foundation-submission-2014/>
CEO Mobile: 61 + 0474 050 463 E: info@waubrafoundation.org.au www.waubrafoundation.org.au

In complete contrast to the aero-engine industry, who must work to vastly higher standards of professionalism and precision, or they will simply go out of business.

I am not in the least surprised that Australia has a disproportionate number of low frequency and infrasound complaints from wind turbines, at large distances. Anyone familiar with the basic principles of aero acoustics and turbulent interaction would expect this if turbine separations are compromised.

Yet Australia has a comparatively small population, in comparison to the available area of landmass. How does a nation with more land per unit population than almost any other country on earth succeed in cramming wind-turbines into a greater density than is even recommended by the wind-turbine manufacturers ?

Malcolm

Why has this crucially important issue of adequate separation distances been ignored, at this and other Wind Power Facilities in Australia, other than for the financial gain of the proponents, and yet again, at the direct expense of the health and sleep of wind turbine neighbours? This is just one example of the lax regulatory environment in which the wind industry operates in Australia – there are many more, only some of which have been outlined previously in this submission.

Systemic regulatory capture at all levels of government across health, planning and noise pollution regulation, and systemic unethical conduct by consultant acousticians employed by the wind industry is the root cause of this and the other problems mentioned above. This is combined with, and illustrated by, a failure at all levels of government to properly investigate noise complaints,⁹² and a failure to address, and prevent them. The regulatory capture is in addition to the misleading and deceptive conduct on the part of the proponents – for example calling the SONUS report a Noise **IMPACT** Assessment when even SONUS did not refer to it in that way.

It is our opinion that the problems are in a large part due to regulatory capture of all levels of government by the wind industry in addition to misleading and deceptive conduct by the wind industry, and unethical conduct by its paid acoustical consultants. The wind industry and its acoustic consultants help write the rules that enable them to directly and intentionally harm rural Australians, for financial gain.

A good example is the cosy coterie acoustic consultants working for the wind industry, including two with SONUS email addresses, who provided feedback to the SA EPA to ensure that the draft 2008 Wind Farm Noise guidelines were edited to remove references to items such as amplitude modulation and vibration, in order to make it easier for wind developers to locate their wind farms close to South Australian residents with consequent financial gain for the proponents, at the direct expense of the health of rural residents, and with the residents unable to easily or effectively challenge the substantially weakened SA EPA Wind Farm Noise Guidelines.

It would appear that each of these acoustic engineers as well as the SA EPA Noise experts involved in ensuring these guidelines were altered to assist the wind industry have ignored their primary duty of care and ethical obligations according to the AAS code of ethics to ensure that ***“The welfare, health and safety of the community shall at all times take precedence over sectional, professional and private interests”***.

A copy of extracts from this FOI document is attached to this submission, so each of the SCA members is made fully aware of the changes to the SA EPA guidelines proposed by these wind industry consultant acousticians.

⁹² See the Waubra Foundation’s submission to the Climate Change Authority (CCA) with respect to the conduct of the National Wind Farm Commissioner (NWFC) (attached). It is not surprising that the CCA did not wish to make our submission public, along with submissions from severely noise-impacted people whose complaints the NWFC had closed without a noise investigation.

I have been advised that this document is also in the hands of the current South Australian Ministers for Energy (Hon Dan Van Holst Pelekaan) and Planning (Hon Stephan Knoll).

A thorough, independent, forensic investigation into the conduct of the South Australian EPA and the external acoustic consultants who have advised it over the last ten years is long overdue.

Overdue, too, is an industry INDEPENDENT, expert review of the current South Australian Wind Turbine Regulatory Regime with respect to both Planning and Noise Pollution Regulation.

In the meantime, anyone who approves a wind farm in the light of the recent judicial rulings and the new scientific evidence runs the risk that they may one day be held personally accountable for the inevitable harm to human health and noise nuisance to neighbours that will follow.

The Foundation issued an Explicit Cautionary Notice exactly seven years ago to planning authorities, amongst others.⁹³ The Notice was drafted by a former Supreme Court Judge of Victoria and then Director of the Foundation Justice Clive Tadjell, the Founder of the Waubra Foundation, and myself and was based on the information then available to us. The warning was prescient then, and even more relevant 7 years later.

The Text of the Explicit Cautionary Notice is as follows:

Explicit Cautionary Notice to Those Responsible for Wind Turbine Siting Decisions

Including Specifically:

- Directors of Wind Developers
- Publicly Elected Officials from Federal, State and Local Government, and
- Bureaucrats in Relevant Departments

Be advised that, as a result of information gathered from the Waubra Foundation's own field research, and from the clinical and acoustic research available internationally, ***the following serious medical conditions have been identified in people living, working, or visiting within 10km of operating wind turbine developments.*** The onset of these conditions corresponds directly ***with the operation of wind turbines:***

- chronic severe sleep deprivation;
- acute hypertensive crises;
- new onset hypertension;
- heart attacks (including Tako Tsubo episodes);
- worsening control of preexisting and previously stable medical problems such as angina, hypertension (high blood pressure), diabetes, migraines, tinnitus, depression, and post traumatic stress disorder;
- severe depression, with suicidal ideation;
- development of irreversible memory dysfunction, tinnitus, and hyperacusis.

Other symptoms include those described by Medical Practitioners such as Dr Amanda Harry, and Dr Nina Pierpont in her landmark Case Series Crossover Peer Reviewed Study (submission No 13 to the Australian Federal Senate Inquiry into Rural Wind Farms) and published in Dr Pierpont's book entitled "Wind Turbine Syndrome, A Report on a Natural Experiment", 2009, published by K-Selected Books, Santa Fe.

These serious health problems were also identified by Australian GP Dr David Iser in 2004. Dr Iser formally notified the Victorian Government of the time after his patients became unwell following the start up of the Toora wind project. His warnings were ignored without being properly investigated by the authorities and politicians.

All this and supportive material has been made available to the Boards of the major developers, State Ministers for Health and Planning and senior health bureaucrats. The time for denial, and of using the Clean

⁹³ <https://waubrafoundation.org.au/about/explicit-cautionary-notice/>

Energy Council to shoulder the increasingly difficult task of denying the link between adverse health and operating wind turbines, is over.

At the Toora and Waubra wind projects, some seriously ill affected residents have been bought out by the developers; but only after they signed confidentiality agreements specifically prohibiting them from speaking about their health problems. This buy-out activity would support a conclusion that developers are aware of the health problems.

Meanwhile, wind developments have continued, with developers asserting that their projects meet acceptable standards, and thereby implying that they cannot be causing health problems.

The Foundation is also concerned that Vibroacoustic Disease, as recorded and described by Professor Mariana Alves-Pereira's team from Portugal, will develop in people chronically exposed to wind turbines. The disease has already been identified in the occupants of a house with levels of infrasound and low frequency noise identical to levels the Foundation is recording in the homes of affected residents in Australia.

The Foundation is aware of over 20 families in Australia who have abandoned their homes because of serious ill health experienced since the turbines commenced operating near their homes. Most recently, five households from Waterloo in South Australia have relocated, where the larger 3 MW turbines have had a devastating impact on the health of these residents. Some of these people have walked away from their only financial asset, to live in a shed or a caravan on someone else's land.

The Foundation notes the mid-2010 advice from the National Health and Medical Research Council that a *"precautionary approach"* be followed. We are not aware that either industry or planning authorities have adopted this exceedingly valuable and important advice.

The Foundation's position, as the most technically informed entity in Australia upon the effects of wind turbines on human health, is this:

Until the recommended studies are completed, developers and planning authorities will be negligent if human health is damaged as a result of their proceeding with, or allowing to proceed, further construction and approvals of turbines within 10km of homes. It is our advice that proceeding otherwise will result in serious harm to human health.

We remind those in positions of responsibility for the engineering, investment and planning decisions about project and turbine siting that their primary responsibility is to ensure that developments cause no harm to adjacent residents; and, if there is possibility of any such harm, then the project should be re-engineered or cancelled. To ignore existing evidence by continuing the current practice of siting turbines close to homes is to run the dangerous risk of breaching a fundamental duty of care, thus attracting grave liability.

The Waubra Foundation, 29 June, 2011.

There is now independent objective scientific and acoustic evidence that fully supports the Waubra Foundation's position in the Explicit Cautionary Notice in June 2011, and it is therefore now much easier for adversely affected individuals to start to hold those responsible to account. That process of holding some of the various responsible parties to account is starting to occur in litigation currently before the Supreme Courts of NSW, Victoria and South Australia.

Yours sincerely



Sarah Laurie
CEO Waubra Foundation
Bachelor Medicine, Bachelor Surgery, Flinders University 1995

Attachments

1. Correspondence between an unnamed Acoustic consultant from Bassett Acoustics to the SA EPA with an attachment of suggested alterations from a South Australian group of consultant acousticians to the then draft SA EPA Wind Turbine Guidelines 2008 to avoid mention of amplitude modulation (4.7), remove reference to vibration (3.3), and other changes generally benefiting the wind industry.
2. Dr Bob Thorne's Review of the SONUS Environmental Noise Assessment for the NEOEN Proposal for the Crystal Brook Wind Farm, commissioned by Ian Peterson, 20th June, 2018
3. Waubra Foundation's recent submission to the Climate Change Authority regarding the conduct of the National Wind Farm Commissioner with respect to his failure to ensure noise complaints were appropriately acoustically investigated. The Climate Change Authority recommendation was that state authorities follow up on noise complaints... ignoring the fact that the reason the Commissioner's position was established was to ensure that the residents noise complaints were acted upon as the state authorities were failing to act.



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13th April, 2018

WAUBRA FOUNDATION SUBMISSION TO THE CLIMATE CHANGE AUTHORITY REVIEW OF THE WIND FARM COMMISSIONER

Terms of Reference of CCA Review

The review must consider the following questions (as per the Minister's letter to the Chair of the CCA on 6th March 2018 ¹ :

- *To what extent is the role of the National Wind Farm Commissioner fulfilling the terms of reference (attached), including:*
 - *Working collaboratively with all levels of government, scientists, industry and the community to resolve complaints from communities about proposed and operational wind farms;*
 - *Referring complaints about wind farms to relevant state authorities and help ensure that they are properly addressed;*
 - *Leading efforts to promote best practices, information availability, and provide a central trusted source for dissemination of information?*
- *Should the role of the National Wind Farm Commissioner continue beyond the initial period of three years?*
- *Should the scope of the National Wind Farm Commissioner's role be expanded to other large scale renewable energy projects, such as solar and storage?*
- *What options are available to fund any ongoing role for the Wind Farm Commissioner?*

The Terms of Reference for the Wind Farm Commissioner ² included the following:

The negotiated settlement of the Renewable Energy Target in mid-2015 is expected to lead to increased construction of wind turbines in the next five years.

The Senate Select Committee on Wind Turbines, held during 2015, identified many issues of concern relating to the standards, monitoring, and operation of wind farms.

1

<http://www.climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/2018%20Review%20NWFC/Terms%20of%20Reference.pdf>

2

<http://www.climatechangeauthority.gov.au/sites/prod.climatechangeauthority.gov.au/files/files/2018%20Review%20NWFC/Terms%20of%20Reference.pdf>

The Government responded positively to the recommendations of the Committee's Interim Report, including the creation of the role of a National Wind Farm Commissioner.

The Commissioner will work collaboratively with all levels of government, scientists, industry and the community to resolve complaints from the communities about proposed and operational wind farms. The Commissioner will refer complaints about wind farms to relevant state authorities and help ensure that they are properly addressed.

The Commissioner will work with stakeholders to identify needs and priorities for monitoring wind farms.

The Commissioner will lead efforts to promote best practices, information availability, and provide a central trusted source for dissemination of information.

The Commissioner, supported by the Australian Government Department of the Environment, will report to the Minister for the Environment and provide an Annual Report to the Australian Parliament on delivering against these Terms of Reference.

The work of the Commissioner will not duplicate or override the important statutory responsibilities of other jurisdictions, such as those relating to the planning and approval of wind farms.

The Commissioner is to draw on the work of the Independent Scientific Committee on Wind Turbines.

Background to the Waubra Foundation's submission

The Waubra Foundation is a charity registered with the Australian Charities Not For Profit Commission (ACNC)³ with the charitable purposes of "advancing health" and to "promote or oppose a change to law, government policy or practice". Our objectives are "to promote human health and well being through the prevention and control of diseases and other adverse health effects due to industrial sound and vibration, and to promote and protect human rights where those human rights are, or may be, adversely affected because of industrial sound and vibration".⁴

We were established in 2010, and since then have worked collaboratively with industry independent, ethical, acoustic and psychoacoustic researchers, in order to provide support to noise nuisanced members of predominantly rural communities who approach us for information and assistance. These noise sources have included open cut and underground coal and gold mines, coal seam gas extraction and transportation facilities, power generation facilities including gas and coal fired power stations, and noise from operating industrial wind power facilities, with multiple individual wind turbines, commonly known as wind "farms".

Our work in this area **across a range of industrial noise sources** has recently been recognised by the Administrative Appeals Tribunal, who amongst other things in their decision also recognised that the current regulatory framework for wind turbine noise based on dBA alone, that ignores low frequency noise, does not protect people, that there is field evidence of measured wind turbine noise levels exceeding limits known to induce noise annoyance, and that wind turbine noise can be a pathway to disease, including cardiovascular diseases, via noise annoyance.⁵

The regulatory context in which these often severely noise nuisanced residents who seek our help find themselves can be broadly summarized as follows:

³ <https://www.acnc.gov.au/RN52B75Q?ID=B17A5108-A8C0-40F7-A4D2-4CC0495E757D&noleft=1>

⁴ <https://waubrafoundation.org.au/about/objectives/>

⁵ <https://waubrafoundation.org.au/resources/aat-decision-reasons-waubra-foundation-vs-acnc-dec-4-2017/>

- **There is limited acknowledgement, by some state health authorities, that noise pollution, including low frequency noise, and including wind turbine noise, is or could be a public health problem, because of the known, accepted, adverse effects of chronic noise exposure on sleep and stress.** These adverse impacts are worse if people are at the extremes of age, have underlying physical or mental health conditions, or have specific risk factors including motion sickness, migraines and inner ear pathology. **Some state health authorities (QLD⁶ and Victoria⁷) have acknowledged the important issue of low frequency noise sensitivity and noise sensitization in individual reactions to noise, an issue of particular relevance to wind turbine noise.** Noise sensitisation relates to the scientific observation that people do not “get used to” or “habituate” to noise with certain characteristics (impulsiveness / pulsing) – **rather they become increasingly sensitive, resulting in a lowering of their thresholds of perception with ongoing exposure.**⁸
- **There is widespread ignorance** about the known and serious adverse health effects of noise and vibration **amongst treating health practitioners**, with some notable exceptions. This is in part understandable because of the workload demands on busy rural medical practitioners, and in the context of wind turbine noise specifically, a very active product defence campaign, reminiscent of that used by Big Tobacco, and James Hardie, despite admissions about wind turbine noise made by wind turbine manufacturers such as VESTAS.⁹
- **There is widespread regulatory failure on the part of noise pollution control authorities**, who are state based and located in cities with few (if any) regional offices, and who have a track record of working very closely with noise polluters and their consultant acousticians, including to write “guidelines” and regulations but who in almost all instances abjectly fail their statutory duty of care and ethical obligations to protect the health and wellbeing of residents. If they were protecting residents they would ensure that genuinely industry independent full spectrum noise investigations occur, consistent with the latest scientific evidence, and would take prompt and effective subsequent action to address identified problems. Instead, noise “investigations” (if they occur at all) are almost always carried out under the control, and direction, of noise polluters. Residents (regardless of the noise source) consistently report that activity and noise levels during the monitoring period are not representative of what they usually have to endure, and that conditions revert back to “normal” when the acoustic monitoring equipment is removed. This situation has understandably led to longstanding and deep distrust of noise pollution regulatory authorities, and contempt for industry acoustic consultants who are regarded, rightly, as “guns for hire” rather than independent professionals abiding by their code of ethics.

Accordingly, in this regulatory and ethical vacuum, where for nearly eight years the Foundation has observed the legal and human rights of these vulnerable and sick Australians being regularly and systematically being ignored by government authorities as well as noise polluters, our activities have included responding directly to residents’ specific requests for information, support and assistance, regardless of the noise source. We actively encourage noise nuisanced residents to collect their own scientifically objective, and where possible legally admissible evidence, of their acoustic exposures, either by employing their own acoustic consultants if they

⁶ https://www.health.qld.gov.au/_data/assets/pdf_file/0027/428634/report.pdf

⁷ <https://waubrafoundation.org.au/wp-content/uploads/2013/05/Wind-farms-sound-and-health-Technical-information-WEB-29April2013.pdf>

⁸ <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>

⁹ <https://waubrafoundation.org.au/resources/australian-environment-foundation-what-vestas-knew-and-when/>

can afford to do so, or by purchasing their own acoustic recording and monitoring equipment and learning how to use it, where possible with industry accepted technical qualifications.¹⁰

We have also encouraged people to keep detailed diaries of their responses to those acoustic exposures via detailed environmental noise exposure diaries,¹¹ and by the use of concurrent personal physiological monitoring devices if symptoms such as **repeated rapid acceleration of heart rate** and **sleep disturbance** are reported by them. We encourage this particular data collection because these specific symptoms are increasingly being recognised as examples of activation of the startle reflex response (an involuntary sympathetic nervous system reaction to acoustic, pressure and vestibular stimuli). Repeated activation of the startle reflex in mammalian studies (with impulsive noise vs slow rising noise at the same dB level as the acoustic stimulus) has been demonstrated to lead to noise sensitization.¹²

A notable example of this startle reflex (aka fight flight response) reaction to amplitude modulated wind turbine noise now in the public domain is that of a NSW couple, previously noise sensitized to coal mining extractor fan and coal fired power station noise near their home, who subsequently reacted suddenly, and powerfully, to wind turbine noise at Taralga, in rural NSW with only transient exposure whilst attending a public toilet on their way home. In that instance amplitude modulated sound from the nearby wind turbines was detected precisely where this reaction occurred, and their symptom reports were not only witnessed, but the rapid activation of the sympathetic nervous system was confirmed with objective physiological data captured on the biological monitoring showing a sudden rapid acceleration of heart rate.¹³

It is not surprising to us that the wind industry via its acoustic consultants and other well known product defenders has attempted to discredit this Taralga physiological data, in part by discrediting the researchers who collected it alleging ethical breaches by those researchers, and by also asserting that it was unthinkable that wind turbine noise could be responsible for these symptoms, despite the fact that this pattern of symptom occurrence is regularly publicly reported by noise sensitized residents. This sort of objective physiological and acoustical scientific data is very damaging to those who deny there is (or could be) a direct causal link between reported symptoms and (amplitude modulated) wind turbine noise, despite admissions by UK based, wind industry consultant acoustician Dr Geoffrey Leventhall in his evidence to the 2015 Senate Inquiry that it is amplitude modulation that “upsets people” (evidence given on 23 June, 2015 in Canberra in response to a question from Senator John Madigan, chair of the inquiry about whether Leventhall supported full spectrum acoustic investigations inside homes). The extract from the Official Hansard is reproduced immediately below:

CHAIR: What sort of research do you think is now required as a priority? Do you support the detailed investigation of the full acoustic spectrum inside affected residents' homes, together with concurrent physiological testing of their brainwaves, heart rate, blood pressure and stress biomarkers?

Dr Leventhall: I think that the most important aspect of wind turbine noise—which I said in the paper I published nearly 10 years ago—is the amplitude modulation. Work is now developing on that, and I believe that that is where the main answer should be given, in amplitude modulation, because this is what upsets people. Personally, I do not believe that the infrasound and the low-frequency noise are an important problem, but because of the public and political pressure, it is inevitable that some work will be done on that. Work inside residences is obviously more important than work outside residences.

¹⁰ <http://www.acoustar.qld.edu.au/noise-measurement.html>

¹¹ <https://waubrafoundation.org.au/information/residents/journals/>

¹² <https://waubrafoundation.org.au/resources/laurie-thorne-cooper-startle-reflex-sensitisation/>

¹³ <https://waubrafoundation.org.au/resources/rapley-et-al-case-report-cross-sensitisation-infrasound-low-frequency-noise/>

This denial of any link between noise induced stress resulting in adverse health effects by industry associated acousticians and noise pollution regulatory officials is increasingly untenable from a clinical perspective with the increasing clinical recognition that acute severe stress resulting in adrenaline surge pathology such as Tako Tsubo cardiac events can indeed be induced by noise,¹⁴ as well as epileptic seizures,¹⁵ drowning and hanging,¹⁶ and severe infections.¹⁷ Importantly there is increasing clinical recognition that the originating stress resulting in Tako Tsubo events can be neurological or physiological, as well as emotional.¹⁸

In other words, in lay terms, acute severe stress, including from noise, is resulting in the release of large quantities of adrenaline. This excess of adrenaline can in turn induce Tako Tsubo heart events that are potentially fatal. Such events have been reported to the Foundation, including in young people, at both coal mines in the Hunter Valley Region, and at industrial wind power developments.¹⁹ Other researchers including Engineer Bill Palmer from Ontario have also reported clusters of unexpected sudden cardiac deaths in residents exposed to wind turbine noise in rural Ontario, and queried whether the wind turbine noise exposure could have been a factor.²⁰ It is certainly possible that some of these deaths were due to Tako Tsubo events.

With respect to the subject of ethics, we note in particular that the Australian Acoustical Society has as its first item in the code of conduct that "***the welfare, health and safety of the community shall at all times take precedence over sectional, professional and private interests***".

It is the Foundation's view that our role would be limited to facilitating independent research into the as yet unanswered scientific questions, rather than encouraging residents to obtain their own independent acoustic monitoring data if all acousticians as a profession, including particularly those working for noise pollution regulatory authorities, were indeed operating ***at all times*** in accordance with their code of ethics.

With respect to wind turbine noise specifically, Australian Research Council funded wind turbine noise researcher, Emeritus Professor Colin Hansen has made some pointed comments with respect to the issue of the lack of ethics within his profession, with respect to wind turbine noise.^{21 22} We are clearly not alone in our concerns about the conduct of acousticians in Australia.

What are at issue are repeated breaches of an increasing number of Australians' fundamental human and legal rights with respect to protection from health damaging noise pollution. The fundamental right to attain the best possible physical and mental health (enshrined in six out of seven of the UN instruments to which Australia is a signatory) is impossible to achieve, even for

¹⁴ <https://academic.oup.com/eurheartj/article/37/37/2844/2469940>

¹⁵ <https://www.radcliffecardiology.com/articles/life-threatening-takotsubo-cardiomyopathy>

¹⁶ [http://www.iccjournals.org/article/S0883-9441\(15\)00465-7/pdf](http://www.iccjournals.org/article/S0883-9441(15)00465-7/pdf)

¹⁷ <https://www.sciencedirect.com/science/article/pii/S2210833514001245>

¹⁸ <https://www.radcliffecardiology.com/articles/life-threatening-takotsubo-cardiomyopathy>

¹⁹ <https://wauabrafoundation.org.au/resources/acoustical-society-america-conference-2015-wauabra-foundation-presentation-notes/>

²⁰ <http://www.imedpub.com/articles/why-wind-turbine-sounds-are-annoying-and-why-it-matters.pdf>

²¹ <https://wauabrafoundation.org.au/resources/hansen-c-whats-our-ethical-responsibility/>

²² <https://wauabrafoundation.org.au/resources/hansen-c-collateral-damage-engineering-ethics-and-wind-farms/>

people in excellent physical health with no underlying risk factors, if they are chronically subjected to uncontrolled, unregulated, excessive noise with noise characteristics resulting in sleep disturbance, stress and progressive noise sensitization.

This health damage is precisely what is currently occurring in Australia, in the context of wind turbine noise as well as other industrial noise sources – and there is a significant volume of evidence now in the public domain from both noise impacted people and independent researchers. It was in part for this very reason that the position of National Wind Farm Commissioner was created – due to the evidence obtained during the third Federal Senate Inquiry chaired by Senator John Madigan, dealing with the issue of wind turbine noise and its regulation. Similar evidence was provided in our AAT case, previously mentioned, where the judges accepted that wind turbine noise could be a pathway to disease, including cardiovascular disease.

Please note in the context of this submission that noise is defined as “unwanted sound” and can be inaudible, and that Australian Acoustician Steven Cooper’s latest research has demonstrated that noise sensitized people react with 100% accuracy to amplitude modulated inaudible wind turbine recorded sound to which they are blinded, in a recent prospective, case control study, reported at the American Society of Acoustics Conference in New Orleans in December 2017, three days after the AAT decision was delivered. This laboratory research, at last, provides clear evidence of a direct causal link between inaudible sound and the precise symptoms and sensations reported by residents living near a range of industrial developments, including wind turbines, when these previously “normal” people are exposed to amplitude modulated sound.

I have been advised by Mr Cooper that the National Wind Farm Commissioner has been made aware of this groundbreaking research. Mr Cooper’s work in this area is being increasingly recognised by his international peers, and he is an invited speaker to the Euronoise conference in Crete in June 2018.

Finally, with respect to the obligations of Australian Federal Public Servants to protect the human rights of Australian citizens I note the following requirements, laid out in the APS Values and Code of Conduct in Practice.²³ (bold emphasis mine)

*Employees of the Australian Public Service (APS) **occupy a position of trust**. They are entrusted by the Government and the community to undertake important work on their behalf. **With this trust comes a high level of responsibility which should be matched by the highest standards of ethical behaviour from each APS employee.***

*Together the APS Values, the APS Employment Principles and the APS Code of Conduct **set out the standard of behaviour expected of agency heads and APS employees. They provide the public with confidence in the way public servants behave, including in their exercise of authority when meeting government objectives.***

The Public Service Act 1999 (PS Act) requires APS employees and agency heads at all times to behave in a way that upholds the APS Values. Agency heads and Senior Executive Service employees must also promote the Values. All employees must inform themselves of their obligations under the PS Act.

²³ <http://www.apsc.gov.au/publications-and-media/current-publications/aps-values-and-code-of-conduct-in-practice>

The conduct of public servants, both inside and outside the workplace, can have implications for the confidence the community has in the administration of an agency or the APS as a whole. This guide is structured around the three professional relationships that are a central part of work in the public service: relationships with the Government and the Parliament; with the public; and with public service colleagues.

Further scrutiny of the APS requirements and values reveals that public servants must be ethical, accountable and respectful.²⁴ Extracts from each of those sections are reproduced below.

Ethical

2.2.7 The Ethical Value provides for an APS that demonstrates leadership, **is trustworthy, and acts with integrity in all it does.**

2.2.8 The Directions about this Value **require APS employees to comply with all relevant laws, appropriate professional standards and the APS Code of Conduct.** Employees must act in accordance with government policy and decisions. An employee's actions must also comply with the law. [7]

2.2.9 The law can sometimes be complex. The work of public servants may be subject to many different statutes, regulations, other legislative instruments and other rules. Employees should ensure they know and understand the laws that are relevant to their duties.

2.2.10 **When working with the public, employees must follow through on commitments made and must be able to demonstrate that they have acted with honesty and integrity. Employees are expected to act in the right way, as well as the technically and legally correct way.**

2.2.11 The Directions about this Value also require employees to provide leadership in policy development, implementation and program management. This requirement is relevant to consultation with the community on these matters.

Accountable

2.2.17 The APS is open and accountable to the Australian community under the law and within the framework of ministerial responsibility.

2.2.18 The Directions about this Value **require APS employees to be open to scrutiny and transparent in decision-making. They should be able to demonstrate that actions and decisions have been made with appropriate consideration. Employees should be able to explain actions and decisions to the people affected by them.**

Employees are accountable for their actions and decisions through statutory and administrative reporting systems.

2.2.19 One of the ways in which employees contribute to the proper functioning of government is by making decisions that comply with policy and law. This applies both in the management of programs and in deciding individual cases. Decisions that may affect the rights and entitlements of people may be subject to the requirements of administrative law.

Respectful

2.2.12 The Respectful Value provides for an APS that respects all people, including their rights and their heritage.

2.2.13 The Directions about this Value require APS employees to treat all people with dignity, recognising that all people have value. **They should deal with all people honestly and with integrity. Employees should recognise the importance of human rights and understand Australia's human rights obligations,** and comply with all relevant anti-discrimination laws. They should recognise and foster diversity and be open to ideas in policy development, implementation, program management and regulation.

2.2.14 An awareness of, and sensitivity to, the diversity of the Australian community is important to achieve quality advice and service provision. It ensures different perspectives are brought to bear on decision-making. Good policy and program delivery is responsive to the needs and interests of different community groups.

2.2.15 Consultation with the community and business sectors is critical to policy development and program design. Different perspectives promote innovation and can produce new ideas. Good policy requires a thorough understanding of the issue to be addressed and the impact any policy proposals would have on stakeholders. **Governments are rarely able to impose policy solutions in isolation, and the success of resultant programs is dependent to a large extent on the ability of government to mobilise wide community support.**

It is therefore through the broader lens of the current regulatory context for noise pollution in Australia, with the background of specific concerns about the failure of ethical behaviour of acousticians resulting in breaches of legal common law rights to live in one's home without being

²⁴ <http://www.apsc.gov.au/publications-and-media/current-publications/aps-values-and-code-of-conduct-in-practice/the-public>

noise nuisanced, and breaches of fundamental human rights to attain the best possible physical and mental health, in addition to the specific code of conduct for Australian Public Servants and relevant values, as well as the narrower terms of reference of this particular review, and the terms of reference for the Wind Farm Commissioner's work that we look at the track record of the National Wind Farm Commissioner (NWFC) and his office.

Direct Involvement with the NWFC

As CEO of the Foundation, I have had very limited direct involvement with the NWFC. At the suggestion of the member for Wannon, Dan Tehan, I met with the NWFC in December 2015 in a café in Melbourne. Whilst the Commissioner gave the appearance of listening to what I had to say, he was also at times busy acknowledging people he knew. The NWFC promised at that meeting to arrange a meeting for me with members of the Independent Scientific Panel, but no such meeting was ever subsequently arranged.

I was concerned at the time of the meeting that neither the Commissioner, nor those who appointed him, were genuinely interested in establishing what the precise acoustic exposures of noise impacted residents were, which should be the starting point for any valid investigation of a noise complaint at an existing wind farm. There was no budget for industry independent noise monitoring, and my direct knowledge of the historical behaviour of state based regulatory authorities on the issue of wind turbine noise in New South Wales, Victoria and South Australia gave me no confidence that referrals by the NWFC (if they ever occurred) would be properly conducted. I am not aware of any noise investigations having been conducted at the instigation of the Wind Farm Commissioner – either by regulatory authorities or by consultant acousticians and would be interested to know if they have occurred, what the outcomes were, and what the publicly available information about any such investigations might be.

I was also concerned that there could have been an agenda to “shut down complaints and complainants” by a variety of means including the use of a type of non disclosure agreement under the guise of “privacy” by the Office of the Commissioner itself, as has happened. This behaviour is not consistent with the transparency requirement in the APS code of conduct. In addition I had multiple reports from various residents at proposed wind farms of the Commissioner encouraging the use of non disclosure agreements by the wind industry including particularly the so called “good neighbour agreements” in advance of wind turbine developments being approved or built. An example of such an agreement is the Trustpower Neighbour Deed written by Trustpower Australia Holdings Ltd for residents at the Palmer Wind Farm.²⁵ Such agreements legally bind those who sign them, and in particular may prevent the subsequently noise impacted resident from complaining to a regulatory authority about a subsequent noise nuisance problem. Such agreements are sometimes referred to by wind industry supporters as “community benefit sharing” but in effect are “shut up” agreements which allow fundamental abuses of human rights to subsequently occur especially if vulnerable people are effectively bullied into signing them. This situation is of concern particularly when those people have been falsely reassured that “there are no health problems from wind turbine noise” and do not have the personal capacity to do their due diligence. These non disclosure agreements are also commonly part of property buy out agreements when the wind industry are forced to purchase the properties of noise affected residents – multiple former residents at Toora (confirmed by a Slater & Gordon employee in a letter to the Australian) and Waubra Wind Farms in Victoria (eg Trish and Victor Godfrey) being historic examples in the public domain.

²⁵ <https://waubrafoundation.org.au/resources/neighbour-deed-palmer-wind-farm-south-australia/>

I have since listened with increasing concern to numerous private reports from rural residents and others including industry independent acousticians and health professionals who have interacted with the NWFC since that original meeting. Examples of situations where I was not specifically requested by those sharing them with me to keep those details confidential are listed below.

1. I was contacted by a number of severely chronically wind turbine noise affected Waubra residents who met with the NWFC in a pre arranged meeting, but who were not allowed by the NWFC to have independent observers at that meeting. The NWFC drove up from Melbourne with the wind farm senior representative. This alone was cause for concern with respect to the perception of the lack of independence of the NWFC. Other concerns were expressed about the attitude of the NWFC during the course of that meeting. After the meeting, the residents were understandably cynical about how useful the NWFC would be in helping them resolve longstanding and ongoing noise complaints with the operator, Acciona, and the failure of the duty of care of the noise pollution regulatory authority being the Victorian Department of Planning. I was subsequently told that some residents were so disgusted with what they saw during that meeting that they did not see any point in lodging a formal complaint with the NWFC, and that other residents who did lodge complaints with the NWFC had their complaints closed by him with no action with respect to the noise nuisance they had complained of. This behaviour by the NWFC would appear to be in potential breach of multiple areas of the APS code of conduct and stated values and certainly led to a breach of trust by those residents.
2. I note that in a newspaper article in the Ballarat Courier published on 17th January, 2018²⁶ that the NWFC was quoted as saying that of the 55 complaints lodged by residents at existing wind farms that 53 complaints had been closed. Given that many of those complaints were reported to include noise complaints, and that no independent noise investigations appear to have been conducted to thoroughly investigate those complaints, I question the factual basis on which those complaints relating to noise and vibration have been closed.
3. In that same newspaper article the NWFC was quoted as saying the following:

“Andrew Dyer, whose tenure as commissioner runs out in November 2018, said the vast majority of complaints came from wind farm proposals rather than operating sites. He said the bulk of complaints continued to be concerns around noise, with illness-related queries declining as more turbines appear.

If residents are increasingly being encouraged to sign good neighbour agreements, that prevent them from complaining to anyone including the NWFC about the subsequent noise impacts, then that could also explain the alleged “illness-related queries declining”. Another explanation could be that noise affected people do not trust the NWFC, and regard him and his office as a waste of time and effort, because they are aware of others who have put extensive effort into lodging complaints only to have the NWFC dismiss them by simply closing their case and saying insufficient evidence has been provided to substantiate their claims. I am aware of numerous severely noise affected people from NSW, Victoria and South Australia who individually decided against lodging complaints for that reason.

The Ballarat Courier article goes on to state the following:

“Like any change, whether it’s mobile towers, smart meters or wind turbines, there’s going to be a period of time for communities to get used to them,” Mr Dyer said. “People have real or

²⁶ <https://www.thecourier.com.au/story/5172866/why-people-arent-complaining-about-wind-farms-anymore/>

perceived fear of any new technology, but if there was a systemic issue (with wind-related illness) there would have been trends by now.”

With respect to Mr Dyer’s claim that residents are “getting used to” the wind turbines, there is no scientific evidence that people who become noise sensitized to wind turbine noise can then “get used to” or habituate to the noise. On the contrary, the scientific and acoustic evidence suggests that once noise-sensitized, people will only improve once they are removed from the noise source, and their exposure is reduced. This statement by the NWFC is not only factually incorrect, it is also inconsistent with the APS values of honesty and using the best available (scientific) evidence, rather than propaganda manufactured by wind industry product defence teams.

With respect to Mr Dyer’s claim again in the same newspaper article that “*if there was a systemic issue (with wind-related illness) there would have been trends by now*” I refer the CCA review team to the paper by PhD candidate Eric Zou,²⁷ analyzing suicide rates using a very large data set from multiple independent credible sources including the Centre for Disease Control (CDC), that showed a statistically significant increase in suicide rates corresponding with sleep disturbance and wind direction, suggesting that wind turbine noise related adverse effects on sleep could indeed be a serious systemic problem, with fatal outcomes. Sleep disturbance has been widely reported by wind turbine noise affected residents, and has been confirmed on numerous occasions as an issue by experienced Sleep Physicians such as Dr Wayne Spring, and in the UK, Dr Chris Hanning in addition to local treating doctors such as Dr David Iser from Toora in Victoria in 2004, well before the Waubra Foundation was established six years later. Recent Swedish laboratory research has demonstrated that strongly amplitude modulated wind turbine noise can induce sleep disturbance even in fit young healthy study participants. Chronic sleep disturbance regardless of the cause is widely and increasingly acknowledged to be a major contributor to serious longterm adverse health effects for both physical and mental health – a fact acknowledged in the recent AAT Court decision previously mentioned. The failure of the NWFC to publicly acknowledge that sleep disturbance in the context of wind turbine noise exposure is a serious and growing issue in the community that must be dealt with, and prevented, in order to protect the fundamental human and legal rights of rural residents, is indicative of whose financial interests this particular NWFC is working so hard to protect.

4. Multiple residents have informed me that the NWFC had told them that the Foundation was scaremongering, and that there was no evidence of any adverse health effects from wind turbine noise. In addition, a South Australian then shadow Minister and now Minister in the new South Australian government led by Premier Steven Marshall told me that the NWFC had told him that there was no evidence of adverse health effects from wind turbine noise. This statement is factually incorrect. Honesty is one of the requirements of the APS. I have no reason to doubt these consistent accounts from multiple sources.

With respect to the terms of reference for the review as listed by the Minister, I make the following comments (in red).

- *To what extent is the role of the National Wind Farm Commissioner fulfilling the terms of reference (attached), including:*

²⁷ the paper by Eric Zou, and a critique of it by Dr Nina Pierpont are available here: <http://en.friends-against-wind.org/health/pierpont-re-zou-wind-turbine-syndrome>

- Working collaboratively with all levels of government, scientists, industry and the community to resolve complaints from communities about proposed and operational wind farms; *with respect to complaints about noise and vibration, in the absence of objective and competent evidence based, industry independent, investigation of the acoustic exposures, conducted in a manner consistent with the AAS code of ethics, and incorporating the very latest scientific evidence, I do not understand how the NWFC can resolve such noise complaints, nor do I understand how this can be considered consistent with the various provisions of the APS code of conduct.*
- Referring complaints about wind farms to relevant state authorities and help ensure that they are properly addressed; *I am unaware of any investigations by state based authorities, and in any case, given their track records I have no confidence in their ability to conduct such measurements free from interference and undue influence from the wind industry and political pressure. The result is always the sacrifice of the legal and human rights of noise impacted residents, many of whom do not have the financial resources to pursue legal remedies, a fact well known to the industry and the regulators. This result is contrary to the APS code of conduct.*
- Leading efforts to promote best practices, information availability, and provide a central trusted source for dissemination of information? *I have direct knowledge that the NWFC has provided misleading information to politicians and noise affected and concerned rural residents, as reported to me by those individuals. The failure of the NWFC to take notice of important scientific developments and instead to publicly pedal wind industry propaganda that people “get used to” the noise as per the media report in the Ballarat Courier provides direct evidence of his abject failure in this particular area. He is not trusted, with good reason.*
- Should the role of the National Wind Farm Commissioner continue beyond the initial period of three years? *It has long been my view that what is required to protect public health is a Federal National Noise Pollution regulatory regime, incorporating all industrial noise sources, to provide oversight to ensure that the existing state regulatory regimes actually work with strong Federal oversight, free of political and industry influence, to protect people’s health in accordance with the AAS code of ethics, and minimize the effect on the current Federal Health budget. It would need to be staffed by adequately remunerated Acousticians of impeccable ethical standing and technical knowledge and ability who were trusted by the community, into whose homes they would be entering to conduct acoustic investigation if state regulatory authorities were unable or unwilling to act on residents noise complaints. It could be funded by hefty fines of noise polluters for repeated breaches of noise pollution regulations and/or noise nuisance episodes – such a system would act to positively reinforce to noise polluters that health damaging excessive noise pollution doesn’t pay. At the moment, wind turbine noise pollution pays handsomely, in the form of lucrative renewable energy subsidies. There are currently no adverse financial consequences for harming people’s health or forcing them out of their homes, and there is ongoing public and private denial of any wind turbine noise related health problems by the current NWFC.*
- Should the scope of the National Wind Farm Commissioner’s role be expanded to other large scale renewable energy projects, such as solar and storage? *Outside the Foundation’s area of interest and expertise*
- What options are available to fund any ongoing role for the Wind Farm Commissioner? *See the above suggestion re funding*

Sarah Laurie
 Bachelor Medicine, Bachelor Surgery, Flinders University 1995
 CEO Waubra Foundation

DPTI:scapreps

From: Sarah Laurie <sarah@waubrafoundation.org.au>
Sent: Friday, 29 June 2018 4:26 PM
To: DPTI:scapreps
Subject: Waubra Foundation Attachment to go with Written submission, and Request to be Heard in support of submission, Re Development Number 354/V003/18 (Applicant Neoen Australia)
Attachments: Noise Impact Assessment Commentary Crystal Brook Windfarm South Australia, Report No 4154 20 June 2018.pdf; ATT00001.txt

Attention Lee Webb

Dear Lee

this is one of the three attachments to go with the Waubra Foundation's submission.

Please acknowledge receipt.

regards

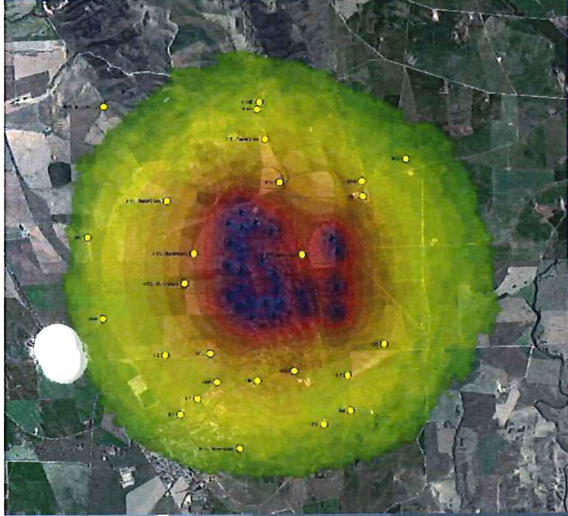
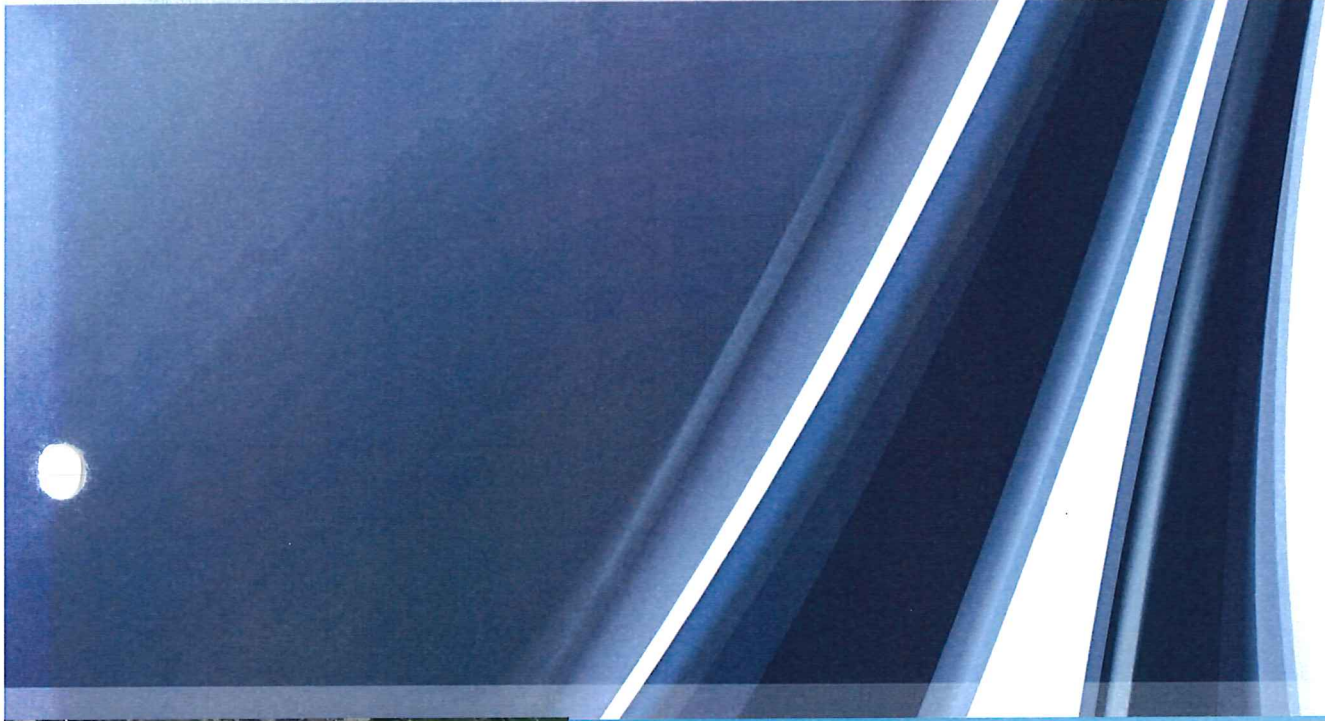
Sarah Laurie



NOISE MEASUREMENT SERVICES

**NOISE IMPACT ASSESSMENT COMMENTARY
CRYSTAL BROOK WIND FARM
SOUTH AUSTRALIA**

Report No 4154 20 June 2018



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1 pdf	0	Ian Peterson
2	0	Noise Measurement Services

REPORT FOR Ian Peterson

CONTACT Ian Peterson

Signed



Dr Bob Thorne PhD, FRSPH, MIOA
(Principal)

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Executive Summary

This Report is in response to a request from Mr Ian Peterson for a noise impact assessment commentary with respect to the proposed Crystal Brook Energy Park (CBEP). The commentary presents a set of noise impact assessments based on turbine data provided in Sonus CBEP documentation. The provenance and application of the South Australian wind farm noise guidelines are discussed. The potential for noise impacts is identified.

Introduction

The proposed Crystal Brook Energy Park will have up to 125MW of wind generation comprising 26 turbines (up to 240m in height). Documentation for this project is sourced from:

https://www.saplanningcommission.sa.gov.au/_data/assets/pdf_file/0005/462857/354_V003_18_Application_docs_Part_1.pdf

and

https://www.saplanningcommission.sa.gov.au/_data/assets/pdf_file/0006/462858/354_V003_18_Application_docs_Part_2.pdf

Neoen documentation states that:

The wind turbines and their sites have been selected and sited to meet key impact management criteria including:

- *The EPA's noise criteria*
- *A minimum distance of 1km from un-involved residences and 2km from the closest zoned living area (the Rural Living Zone)*

However, Neoen also states, in relation to concern about noise and potential health effects:

Concern raised in relation to noise and infrasound and potential health impacts on the local community

The development must comply with the SA Environment Protection Authority (EPA) Wind Farm Guidelines. Expert acoustic engineering advice has been integral to the siting of the proposed wind turbines to ensure the SA Environment Protection Authority (EPA) Wind Farm Guideline is met.

Regarding infrasound, there is no scientific data to suggest that the levels of low frequency noise emitted by wind turbines make humans sick. Research to date has not shown any negative health effects at the noise levels produced by operational wind turbines.

The project team has also taken a conservative approach, and no wind turbines will be located within 1.3km of a non-involved landholder (the Guidelines specify 1km).

DISCUSSION

1. Ambient Sound Levels

Appendix A refers to the ambient noise level and weather surveys being undertaken by residents.

2. Wind Farm Noise Calculations

Wind farm noise calculations, tabulated sound levels at residences, and graphical noise exposure contours are presented in Appendix B. A standard (ISO 9613-2) noise prediction model is applied. Two wind turbine sound power levels are applied; 105 dB(A) and 110 dB(A), as there is no certainty that the *indicative* 105 dB(A) SWL noise turbine nominated in the Sonus report 'Crystal Brook Energy Park Environmental Noise Assessment March 2018' will be the turbine installed.

- The 110 SWL contour provides a practical and reasonable approach to assessing the '105 dB SWL turbine plus 5 dB penalty for amplitude modulation' zone of influence.
- As an absolute the minimum the applicant must provide the true certified sound power levels, operational conditions (e.g. is there a 'low-noise' mode) and wind speed data for each turbine type to be installed.

3. Potential for Adverse Health Effects

An Administrative Appeals Tribunal Decision that specifically addresses the potential for adverse health effects due to wind farm noise is presented in Appendix C.

4. South Australia Noise Legislation and Wind Farm Guidelines

Relevant sections of the South Australian noise policy, noise characteristics and wind farm guidelines are presented and discussed in Appendix D.

5. Amplitude Modulation and Other Characteristics

Relevant sections from a Sonus paper addressing wind farm noise, amplitude modulation and other characteristics are presented in Appendix E. This material and a potential 5 dB penalty is not addressed in the Sonus report 'Crystal Brook Energy Park Environmental Noise Assessment March 2018'.

6. Glossary

A Glossary of terms is provided in Appendix F.

Appendix A: Ambient Sound Levels

Ambient sound level monitoring commenced at three residential locations in October 2017. Sound levels are collected at 10-minute intervals with Class 1 BSWA Model 308 sound level meters. Depending on the location, each meter collects time-average (LAeq) and statistical (e.g. LA90) sound levels or time-average and one-third octave band sound levels.

Each meter is connected to a soundcard to record audible, low frequency and infrasound. A second microphone provides recording for infrasound and low frequency sound.

A Davis weather station collects weather data as wind speed and direction, temperature, humidity, barometric pressure and rainfall, also at 10-minute intervals.

Appendix B: Wind Farm Noise Calculations

The ISO 9613 standard from 1996 is the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. The calculations in this Commentary are implemented with SoundPLAN 8. SoundPLAN supports and complies with changes that have been proposed to ISO/TR 17534-3:2015, relating to acoustics software for the implementation of standards associated with the calculation of sound outdoors.

The recommended changes outlined to ISO 9613-2 will help improve the accuracy of calculated sound levels, which can currently differ significantly.

Noise modelling presents 'single-figure dB(A)' values to provide a *simplified overview of potential noise exposure*. The effects of low frequency sound and amplitude modulated sound are not considered. *As such, the levels must be adjusted in terms of real-life '24/7/365' application.*

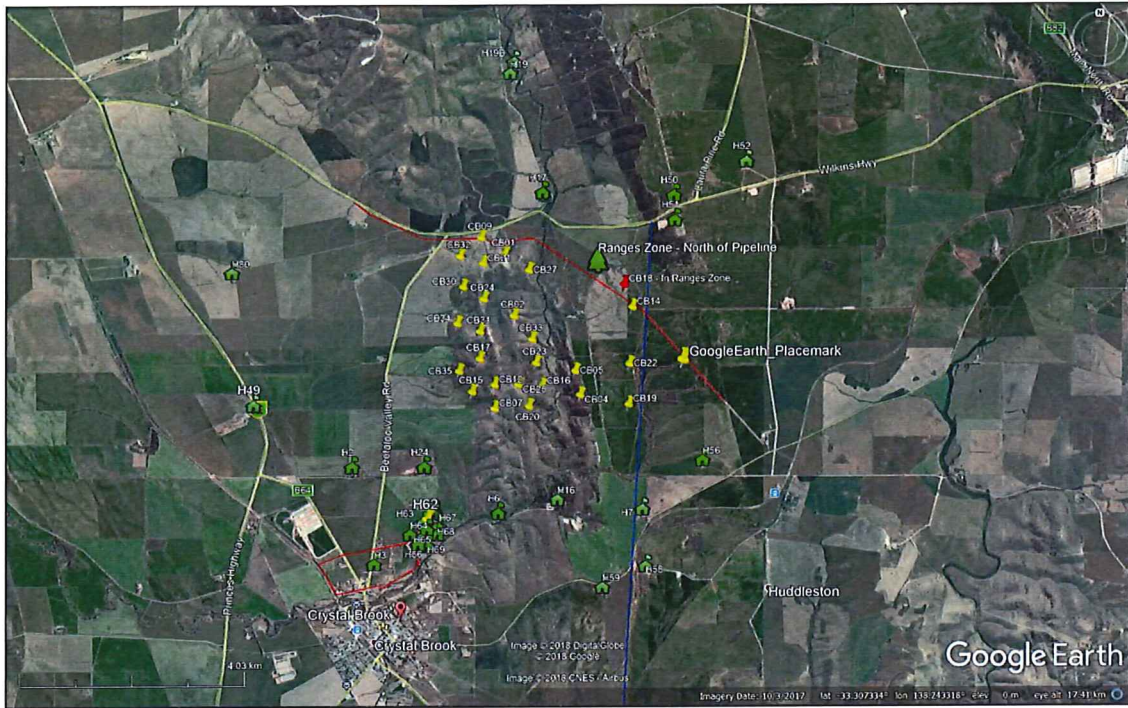
The calculations and modelling in this Commentary are under Default conditions as these present the readily assessable conditions for a slight downwind breeze for comparison purposes. *In practice, under field observations, real conditions can vary significantly due to temperature changes, changes in wind speed and direction, and changing operational conditions applied to the wind farm turbines.* These variations can happen quickly, in minutes, and noise modelling does not normally present these important variations.

Model Variables	
Noise Model Standard	ISO 9613-2: 1996
Air absorption Standard	ISO 9613-1
Ground Absorption Factor	0.5
Air Pressure	1013.3 mbar
Relative Humidity	70.00%
Temperature	10.0 °C
Receptor Height (m)	1.5

Noise Source											
Model	GE 4.8-158 Wind Turbine Generator										
Hub Height (m)	160										
Rotor Diameter (m)	158										
Sound Power Level	Sum	16Hz	31Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
dB(Z)	125	124	117	113	109	105	101	101	96	85	71
dB(A)	105	67	78	87	93	96	98	101	97	86	70

The noise prediction locations and turbine sound power data have been recorded from information provided by Mr Peterson.

Residences and Turbines



Results for the ISO Default condition, Port Pirie wind rose, and 100% southerly wind at 6m/s are presented in Table 1 and graphically in Plates 1 to 6.

Table 1: Summary forecast noise levels (LAeq) for different operational scenarios

Receiver	Forecast Noise Level (dB(A))					
	Turbine SWL 105dB(A)			Turbine SWL 110dB(A)		
	ISO Default Met	Port Pirie Met	100% Southerly Wind	ISO Default Met	Port Pirie Met	100% Southerly Wind
H2	29.0	27.6	26.5	34.1	32.7	31.6
H3	24.3	22.4	19.7	29.4	27.5	24.8
H4	27.3	25.6	23.1	32.4	30.7	28.2
H6	28.1	27.1	25.2	33.2	32.2	30.3
H7	30.0	29.1	27.4	35.1	34.2	32.5
H12 - Beneficiary	35.9	35.6	35.5	41.0	40.7	40.6
H13 - Beneficiary	37.9	37.7	37.8	43.0	42.8	42.9
H14 - Beneficiary	31.2	30.5	31.0	36.3	35.6	36.1
H15 - Beneficiary	40.5	40.5	40.5	45.7	45.6	45.6
H16	32.8	32.0	30.6	37.9	37.1	35.7
H17	35.1	34.9	35.1	40.2	40.0	40.2
H18 - Beneficiary	27.5	26.9	27.5	32.6	32.0	32.6
H19	24.6	23.7	24.6	29.7	28.8	29.7
H19B	23.9	23.0	23.9	29.1	28.1	29.0
H22 - Beneficiary	9.9	8.5	9.6	15.0	13.6	14.7
H24	33.0	32.4	31.8	38.1	37.5	37.0
H33 - Beneficiary						
H49	24.0	22.4	22.3	29.1	27.5	27.4
H50	29.4	28.8	29.3	34.5	33.9	34.4
H51	31.0	30.7	30.9	36.1	35.8	36.0
H52	22.0	21.2	21.9	27.1	26.3	27.0
H56	30.0	29.4	28.6	35.1	34.5	33.7
H58	23.9	22.5	19.5	29.0	27.6	24.6
H59	25.3	23.6	20.3	30.4	28.8	25.4
H60	30.2	29.0	26.9	35.3	34.1	32.0
H75 - Beneficiary	19.5	17.6	13.7	24.6	22.7	18.8
H80	22.5	21.1	21.8	27.6	26.2	26.9

Plate 1: Calculations under ISO 9613-2 default settings, turbines at 105 dB(A) sound power level

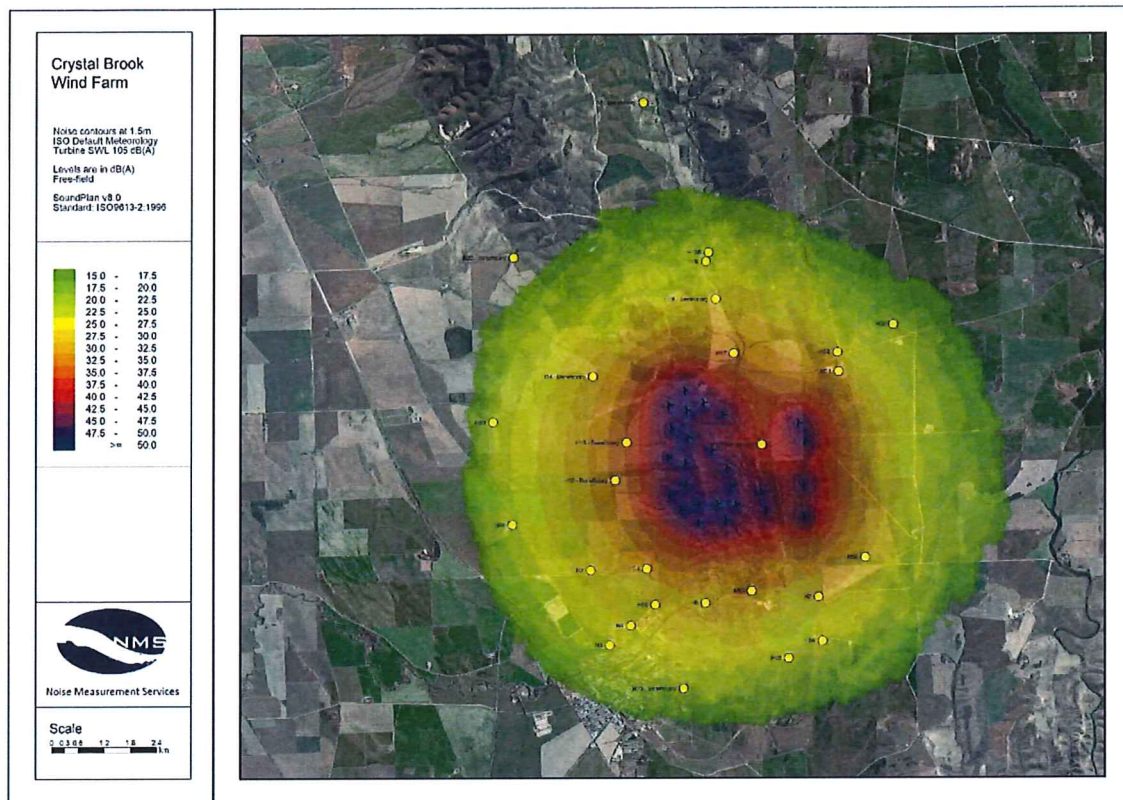


Plate 2: Calculations with Port Pirie wind rose data, turbines at 105 dB(A) sound power level

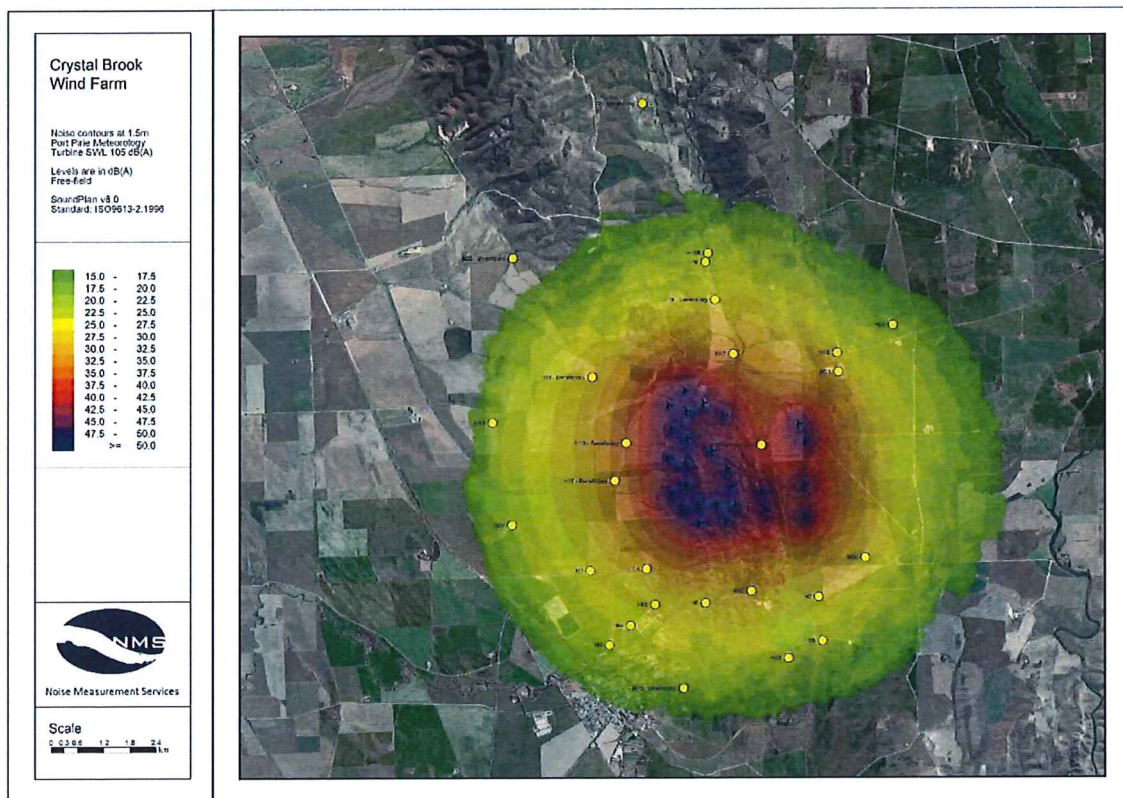


Plate 3: Calculations with 6m/s wind from the south, turbines at 105 dB(A) sound power level

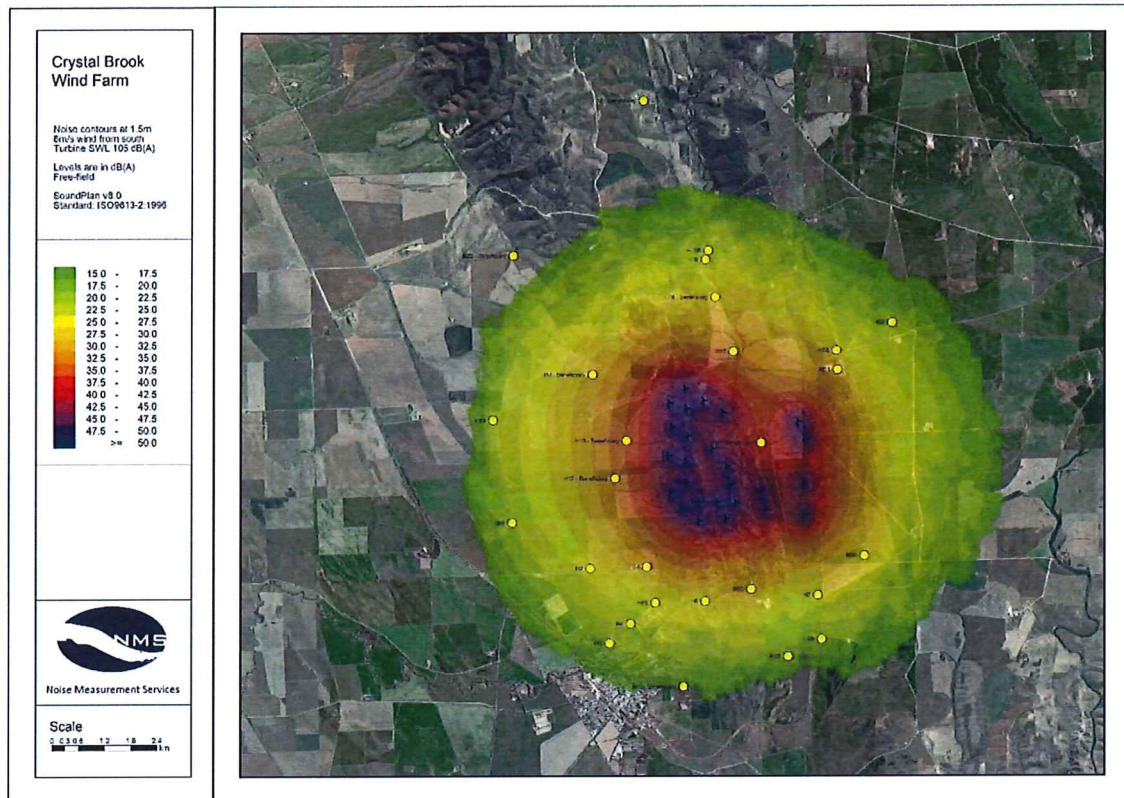


Plate 4: Calculations under ISO 9613-2 default settings, turbines at 110 dB(A) sound power level



Plate 5: Calculations with Port Pirie wind rose data, turbines at 110 dB(A) sound power level

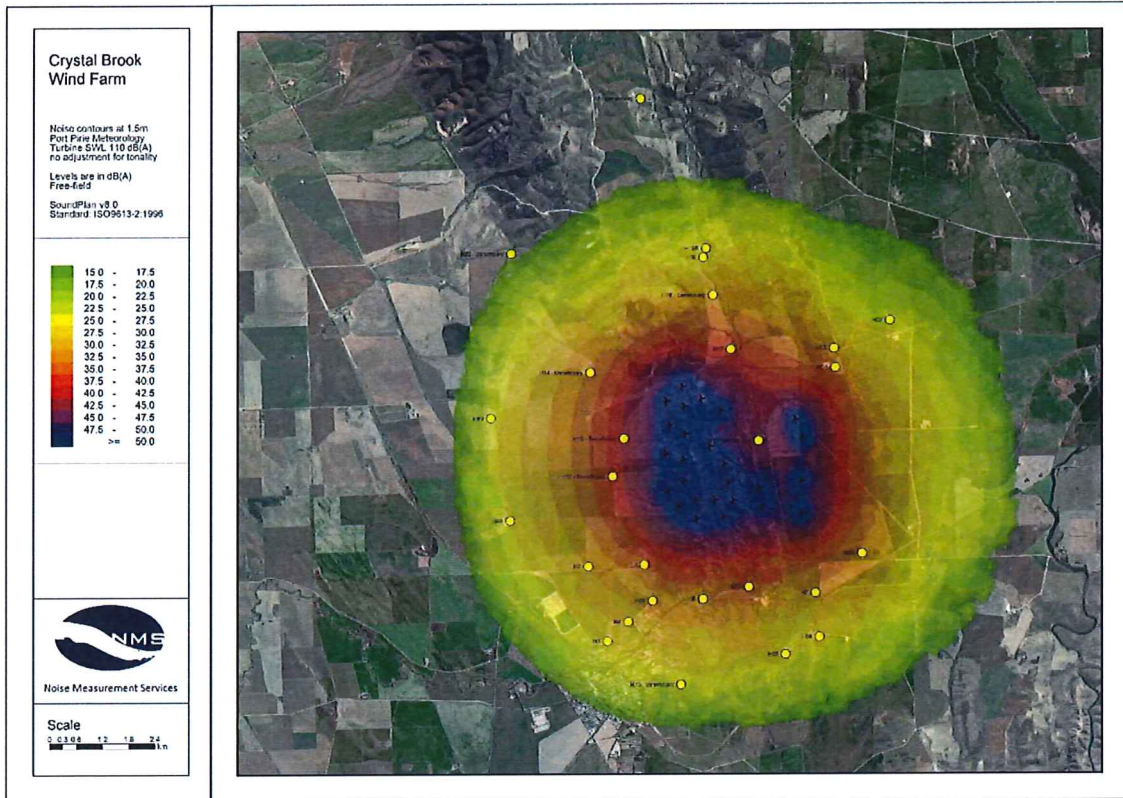
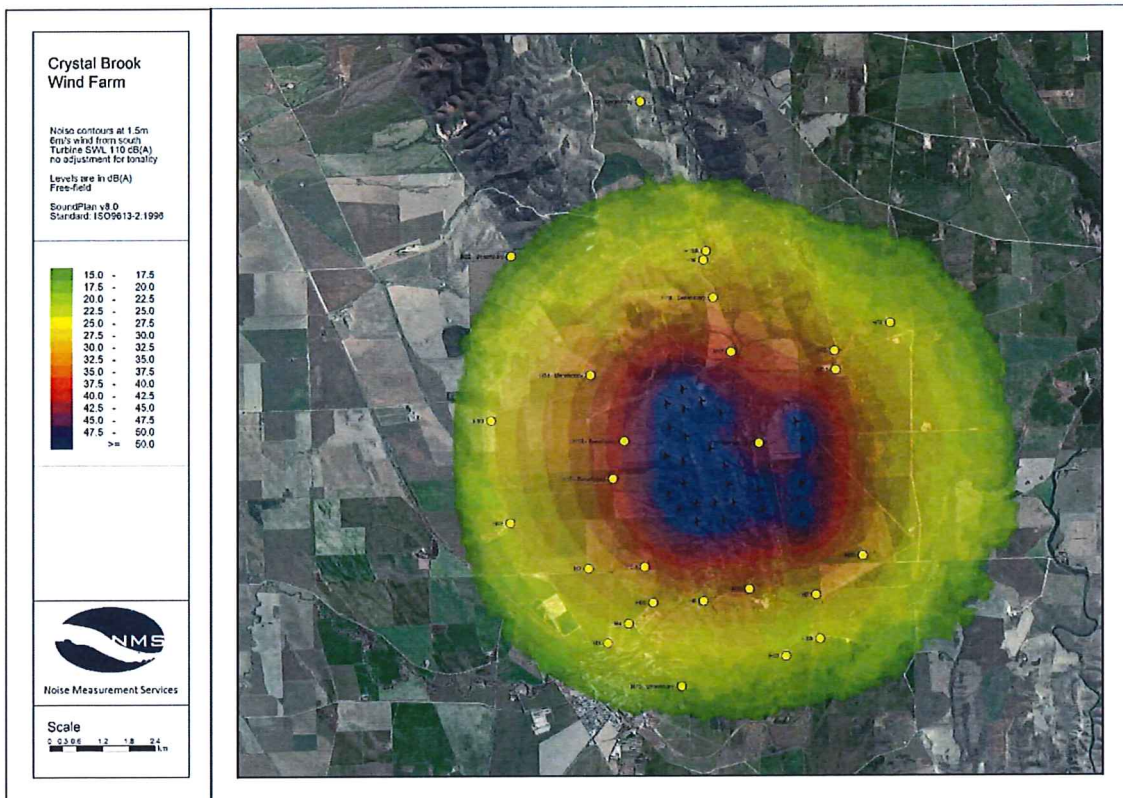


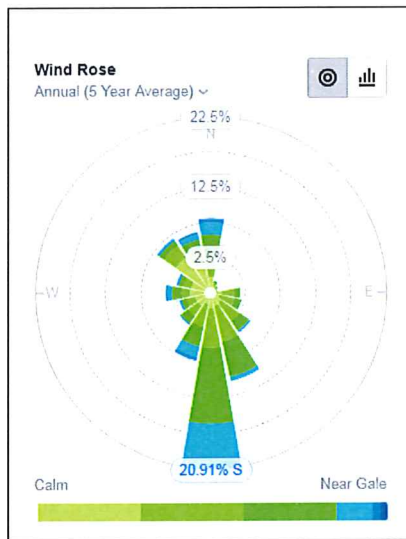
Plate 6: Calculations with 6m/s from the south, turbines at 110 dB(A) sound power level



Summary calculations

Receiver	Forecast Noise Level (dB(A))					
	Turbine SWL 105dB(A)			Turbine SWL 110dB(A)		
	ISO Default Met	Port Pirie Met	100% Southerly Wind	ISO Default Met	Port Pirie Met	100% Southerly Wind
H2	29.0	27.6	26.5	34.1	32.7	31.6
H3	24.3	22.4	19.7	29.4	27.5	24.8
H4	27.3	25.6	23.1	32.4	30.7	28.2
H6	28.1	27.1	25.2	33.2	32.2	30.3
H7	30.0	29.1	27.4	35.1	34.2	32.5
H12 - Beneficiary	35.9	35.6	35.5	41.0	40.7	40.6
H13 - Beneficiary	37.9	37.7	37.8	43.0	42.8	42.9
H14 - Beneficiary	31.2	30.5	31.0	36.3	35.6	36.1
H15 - Beneficiary	40.5	40.5	40.5	45.7	45.6	45.6
H16	32.8	32.0	30.6	37.9	37.1	35.7
H17	35.1	34.9	35.1	40.2	40.0	40.2
H18 - Beneficiary	27.5	26.9	27.5	32.6	32.0	32.6
H19	24.6	23.7	24.6	29.7	28.8	29.7
H19B	23.9	23.0	23.9	29.1	28.1	29.0
H22 - Beneficiary	9.9	8.5	9.6	15.0	13.6	14.7
H24	33.0	32.4	31.8	38.1	37.5	37.0
H33 - Beneficiary						
H49	24.0	22.4	22.3	29.1	27.5	27.4
H50	29.4	28.8	29.3	34.5	33.9	34.4
H51	31.0	30.7	30.9	36.1	35.8	36.0
H52	22.0	21.2	21.9	27.1	26.3	27.0
H56	30.0	29.4	28.6	35.1	34.5	33.7
H58	23.9	22.5	19.5	29.0	27.6	24.6
H59	25.3	23.6	20.3	30.4	28.8	25.4
H60	30.2	29.0	26.9	35.3	34.1	32.0
H75 - Beneficiary	19.5	17.6	13.7	24.6	22.7	18.8
H80	22.5	21.1	21.8	27.6	26.2	26.9

Plate 7: Port Pirie wind rose



Port Pirie is the closest BOM station at 23 km distant

Wind rose recorded from:

<https://wind.willyweather.com.au/sa/flinders-ranges-and-outback/port-pirie.html>

Additional weather data for Crystal Brook is available in pictorial form from Meteoblue:

https://www.meteoblue.com/en/weather/archive/windrose/crystal-brook_australia_2073422

Appendix C: Potential for Adverse Health Effects

Whether there is evidence that wind farm emissions cause or are associated with diseases, and, whether there is a plausible basis for thinking that wind farm emissions could lead to disease has been considered in the case: *Waubra Foundation and Commissioner of Australian Charities and Not-for-profits Commission* [2017] AATA 2424 (4 December 2017). The Tribunal consisted of the **Honourable Justice White, Deputy President and Deputy President K Bean**.

The official link to the AAT decision on the Austlii website is here: <http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/AATA/2017/2424.html>

The section of the judgment dealing with wind turbine noise being a pathway to disease is summarised here:

Excerpts from Pages 141 to 148 of the Decision

468. *The propositions which we understand have unanimous support from the relevant experts or are not contested include the following:*

- *Wind turbines emit sound, some of which is audible, and some of which is inaudible (infrasound);*
- *There are numerous recorded instances of WTN exceeding 40 dB(A) (which is a recognised threshold for annoyance/sleep disturbance);*
- *There are also recorded instances of substantial increases in sound at particular frequencies when particular wind farms are operating compared with those at times when they are shut down;*
- *If it is present at high enough levels, low frequency sound and even infrasound may be audible;*
- *WTN is complex, highly variable and has unique characteristics;*
- *The amount and type of sound emitted by a wind farm at a given time and in a given location is influenced by many variables including topography, temperature, wind speed, the type of wind turbines, the extent to which they are maintained, the number of turbines, and their mode of operation;*
- *Wind farms potentially operate 24 hours a day, seven days a week;*
- *There are numerous examples of WTN giving rise to complaints of annoyance from nearby residents, both in Australia and overseas.*

469. *The propositions which are supported by the preponderance of relevant expert opinion, and which we accept on that basis, include the following:*

- *A significant proportion of the sound emitted by wind turbines is in the lower frequency range, i.e. below 20 Hz;*
- *The dB(A) weighting system is not designed to measure that sound, and is not an appropriate way of measuring it;*

- *The most accurate way of determining the level and type of sound present at a particular location is to measure the sound at that location;*
- *The best way of accurately measuring WTN at a particular location is through ‘raw’ unweighted measurements which are not averaged across time and are then subjected to detailed “narrow-band” analysis;*
- *When it is present, due to its particular characteristics, low frequency noise and infrasound can be greater indoors than outdoors at the same location, and can cause a building to vibrate, resulting in resonance;*
- *Humans are more sensitive to low frequency sound, and it can therefore cause greater annoyance than higher frequency sound;*
- *Even if it is not audible, low frequency noise and infrasound may have other effects on the human body, which are not mediated by hearing but also not fully understood. Those effects may include motion-sickness-like symptoms, vertigo, and tinnitus-like symptoms. However, the material before us does not include any study which has explored a possible connection between such symptoms and wind turbine emissions in a particular population.*

470. *We consider that the evidence justifies the following conclusions:*

- *The proposition that sound emissions from wind farms directly cause any adverse health effects which could be regarded as a “disease” for the purposes of the ACNC Act is not established;*
- *Nor, on the current evidence, is there any plausible basis for concluding that wind farm emissions may directly cause any disease;*
- *However, noise annoyance is a plausible pathway to disease;*
- *There is an established association between WTN annoyance and adverse health effects (eg. this was established by the Health Canada study);*
- *There is an established association between noise annoyance and some diseases, including hypertension and cardiovascular disease, possibly mediated in part by disturbed sleep and/or psychological stress/distress;*
- *There are as yet no comprehensive studies which have combined objective health measurements with actual sound measurements in order to determine for a given population the relationships between the sound emissions of wind turbines, annoyance, and adverse health outcomes. Indeed there is as yet no study which has given rise to a soundly based understanding of the degree to which particular types or levels of wind turbine emissions give rise to annoyance, or what levels or types of emissions are associated with what level of annoyance in the population. Because it relied on calculated rather than actual sound measurements, and was limited to the A and C-weighted systems, the Health Canada study did not do this.*

473. *The applicant submitted that the evidence in the hearing provided plausible and credible evidence of the kind required. Counsel referred in particular to the effect of noise on sleep and, in particular, in disturbing sleep. It was not contentious that impaired sleep, if sufficiently serious, may result in a number of*

ailments and diseases. Professor Wittert said that “depression and sleep disturbance are, respectively, the first and third most common psychological reasons for patient encounters in general practice”. The professor went on to say that insomnia doubles the risk of future development of depression and that insomnia symptoms together with shortened sleep are associated with hypertension. Professor Wittert also said that a person suffering from restricted sleep is exposed to an increased risk of elevated blood sugar levels and endocrine disorders such as diabetes, symptomatic ischaemic heart disease, hypertension, obesity, insomnia and anxiety related illnesses.

476. As our earlier findings have indicated, some wind farms generate sound which is capable of causing, and does cause, annoyance. We are further satisfied that annoyance of the kind which is generated (often associated with psychological distress and sleep disturbance), is a recognised pathway to a range of adverse health outcomes, including hypertension and cardiovascular disease.

481. It follows in our view that the applicant has established that there is a plausible basis for thinking that wind turbine sound (mediated by annoyance) may lead to adverse health outcomes, such as to warrant further investigation. It is unnecessary for us to draw conclusions as to the precise nature of the annoyance which is caused, and whether annoyance may be caused by sound which is not audible (infrasound). That is something which we expect will be the subject of further study and investigation. For our purposes, it is sufficient that annoyance is produced, and it appears that it may be associated with adverse health outcomes. An identification of the causes of that annoyance may allow it to be reduced or mitigated and adverse health outcomes to be reduced or avoided.

482. We regard it as particularly significant that the NHMRC has considered that, despite the absence of direct evidence that exposure to wind farm noise affects physical or mental health, and the poor quality direct evidence that wind farm noise is associated with annoyance or sleep disturbance, it is appropriate to provide funding to the extent of \$3.3 million for an evaluation of the “sleep and physiological disturbance characteristics of wind farm noise compared to traffic noise” and for an investigation of whether “exposure to infrasound causes health problems”. Given this degree of recognition by the NHMRC, we do not consider that it should be held that the associations which are the subject of the applicant’s activities do not have plausibility or credibility, although not as yet positively established.

485. Given our finding that there is a plausible basis for considering that wind farm sound emissions may have an adverse effect on human health, we accept that conducting, supporting and advocating for further research or engaging in awareness raising activities could be properly characterised as activities promoting the prevention or control of diseases (in the sense of that term explained earlier).

Appendix D: South Australia Noise Legislation and Wind Farm Guidelines

The South Australia *Environment Protection (Noise) Policy 2007* under the *Environment Protection Act 1993* sets out the requirements for measuring and assessing noise. One of the critical terms is 'characteristic'.

*The Noise Policy states that a **characteristic**, in relation to noise from a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined by the Authority or another administering agency, in accordance with the *Guidelines for the use of the Environment Protection (Noise) Policy 2007* published by the Authority as in force from time to time, to be fundamental to the nature and impact of the noise;*

- **low frequency characteristic**—a noise has a low frequency characteristic if it has a characteristic that dominates the overall noise with content between 20 hertz and 250 hertz;
- **modulating characteristic**—a noise has a modulating characteristic if it varies significantly in frequency character or amplitude;

With respect to wind farms, the Policy states:

34—Wind farms

(1) If a person operates a wind farm, the Wind Farms Environmental Noise Guidelines 2003 prepared by the Authority apply.

(2) In this clause—wind farm means a group of wind turbine generators.

35—Issue of environment protection orders to give effect to guidelines

The Authority or another administering agency may issue an environment protection order to a person who undertakes an activity referred to in this Part to give effect to the guidelines that apply to the activity under this Part.

Comments:

1. It is understood that later Guidelines issued in 2009 are applied by the SAEPA although the Policy does not specifically allow for this later document. The disclaimer to the 2009 Guidelines state:

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

2. From a technical point-of-view, therefore, as sound/noise monitoring and evaluation professionals we would apply the provisions of the Policy relating to 'characteristics'. This position, we believe, is supported by the information recorded in Appendix E.

3. It would appear that the guidelines do not apply to a specific windfarm, e.g. Crystal Brook, unless and until an environment protection order has been issued to a person who undertakes the wind farm activity.

Appendix E: Amplitude Modulation and Other Characteristics

Sonus, in the document titled '*Wind Farms Technical Paper – Environmental Noise*' dated November 2010 to the Clean Energy Council, state:

Amplitude Modulation

Amplitude modulation is an inherent noise character associated with wind farms. It should be noted that the ambient environment modulates in noise level by a significantly greater margin and over a significantly greater time period than that which would be audible from a wind farm at a typical separation distance. Notwithstanding, the South Australian Guidelines (2003 & 2009) note that the objective standards include a 5 dB(A) penalty for this fundamental and inherent character of amplitude modulation.

A 5 dB(A) penalty is a significant acoustic impost. To reduce a noise source by 5 dB(A) requires either the distance between the source and the receiver to be approximately doubled, or the noise source to reduce its output by two thirds. In wind farm terms, this means the distance between the farm and the nearest dwellings might need to be doubled, or up to two thirds of the total turbine numbers would need to be removed, compared to a wind farm not subject to such a penalty.

The ability to hear the "swish" (amplitude modulation) depends on a range of factors. It will be most prevalent when there is a stable environment (temperature inversion) at the wind farm and the background noise level at the listening location is low. In addition, amplitude modulation is greater when located cross wind from a wind turbine (Olermans and Schepers, 2009). It is noted that whilst the amplitude modulation is greater at a cross wind location, the actual noise level from the wind farm will be lower than at a corresponding downwind location. These conditions are most likely to occur when wind speeds at the wind farm are low under a clear night sky.

The swish is at its greatest under the above conditions as the change in wind speed at increased heights above the ground is also at its greatest, and this results in an increased difference in wind speed as the blades move through the top of their arc and down past the tower. In addition, if there are several turbines subject to similar conditions, then it is possible this can have an amplifying effect on the modulation. The increase in swish under these specific conditions is termed the Van Den Berg Effect, and it is suggested higher levels of swish might result in higher levels of annoyance and potentially sleep disturbance.

The Van Den Berg effect was observed on a flat site in Europe under specific conditions and in the two matters before the NSW Land and Environment Court (Gullen Range wind farm NSW LEC 41288 of 2008 and Taralga wind farm NSW LEC 11216 of 2007), it has been determined by the relevant experts that the required meteorological conditions to trigger the effect were not a feature of the environment. In Gullen Range (NSW LEC 41288 of 2008), the meteorological analysis prepared by Dr Chris Purton concluded that

suitable conditions for this effect are not a feature of the area because of the elevated ridgeline location of the wind farm (Purton, evidence NSW LEC 41288 of 2008).

If suitable conditions did exist to regularly generate high levels of swish, then there is no scientific research to indicate that the existing Standards and Guidelines do not adequately account for it. Indeed, given the conditions are more likely to occur at night, then sleep disturbance would be the main issue to address, and the noise standards applied to wind farms are significantly more stringent than limits established for the potential onset of sleep disturbance. This is discussed in further detail in the following section.

In the first draft of the National Wind Farm Development Guidelines (EPHC, 2009), excessive swish is referred to as one of the potential Special Audible Characteristics (or SACs) along with low frequency, infrasound and tonality. It recommends that:

With the exception of tonality, the assessment of SACs will not be carried out during the noise impact assessment phase, that is, pre-construction. This arrangement reflects two key issues:

- i. There are, at present, very few published and scientifically-validated cases of any SACs of wind farm noise emission being problematic at receivers. The extent of reliable published material does not, at this stage, warrant inclusion of SACs other than tonality into the noise impact assessment planning stage.*
- ii. In the case that reliable evidence did demonstrate merit in assessing such factors during the pre-construction phase, there is a gap in currently available techniques for assessing SACs as part of the noise impact assessment. In part this is due to the causes of most SACs in wind turbine noise emission not yet being clearly understood.*

In summary:

- Swish is an inherent noise characteristic of a wind farm;
- Modulation in noise level is a feature of the ambient noise environment surrounding a wind farm;
- The level and depth of swish can vary with meteorological conditions, and under certain conditions, will be more prevalent;
- The conditions to consistently generate high levels of audible swish have not been established to be a typical feature of Australian wind farms;
- The level, depth, time and testing regime for excessive swish that would justify introducing a more stringent standard have not been established;
- Sleep disturbance is the key issue associated with excessive swish, if it is to occur.

Appendix F: Glossary

Background sound pressure level (LA90,T), LA90

Commonly called the "L90" or "background" level and is an indicator of the quietest times of day, evening or night. The LA90 level is calculated as the noise level equalled and exceeded for 90% the measurement time. The measured LA90 time-intervals are arithmetically averaged to present the "average background" levels of the environment for day/evening/night. The level is recorded in the absence of any noise under investigation. The level is not adjusted for tonality or impulsiveness.

Equivalent Continuous or time average sound pressure level (LAeq,T), Leq

Commonly called the "Leq" level it is the logarithmic average sound/noise level from all sources far and near. The level can be adjusted for tonality.

CAUTION: this is NOT the same measure as described in the Noise Policy definition of *ambient noise level (continuous)* as the Policy definition applies the exponential Fast response.

Façade-adjusted level

A sound level that is measured at a distance of 1.0 metre from a wall or facade. The level is nominally 2.5 dB higher than the free-field level.

Free-field level

A sound level that is measured at a distance of more than 3.5 metres from a wall or facade.

Beneficial

- A term applied to a person or landowner who directly benefits from a project or activity.
- Landowner with a commercial agreement with the wind farm developer.

DPTI:scapreps

From: Sarah Laurie <sarah@waubrafoundation.org.au>
Sent: Friday, 29 June 2018 4:29 PM
To: DPTI:scapreps
Subject: Attachment to go with Waubra Foundation Submission - SA AAAC 2008 comments
Bassett_Maddern_Sonus_Teage_Mackenzie_Sonus_Heinze
Attachments: SA AAAC 2008 comments
Bassett_Maddern_Sonus_Teage_Mackenzie_Sonus_Heinze.pdf; ATT00001.htm

Attention Lee Webb

Dear Lee

this is the final attachment to accompany the Waubra Foundation submission to the SCAP re the Application by NEOEN.

Could you please ensure that the submission has the three additional documents when it goes to the SCAP members.

Please acknowledge receipt of this email and that all four documents have been received by you.

Regards

Sarah Laurie

DPTI:scapreps

From: Sarah Laurie <sarah@waubrafoundation.org.au>
Sent: Friday, 29 June 2018 4:26 PM
To: DPTI:scapreps
Subject: Waubra Foundation Attachment to go with Written submission, and Request to be Heard in support of submission, Re Development Number 354/V003/18 (Applicant Neoen Australia)
Attachments: Noise Impact Assessment Commentary Crystal Brook Windfarm South Australia, Report No 4154 20 June 2018.pdf; ATT00001.txt

Attention Lee Webb

Dear Lee

this is one of the three attachments to go with the Waubra Foundation's submission.

Please acknowledge receipt.

regards

Sarah Laurie

From: EPA:EPA Contact
Sent: Thursday, 20 November 2008 4:50 PM
To: Lenchine, Valeri (EPA)
Subject: FW: Comment on Draft Wind Farm Noise Guidelines

Attachments: A8K01LT - Comment on Draft Wind Farm Guidelines 2008.pdf

From: [mailto: @bassett.com.au]
Sent: Thursday, 20 November 2008 4:31 PM
To: EPA:EPA Contact
Cc: Peter Maddern; @sonus.com.au; Peter Teague; pmaddern@olis.net.au; Neil Mackenzie;
@sonus.com.au; Peter Heinze;
Subject: Comment on Draft Wind Farm Noise Guidelines

Please find attached a consolidated response on the Draft Wind Farm Noise Guidelines 2008. This response has been prepared by members of the South Australian Acoustical Consulting Community (the SAACC).

Regards,

Acoustic Engineer

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ABN 22 004 873 634

Ref: Wind Farms-A8K01LT

Att: Contact Officer - Draft Noise Guidelines
Environment Protection Authority
77 Grenfell Street
Adelaide SA 5001

20 November 2008

Comment on Draft Wind Farms Environmental Noise Guidelines 2008

On behalf of the South Australian Acoustical Consultancy Community (SAACC), we provide the following comments and suggestions relating to the *Draft Wind Farms Environmental Noise Guidelines 2008*.

We believe the revised Guidelines are inadequate in their current form and represent significant risks to all stakeholders involved in a wind farm development, including developers, owners and operators, the surrounding community, consultants and the relevant Authorities.

A key outcome of the review as articulated by the EPA was to deliver a set of Guidelines that removed the ambiguity surrounding the compliance checking procedure. The procedure to deliver these Guidelines, detailed by the EPA on a number of occasions over a 3 year period, involved carrying out research into modelling wind farm noise to enable assurance about the validity of these models, and in turn, to provide a compliance checking procedure that simply confirmed the inputs to this validated model.

This procedure does not appear to have occurred in full, and it is our opinion that the compliance checking and the broader Guidelines have actually been further complicated, with a greater potential for false compliance passes and false compliance fails.

We submit that these Guidelines should not be released until further research has been carried out. We would prefer that the 2003 guidelines were reinstated while the new guidelines are developed, as we are of the opinion that they are more suitable than the *Wind farms noise guidelines (interim) December 2007*.

The members of the SAACC have significant experience in assessing wind farm sites against the previous guidelines and would welcome the opportunity to use our previous experiences to assist the EPA to formulate further changes to the guidelines.

We note that it would be desirable for the wind farm noise guidelines to be consistent with the approaches contained in the draft Australian Standard for wind farms.

The SAACC's comments and suggestions for improving the current guidelines are included on the following pages.

Table 1 - Comments on Draft 2008 wind farm noise guidelines

Reference	Issue	Suggestion
Section 1. Introduction (Pg. 1)	"...the environments surrounding of wind farms usually have low ambient noise." Care needs to be taken with language that indicates low ambient noise. Review of the ambient equivalent noise levels in comparison to the criteria would generally indicate the opposite to be the case, with low ambient noise levels occurring on occasion and generally when the noise from the wind farm is comparatively low also.	Remove this statement or clarify the ambient noise environment at sites surrounding wind farms is generally low, at times when there are low wind speeds.
Section 2.2 Noise Criteria (Pg. 3)	"...35 dB(A) for localities..." "...localities..." is not defined. It should be clear that this relates to noise sensitive receivers, as defined in the Guidelines. Care needs to be taken with the definition, to ensure encroachment on an appropriately designed and operated wind farm is not an issue (refer further comments below).	Better define that the environmental noise criteria are to be achieved at only originally identified and agreed receivers, to ensure that residential encroachment towards the wind farm is not an issue.
Section 2.2 Noise Criteria (Pg. 3)	"...in a primary production / rural industry zone..." There are other zones a wind farm may be developed in, that do not fall into a "primary production / rural industry" category.	The base environmental noise criteria should be consistent with the criteria in the Noise EPP, and precisely identify the noise criteria for all potential zonings
Section 2.2 Noise Criteria (Pg. 3)	"...the zone objectives and principals should indicate that the zone is intended for..." This requirement could be ambiguous for zoning titles to not fit within those listed in the guidelines. It would be clearer to refer to the base noise level of 40 dB(A) for the typical case, referring to a 35 dB(A) criterion where rural living is principally promoted. This is to overcome the issue where it is not clear whether the 40 dB(A) criterion applies, which should be the "typical" application.	The requirement should be amended to refer to the 35 dB(A) base value and assign it only where rural living land uses are <i>principally promoted</i> , using similar language to that used in the EPP – that is "...the zone objectives and principles should indicate that the zone <i>principally promotes</i> a rural living land use.....".
Section 2.5 Cumulative development (Pg. 4)	The example states "...such that the alternative minimum criteria..."	The term "baseline" should be used, as it is used elsewhere and defined in the Guidelines, to avoid any confusion.
Section 3 Meeting the criteria (Pg.5)	"...cover approximately 2000 intervals." This is inconsistent with other sections of the Guidelines. 2000 intervals indicates the background noise measurement data could be completed in two weeks. Other sections of the Guidelines refer to 800 valid points with the wind in a particular direction, and to 2000 data points when adverse data from wind and rain and data above and below certain wind speeds is removed.	A clear definition is required to remove the inconsistency and to provide a reasonable approach (refer further comments below).

Reference	Issue	Suggestion
Section 3.1 Background Noise (Pg. 6)	<p>Example states that "Background noise environments likely to differ.....should ...be discussed with the EPA"</p> <p>General comment: There needs to be more guidance in the document. A requirement to "discuss with the EPA" does not assist, particularly when attempting to interpret the Guidelines in an Environmental Law Court.</p>	Requirements to "discuss the situation with the EPA" should be avoided, to improve clarity and consistency when applying the guidelines.
Section 3.1 Background Noise (Pg. 6)	<p>Example: "...clearly envisages noise sensitive development...."</p> <p>Too flexible – plenty of zones "envisage" residential land use. This means that the criteria may be applied at a property boundary, which is clearly the opposite intention of the example.</p>	Care to be taken with the language to remove the ambiguity. The term "principally promoted" is recommended as a replacement.
Section 3.1 Background Noise (Pg. 6)	<p>Example "...ensure that no significant physical changes...."</p> <p>The Guidelines do not state what should be done if have been physical changes.</p> <p>The compliance checking procedure flagged as part of the original review would overcome this issue of ensuring the environment remains untouched over the long period of time between background noise measurements and compliance checking.</p>	Compliance checking procedure needs to be reconsidered. (further comments below)
Section 3.1 Background Noise (Pg. 6)	<p>Example "...clear of trees and shrubs...."</p> <p>This is incorrect. The logger should be placed at a similar distance from significant trees as the distance between the trees and the house facade to provide an indication of its effect. Shrubs simply do not affect the L_{90} and should not be referenced here.</p>	Revise example, to remove suggestion that measurements should be clear of trees and shrubs.
Section 3.1 Background Noise – Equipment (Pg. 7)	<p>Guidelines require that the meters and noise loggers be calibrated using an IEC 60942 Class 1 calibrator that is approved by the logger manufacturer.</p> <p>The standard should reference the Australian version of the standard.</p> <p>Calibration by a Class 2 calibrator is considered sufficient for a Class 2 noise logger.</p> <p>There is no reason why the calibrator should be approved by the manufacturer.</p>	<p>Calibration should be referenced to the Australian version of the IEC Standard (AS IEC 60942:2004)</p> <p>Reference to the Class 1 calibrator should be revised to Class 1 or Class 2 calibrator.</p> <p>Requirement for the calibrator to be approved for the logger manufacturer should be removed</p>
Section 3.1 Background Noise – Wind (Pg. 7)	<p>Guidelines state that 'special windshields' must be used if data is to be reported where wind speeds exceed 5 m/s.</p> <p>However, standard windshields could be suitable at the measurement location, where sufficient technical information is able to confirm the influence of wind noise on the measurement.</p>	Remove the reference to 'special windshields', to allow the use of all windshields where technical information confirms their suitability.

Reference	Issue	Suggestion
Section 3.1 Background Noise – Wind (Pg. 7)	".....monitoring the wind speed at the measurement position..." The procedure preferred by the members of the SAACC is to place a single weather logger adjacent one of the representative noise logger locations. It is not clear that this current procedure is acceptable, or whether multiple positions are now required, which would be impractical and unreasonable.	Clarify that wind speed measurements are required at only one receiver location; the location has been judged to be most noise exposed of the measurement locations.
Section 3.1 Background Noise – Wind (Pg. 7)	".....average wind speeds..." Average wind speeds would not affect the L ₉₀ noise level measurements. An indication of the worst case influence of wind on the microphone would be provided by the L ₉₀ wind speeds at the measurement location.	The wind speeds measured should be consistent with the L ₉₀ and use a 10 th percentile descriptor. This should be clear in the Guidelines.
Section 3.1 Background Noise – Rain (Pg. 8)	".....high sensitivity rain gauges....are not readily available." Incorrect. They are, and are in regular use for wind farm developments throughout Australia.	Remove this statement from the guidelines.
Section 3.1 Background Noise – Data (Pg. 8)	".....operating wind speed range." Contradicts the reference to "rated power" used elsewhere in the document. The operating wind speed range (from speed of cut in to cut out) is the current accepted practice. The reference to 2000 valid points needs clarification as per previous comments.	Remove contradiction of rated power elsewhere in the document. Clarify that operating range (from cut in to cut out) is required. Reference to 2000 data points requires clarification as per previous comments.

Reference	Issue	Suggestion
<p>Section 3.1 Background Noise – Data (Pg. 8)</p>	<p>Example "...representative background" The EPA has carried out extensive research to show that the variation in background noise levels is of the order of the compliance level of 5dB(A). Therefore, the Guidelines need to be very clear about how a "representative" background is defined. It will cause significant issues if this ambiguous and flexible phrase is retained, particularly given the outcome of "WTGs being stopped". This provides another core reason why the compliance procedure was to be reviewed.</p>	<p>Method for determining if it is a representative background needs to be well defined.</p>
<p>Section 3.1 Background Noise – Data (Pg. 8)</p>	<p>The influence of atmospheric stability on wind speed profiles is not currently considered. van den Berg¹ demonstrated that under a stable atmosphere (as typical occur during periods of limited cloud cover at night), the difference between wind speeds at hub height and at ground level might be significantly greater than that expected for an unstable atmosphere. This potentially increases noise emissions at night, while also reducing background masking due to low level wind, resulting in possible exceedance of criteria.</p>	<p>Requirement for separate day and sunset to sunrise background noise criteria and wind profile conversion should be considered. Night criteria might be based on period from 1 hr after sunset to 1 hr before sunrise, on nights that there is limited/no cloud cover. Alternatively, practicality of direct measurement of atmospheric stability should be considered. Measurement of wind speed and prediction of levels based on hub height (or similar) wind speeds would remove problem of conversion of wind speed, but influence of wind profile on background noise would still have to be considered.</p>
<p>Section 3.2 Wind speed measurements – Measurement location (Pg. 9)</p>	<p>The guidelines state that the same measurement location is required to be used for measuring for wind speed and direction for background, noise predictions and compliance checking, and then contradict this requirement 2 paragraphs later by stating that the nearest WTG should be used for compliance measurements. Measurement at the same location should be used where possible, to maintain the same wind speed datum. This may not however be always practical, in which case the difference in speed between the location for determining background criteria and the compliance measurements should be accounted for.</p>	<p>Clarification of requirements for place of wind speed measurement is required. Location should be the same for all measurements were possible, and should be accounted for where it is not.</p>

¹ Van den Berg G.P., Effects of the wind profile at night on wind turbine sound, Journal of Sound and Vibration (2003)

Reference	Issue	Suggestion
Section 3.2 Wind speed measurements – Measurement location (Pg. 9)	Evidence that the wind speed and direction sensor is certified is required to be provided as part of the acoustic report. We request that the EPA provides details of the level of certification that is acceptable, as we are not aware of a readily available certification service or standard for anemometers.	Clarify the level of anemometer certification that is required.
Section 3.3 Noise level prediction – Prediction locations (Pg. 9)	It is required that all noise sources associated with the wind farm should be taken into account, but the guidelines do not indicate that sources other than the turbines (eg the transformers/substation) are to be assessed against the Noise EPP, rather than the Wind farm guidelines noise criteria.	State that sources other than the turbines are to be assessed against the Noise EPP, rather than the Wind farm guidelines.
Section 3.3 Noise level prediction – Prediction locations (Pg. 10)	The Guidelines request an "estimate of the model accuracy in dB(A)" A core component of the Guidelines review was to determine the accuracy of a range of models and establish assumptions to ensure a reasonable approach was taken. It is unreasonable to request this information for each project, and it establishes an expectation in the community that such information is available.	Remove requirement for an estimation of accuracy with each assessment, as this recommended model method. The type of model to be used, parameters to be used, and estimate of accuracy should be provided by the EPA.
Section 3.3 Noise level prediction – Prediction locations (Pg. 10)	It is not clear if a single (worst case) wind direction is applied to all turbines in a wind farm, or if individual worst case directions for each of the turbines should be applied.	Clarification is required, as there is ambiguity in this section.
Section 3.3 Noise level prediction – Prediction locations (Pg. 10)	"...higher than actual noise levels...." Simply not true, as the NZ model applies equal air absorption to all frequencies, rather than high frequency noise. In addition, the model cannot be used by anyone other than an experienced acoustic engineer. It is incorrect to provide such an expectation.	Reference to using NZS 6808 to calculate noise levels should be removed.

Reference	Issue	Suggestion
Section 3.3 Noise level prediction – Tonality (Pg. 11)	<p>This section of the guidelines do not make it clear that tonality is to be assessed at the receiver locations, rather than at a distance of approximately 100m from the turbines as per the method in IEC 61400-11.</p> <p>A fixed 5 dB(A) penalty for tonality is required by the guidelines. A sliding penalty for tonality such as that applied in ISO 1996-2 and ETSU-R-97 (United Kingdom DTI 1996) might be more appropriate for cases where installed turbines demonstrate slightly audible tonality at the receivers.</p>	<p>Clarify that tonality is to be assessed to the residential locations, rather than directly adjacent the tower as per the method in IEC 61400-11.</p> <p>Consider the introduction of a sliding penalty for tonality, for cases where there is only slight tonal audibility.</p>
Section 3.3 Noise level prediction – Vibration data (Pg. 11)	<p>We do not believe there is a 'probable vibration impact' as the guidelines state, and are strongly of the opinion that the requirement for predicting vibration to the residences should be removed.</p> <p>A paper presented by Hunt and Halstead at Wind Farm Noise 2007² confirms our view on likely vibration impact.</p>	<p>Requirement for vibration assessment should be confined to only cases where installed turbines create a humanly detectable vibration impact at the residences.</p>
Section 3.4 Data Analysis – Background noise and wind speed data (Pg. 11)	<p>IEC 61400-11 (1998) is referenced as stating that downwind within a direction of +/- 45 degrees is acceptable for the background noise measurements.</p> <p>IEC 61400-11 is now up to version 2.1 (IEC 61400-11 Ed. 2.1 (2006).</p> <p>Additionally, IEC is used solely for sound power measurements, rather than background noise measurements, and requires measurements at +/- 15 degrees downwind.</p> <p>We do not believe that there is significant benefit in measuring background noise for only the worst case wind direction.</p>	<p>Remove requirement for background measurements only for periods with worst case wind direction.</p>
Section 3.4 Data Analysis – Background noise and wind speed data (Pg. 12)	<p>The example graph is poor given the range of wind speeds shown and the resultant graph relative to the baseline level.</p> <p>We suggest that the guidelines should require that noise loggers have noise floors of no more than 25 dB(A).</p>	<p>Update the graph using one that better illustrates a typical background noise plot.</p> <p>Include requirement for maximum logger noise floor of 25 dB(A).</p>

² Hunt M. & Halstead M., Towards a review of NZ standard NZS6808:1998 Acoustics – Assessment & measurement of sound from wind turbine generators, Proceedings of Wind Turbine Noise, France (2007)

Reference	Issue	Suggestion
Section 4.2 Data analysis (Pg. 13)	<p>Guidelines require that the same order of polynomial as was used in the background analysis is used for the compliance checking.</p> <p>However, the same order of polynomial usually provides a poor fit to compliance data as turbine noise most significantly affects noise levels at wind speeds between 6 and 10m/s, while not effecting data below 4m/s and above 10m/s. This causes a visible rise in noise data at around 6 to 10 m/s, so that a linear to third order polynomial does not fit the compliance data or accurately reflect the noise level at the receiver.</p> <p>Linear to third order is also normally insufficient to achieve a good fit to the compliance measurements, due to the turbine noise influence at mid wind speeds. Application of a higher order polynomial is required where turbine noise is affecting receiver noise levels.</p>	The compliance checking procedure should allow for a best fit regression analysis of any order of polynomial equation, not just the linear to third order polynomial that has the same order as was used in the background noise analysis.
Section 4.3 Criteria (Pg. 14)	This section references the section for tonality as section 4.4. Reference is also given to sections 4.3.1 and 4.3.2, which are not included in the document	Amend references in this section.
Section 4.3 Criteria (Pg. 14)	<p>It is required that the compliance checking report contains confirmation that the noise criteria based on previous background noise measurements (if any) are still valid.</p> <p>We are strongly of the opinion that it would be unreasonable to change the noise criteria for a site following construction of the wind farm, as significant investment has been made in a wind farm which has been designed to meet previously agreed criteria.</p>	This requirement should be removed, as altering the noise criteria post construction would impose unreasonable conditions on the wind farm.
Section 4.4 Correction for background (Pg. 14)	<p>Should read '..... This method is based on the Substitution of...', rather than the 'substruction of'.</p> <p>Inclusion of the equation for background noise is unnecessary, given that the guidelines are to be applied by an acoustic engineer eligible for membership to the AAS.</p>	Amend as per suggestions.

Reference	Issue	Suggestion
<p>Section 4.5 Correction for background (Pg. 14)</p>	<p>This section references section 4.3.1, which does not exist.</p> <p>This section is dependant on new background noise criteria being determined for a site, which we suggest would be very unreasonable.</p> <p>The proposed method is expected to be unworkable, as;</p> <ul style="list-style-type: none"> - The turbines are still spinning and creating noise at a wind speed of 0.9 x cut in, making L_{b0} unmeasurable without shutting down the wind farm for a significant period of time (weeks). - Turbines do not generally make significant noise at low speeds, such that the turbine is typically at least 5 dB below the level of background noise. Subtraction of the background from (turbine + background) will be highly dependant on background variation, so very inaccurate. - Summation of wind farm noise will be difficult on sites where turbine mitigation plans are implemented for varying wind speeds, particularly as individual turbines will be subject to wind conditions that vary from the reference wind speed location, due to the topography of the site. 	<p>The proposed compliance monitoring method has complicated, rather than simplified and improved the accuracy of compliance measurements as was the aim of the Guideline review.</p> <p>Section 4.5 should be removed or heavily modified, based on the issues included.</p> <p>Compliance measurement at an alternative measurement location (at distance of approximately 50m from the residence) could be considered. The alternative measurement location would be selected at the same distance from the turbines as the residence, at a location where the background noise is sufficiently low for the turbine noise to be dominant.</p> <p>An alternative compliance approach that should be considered would be validation of the original environmental noise model, by measuring sound power levels on site and then logging at a reference location (which would be far removed from all other noise sources such as residences, significant vegetation, and major roads).</p>
<p>Section 4.7 Annoying characteristics (Pg. 15)</p>	<p>Refer to the NSW Environment Court – Taralga wind farm matter.</p>	<p>Care should be taken to ensure all fundamental characteristics are excluded from the potential application of a penalty, including modulation that may occur during stable atmospheric conditions.</p>
<p>Section 4.8 Excessive noise (Pg. 16)</p>	<p>"...extent of receivers should not be confined to those identified during the DA Stage"</p> <p>The ability for the Guidelines to apply regardless of the encroachment of future dwellings is of extreme concern, given the buffer distances required and the lack of treatment options available.</p>	<p>Relevant receivers must be limited to only those locations which are agreed to be relevant by all parties during the development application. Modification of the noise criteria for a wind farm after construction is unacceptable.</p>

Reference	Issue	Suggestion
Section 5 Documentation (pg 17 – 18)	<p>It appears that a number of the documentation requirements are unnecessary, or could be better provided by the developer in the body of the development application, than in the acoustic report, including:</p> <ul style="list-style-type: none"> - ground vibration data verses wind speed -(unnecessary and unobtainable) - position of all WTG's on a topographic map -(this should have already been provided by developer) - angle direction between the line connecting the relevant receiver and nearest WTG and North (measured clockwise) -(unnecessary) - topographical map of wind farm and affected premises showing labelled contour lines -(map showing noise contours is sufficient) - estimation of vibration impact on nearest residences -(unnecessary) - wind speed data at all noise measurement sites -(it would be sufficient to provide this data for only the most wind exposed location) 	<p>Review the list of required information, only including information in the acoustic report that is relevant to the calculation of noise levels at the residences.</p> <p>A requirement for a table of wind turbine and receiver locations used in the modelling could replace a number of the current requirements.</p>
Glossary (Pg. 20)	<p>References to AS 1259:1990 are out of date.</p> <p>Reference to impulsive or low frequency noise should be carefully considered and worded as they may invoke an unwarranted negative public reaction to wind farm developments.</p>	<p>Refine definitions and explanations of several terms.</p>

The members of the SAACC would welcome a chance to discuss the above points with you in greater detail, or to provide additional comments on further revisions of the guidelines.

Yours faithfully

Principal, National Acoustic Manager
@bassett.com.au

For: Bassett Acoustics, Connell Wagner, Marshall Day, Peter Maddern, Sonus & Vipac

68/

DEVELOPMENT ACT, 1993, S49/S49A – CROWN DEVELOPMENT REPRESENTATION ON APPLICATION

Applicant:	Neoen Australia Pty Ltd
Development Number:	354/V003/18
Nature of Development:	Crystal Brook Energy Park - Hybrid renewable energy project comprising a wind farm (26 turbines with a capacity up to 125MW), a solar farm (400,000-500,000 solar panels with a capacity up to 150MW), an energy storage facility (Lithium-ion battery with a capacity up to 130MW / 400MWh) and associated infrastructure for connection to the electricity grid (including a 33kV/275kV substation and a 300m long 275kV transmission line between the substation and the 275kV Para-Bungama transmission line).
Zone / Policy Area:	Primary Industry Zone - Port Pirie Regional Council
Subject Land:	32 allotments, approximately 3.5km north of Crystal Brook and 23km south-east of Port Pirie.
Contact Officer:	Lee Webb
Phone Number:	7109 7066
Close Date:	Friday 29 June 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders Street, Adelaide during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

My name: S & J Cousins
 My phone number: 0488611463
 PRIMARY METHOD(S) OF CONTACT: Email address: smjc17@gmail.com
 Postal address: _____
 Postcode: _____

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

- My interests are:
- owner of local property
 - occupier of local property
 - a representative of a company/other organisation affected by the proposal
 - a private citizen

The address of the property affected is 28 Ferguson St Crystal Brook Postcode 5523

The specific aspects of the application to which I make comment on are:

- 1 Proximity to residences & C Brook township
- 2 Impact on visual amenity of the Flinders Ranges
- 3 Inadequacy of current EPA windfarm noise guidelines
- 4 Impact on television reception
- 5 Loss of property valuation

- I wish to be heard in support of my submission
 do not wish to be heard in support of my submission
 (Please tick one)

by appearing personally
 being represented by the following person: PAL Kingest J. Wells
 (Cross out whichever does not apply)

Date: 25.6.18 Signature: [Signature]

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapreps@sa.gov.au

Melissa Ware
16 Deakin St
Bell Park, Victoria, 3215

Mobile 0426729525

wmylyss@yahoo.com.au

The Secretary,
State Commission Assessment Panel,
GPO Box 1815,
Adelaide, SA 5001

scapadmin@sa.gov.au

29.6.18

OBJECTION TO CRYSTAL BROOK ENERGY PARK AND ENERGY STORAGE FACILITY

-Development Number 354/V003/18.- Neoen Australia Pty Ltd.

As a private citizen and owner of property and house next to the Cape Bridgewater Wind Farm (CBWF) in Victoria I am objecting to the Crystal Brook Energy Park and Energy Storage Facility based on my experiences and what is known about these proposals.

The CBWF has been causing nuisance to my family and neighbours for over ten years, the documented and verified issues of noise, vibration and sensation complaints continue despite utilising all established complaints processes, including that of the National Wind Farm Commissioner. No protective measures to prevent harm have been initiated by the Government or by the developer.

Adverse impacts of wind turbines on quality of life was recognised in Australia's Administrative Appeals Tribunal (AAT) of Dec 2017, (where I submitted evidence and testified to the impacts the CBWF has on my health), has declared that;

the "noise annoyance" caused by wind turbine generated low frequency noise and infrasound to be "a plausible pathway to disease" based on the "established association between noise annoyance and some diseases, including hypertension and cardiovascular disease, possibly mediated in part by disturbed sleep and /or psychological stress/distress".

The AAT also held that "The dB(A) weighting system is not designed to measure [wind turbine noise] and is not an appropriate way of measuring it".

Duty of Care.

- With the AAT ruling decision makers have a duty of care to protect the public, be independently informed, to be fair and to not wilfully ignore the anecdotal and factual evidence of wind farm harm being put to you. There can be no bias towards developers to condone current noise and health impacts of these industrial developments.
- Three Australian Federal Senate Inquiries, 2011, 2012 and 2015 recognised the health and noise issues, the 2015 Senate Panel visited my home, saw the enormity of the turbines, discussed the appalling noise and vibration conditions we endure and also the impacts on our lives and well-being in Parliament. They made recommendations which have since been ignored or adulterated and have not been adopted to make a difference to the lives of those of us being negatively affected by wind farms.
- There is no proof or evidence that environmental, visual, noise, vibration and sensation impacts will be avoided at or near a wind energy development let alone this 'energy park' industrial complex comprised of wind, solar, battery and hydrogen production.

Health Impacts from wind turbines

- We are not protected from wind farm noise and vibration. Detail and degree of impacts on people can be fully recognised prior to granting approvals by heeding what people like myself actually experience near existing wind developments regardless of the size or scale of development or MW outputs.

I (and many others) experience the following symptoms:

Extreme sensitivity to certain sounds, triggering a flight fright response and you have to leave the house; this is the startle reflex response and is an automatic response to inaudible or audible noise, annoyance, inability to get to sleep, sleep disturbance, exhaustion, headaches, excruciating ear pain, tinnitus, loss of balance, blood pressure changes, affected cognitive function, irritability and distress, to name a few.

Muscles in the inner ear responding to heard and unheard sound at wind farms and uncontrollably spasm and lock up as a protective mechanism against the noise. This along with the startle reflex is beyond our control, it is a subconscious, automatic human response to a trigger which we are not being protected from and which community GP's are not being alerted to. It is not 'in our heads'. It is not 'nocebo', not 'stress' and it is not a 'truth belief' causing these symptoms. Stop ignoring these impacts.

- Steven Cooper an independent acoustician investigated the acoustic conditions inside our homes at Cape Bridgewater, and at sites on and around the wind farm, has done a few investigations, (his findings are accepted worldwide); has used inaudible wind turbine amplitude modulated sound recorded in a CB bedroom and noise sensitised people exposed to low levels of that sound in a controlled environment, a reverberation chamber, have a reaction to those sounds without hearing or knowing when the sounds were played, showing that the symptoms we have been describing especially when the turbines power up or down, are real.

- During the Cape Bridgewater acoustic study Steven Cooper determined the worst symptoms or sensations we separately documented in our diaries occurred while the wind farm was powering up or down by more than 20%. This showed a turbine signature which is not recognised by dBA noise measuring.
- The acoustic impacts of the CBWF have caused me to become extremely sensitised to low frequency noise and sound pulsations and I am now affected by urban noise and everyday sounds which were not a nuisance pre-wind farm exposure. Health investigations and treatment is ongoing at our expense. Damage has occurred.

Buffer Zones

- A ten km or more buffer to wind energy projects is required as wind farms increase in height, length and size. A 1.3 km setback from this 125 MW, 26-wind turbine energy 'park', or even a 5km distance, and its cumulatively impacting 180-metre-high turbines is insufficient at reducing or preventing low frequency noise (LFN) or amplitude modulation (AM) or sound energy pulses which cause disturbance in homes and cause health impacts.
- Bowman Park being located in a valley or being surrounded by dense vegetation is no guarantee that the people using the Trail or Facilities will be protected from noise and vibration nuisance from the adjoining project.
- Goyder Council negotiated a 2 km setback for the Stony Gap wind farm which use Vestas V90 or V112 turbines. This is a slight improvement on the 1.3km at Crystal Brook.
- Locating an Energy Park with battery storage, solar farm, wind farm and a hydrogen production plant in this location will adversely impact on the township of Crystal Brook and probably Port Pirie. Wind farm acoustic emissions have been detected by independent acoustician Les Huson and others, across 3 Victorian wind farms over a 70km distance; even further at other wind farm locations.

Management of project.

- Remote controlling and external facilities monitoring the CBWF has meant the owners are not always aware of what is actually occurring on site at the wind farm i.e. when gearboxes explode, or blades split and spew fibreglass, or fires are burning near the turbines. With three or four major components to the Crystal Brook development and without effective on-site monitoring there could be a disaster ahead for the local residents.
- There are no staff on site at wf's during normal business hours except while during scheduled maintenance or repairs. This puts the onus on surrounding communities to observe the wind project and report issues to the developer, this is not the residents' responsibility. Then, to endure the movement of heavy equipment and the associated traffic jams and thumps through the ground when heavy equipment such as cranes are operating. The goodwill of communities across Australia has been severely damaged and so has Wind Developer 'social licence to operate'.

- The use of drones would be monitored under their own set of aviation regulations and not what the renewable proponent determines. No rural neighbour would feel comfortable with drones and cameras flying over or near their properties and livestock.
- The Crystal Brook Energy Generation graph depicts a fairly steady wind farm MW output, which is not possible because wind flow is naturally never steady, it stops, starts, blows too hard, too little, so no wind farm is capable of any constancy in supply. Turbines stop and start, breakdown and are shut down for maintenance. We see this every day at Cape Bridgewater and this unreliability is reflected in the energy output graphs at the AEMO and Aneroid websites.
- Neoen and other developers cannot avoid the impacts of industrial noise on people and should not be permitted to bulldoze homes as a means of mitigation. This is not 'minimising' the impacts, it is blatant destruction.

Community Consultations and 'benefits'.

- Conducting community consultations, developers proclaiming 'fair and open engagement' and of educating people with propaganda, has not resulted in communities being protected from adverse wind energy emission impacts on neighbours.
- It is not fair and open to dismiss a participant from the Stockyard Hill consultations, (and this has occurred at other developments), because of a letterbox drop and standing up to give a truer picture of what is occurring near operating wind farms.
- It is not fair to dictate the terms of reference and rules around the meetings without input to those terms by the community being engaged in the process.
- It is not fair when friends of the earth or the wind farm alliance attend public meetings or forums to disrupt them or be a threatening force as happened at community meetings in Penshurst and Ballarat.
- Media or developer polls are not an indicator of local consensus for the development of a wind farm. Pacific Hydro did a community survey but excluded anyone who lived within a certain distance to an operating wind farm and the results are skewed.
- Public consultations don't prevent horrific 'surprises' to the community while there is denial of the true impacts of wind farm noise and vibrations on people. No-one prepares you for the disturbances, the noise, the rumbles, the vibrations, the limbic fear, the health impacts and uncontrolled reactions to the amplitude modulation and LFN which drives us from our homes. No-one cares.
- Openness and transparency of wind energy generators and any commitment to resolve concerns would require using updated noise monitoring not using dBA but looking at the significant turbine signature and alleviating the impacts by altering and modifying the turbines and operations or not allowing them. It would require less secrecy about signing up landholders and letting the whole community know from the very beginning that a wind farm is being proposed for an area. Openness, would remove gag clauses and restrictions.

- Money is not a 'fair solution' to noise and vibration impacts are forcing people like me to leave our homes, properties and businesses.
- Being suitably 'responsive' should be the norm for any business but is not an answer or resolution to complaints made about wind developments while nothing changes.
- '*Sharing the benefits with the community*' never makes the destruction of the natural environment, its people or creatures acceptable. The Government should be handing out any benefits and not the subsidy reliant operator.
- A possible Government allocation of \$24 million towards any construction should not be considered any kind of benefit to the local community facing the impacts of such a development. Neoen stating that government money is being allocated, is not an indicator of transparency, nor is it an indicator of being 'an independent power producer'. This is stated even without the projects approval.
- Targeting children in schools and walkers on trails with signs and information promoting renewable energy, open days and tours of the energy project does not prepare communities or protect them from the real noise and vibration and health impacts on homes and families. It is simply advertising and propaganda.

Turbine & Planning

- For public safety, health and well-being there should be a development buffer of more than 1km from people and places of value, the recommended distance should be 10km.
- Cumulative impacts of this project and the proximity to other wind farms in the region must be factored in as a planning issue and cumulative noise issue.
- Increasing the density of turbines and increasing the turbine 'sweep' zone will increase wind shear and turbulence off the blades which predictably causes increased impacts to neighbours. Larger turbines, blades and bases create a larger mass which do not impede sound pulsations but may contribute to an increase in noise disturbance.
- Exhaust fumes, turbine breakdowns, blade splits and lifting, gear box explosions, painting of turbines, oil spatters, additional traffic, workers who don't respect the local environment or local needs, all contribute to polluting the environment and issues don't simply stop post construction as developers imply.
- Regardless of the materials and colours used in this large project, there will still be enormous visual impact on the Beetaloo Valley residents and surrounding areas. In comparison to Cape Bridgewater WF, one of the earliest in Australia, these proposed turbines are HUGE and will be visible, like other wind farms are visible over great distances, particularly when viewed from a height or over open spaces.

- Areas of high conservation or valued landscapes should be evaluated only by independent ecologists and not by the self- interested developer.
- Planning Approval bodies must realise that this nationwide industry is mostly focused on economic gain at all costs, and redesign of the development excluding half of the turbines and half of the landholders is little hardship compared to the economic situation of towns; which will cease to develop because no-one will want to live in a wind farm and no-one who acknowledges the detrimental aspects of wind turbines will want to buy property in or next door to one.
- After approval landholders excluded from any initial, often secret deals, will be dealt with in the same manner as any neighbour to wind farms and probably still bound to any signed agreements about noise etc.
- Wind developments are only financially viable due to the subsidies, tax cuts and financial 'packages', grants and government support; just because the turbines and sweep paths are larger does not guarantee financial viability for the business. Turbines with larger components face larger maintenance costs. Politics and regulations change with public expectations.

Wind Farm noise and vibration.

Wind Farm noise and vibration detrimentally impacts on neighbours and can cause;

- Unacceptable sleep disturbances
- Unacceptable vibrational disturbances to life and property,
- Health issues and ongoing costly impacts on health,
- Loss of amenity and ability to enjoy indoor and outdoor living or working spaces.
- Home abandonments, unsellable homes and properties and increased rates costs.
- Economic and social impacts causing hardship.

- The EPA methodology may have changed since 2012 but acoustic experts like Steven Cooper and Professor Colin Hansen say that wind turbine noise pollution guidelines do not relate to Australian conditions creating wind turbine noise and traffic noise guidelines which are inapplicable. Adverse and unacceptable audible and inaudible noise and vibration nuisance still impacts on neighbours inside and outside their homes and buildings.
- These energy generation complexes have a requirement to satisfy noise criteria at all residential locations yet dBA measured outside is the widely accepted criteria for measuring noise levels and impacts, so any 'compliance' conditions to protect people from broadband noise and wf 'noise' and harm occurring inside homes, can never be met.

- Lower inaudible frequencies may not be audible or heard but is uncomfortably felt particularly by people like myself becoming hypersensitised to LFN and AM. This has many impacts on health including being annoying. With current noise standards residents are not being protected from this harm.
- Noise modelling and predictions are useless as they use dBA, are based on averages and do not indicate what will occur inside homes and the bedrooms where people spend most time. They don't reflect what is actually experienced by noise sensitised residents.
- For mitigation of noise impacts, use Amplitude Modulation Noise conditions similar to those imposed on RES UK's Den Brook wind farm (Vestas V90 turbines) or the UK Acoustics 2015 Amplitude Assessment or 5dBA penalty for Amplitude Modulation.
- Each turbine emits different sound powers and the impacts on neighbours vary. These differences of sound energy are not measured by averaged dBA assessments.
- The Sonus Noise Report is deficient and like the Sonus reports for the CBWF (which were investigated during the Senate Inquiry into wf's), does not include monitoring or assessment of noise levels inside dwellings, excluding LFN, AM, or tonality occurring at lower frequencies. Sonus uses 2009 and 2007 guidelines and policies which are outdated as more accurate acoustic testing has discovered the turbine signature not covered in them. They don't reflect what is required to protect neighbouring landowners and nearby towns from harmful impacts.
- The presence of noise issues at the Waterloo wind farm (Vestas V90 turbines) has been proven in scientific papers by Dr Kristy Hansen and also by Steven Cooper at many wind farms, including the CBWF in the Acoustic Study of 2015, Dr Bob Thorne and Mr Les Huson have also confirmed the presence of nuisance at CB and other sites.
- LFN is excluded from the SA 2009 wind farm noise guidelines. NSW guidelines have been updated and include an LFN limit and separate day and night time noise limits which could help alleviate some of the wf noise issues.
- If the wf is monitored, compliance with SA EPA wind farm guidelines 2009, cannot be relied upon to prevent adverse amenity impacts on nearby neighbours.
- The Senate Inquiry into wind farms 2015 and residents across Australia request Permanent Noise Monitoring Stations to be installed at wf's, and real time noise data be publicly available on-line for the life of wind energy projects. There is an obligation to meet those recommendations.
- Noise which is predictable and measurable cannot be ignored. I and many other people are purchasing acoustic technology to accurately measure and record the soundscape where we are being adversely sound impacted. We are using a diarised method developed during the CB Acoustic Study and both tools provide a legal chain of evidence which will help in any nuisance litigation. Professionals and decision makers allowing the harm could be legally held to account.

Wind turbine Shadow flicker and glints.

- Shadow flicker and glints are problematic, they intrude onto external and internal walls and windows. They extend over long distances, flicker through trees and across roads and cause a nuisance when working indoors or out. It is an unwanted physical and mental intrusion, and screening and landscaping is not enough.
- Shutting down the turbines for the duration of shadow flicker is not a common practice and has never been implemented at CB. There is no monitoring of the shadow flicker, problems reported to wind farm operators and planning departments are ignored, no-one enforces conditions specified in Planning Permits and no-one truly cares about the well-being of neighbours either before or after the project is up and running.
- Reflections of the CB spinning blades are visible on glass in windows, in cars, on any reflective surfaces and are intrusive and distracting as you drive in the area, work and live your daily life.

Landscape mitigation.

- Landowners accepting turbines on their land to the North of the Wilkins Highway acted against the municipality's 2013 Development Plans which states that this Ranges Zone should be protected from developments which impact the "scenic amenity of the area". People should be protected from harm, it is not enough to reduce the visual impacts on residents or ignore environment protections.
- Landscape mitigation measures are usually inadequate to address the scope of impacts wf's of this size have on communities.
- Tree planting can never be tall enough to block the visual intrusion and tree planting cannot protect the population from likely turbine noise and vibration harm.
- Any vegetation screening should be sourced locally and be native to the area.
- At CB our experience with tree planting as a visual mitigation attempt included numerous applications of weed kill to clear the areas before tree planting or seeding began. This was repeated a number of times on our (unofficially) organic, and land for wildlife farm and the process actually introduced more weeds. The property had been hand weeded for the fifteen years or so prior to the program being undertaken.
- Trees planted by Pacific Hydro are in poor condition and in no way could ever protect my family as a 'block' to turbine emissions, noise, additional noise during breakdowns or maintenance, turbines powering up and down, oil leaks and sprays from exploded gear boxes or lifting chains. And totally fails as a visual barrier.
- Tree planting on our property by the developer on the fence closest to the wf is spindly and has not grown properly. Other trees further from the wf, planted afterward by us have grown normally.

- The problematic CB turbines are 105m from ground to blade tip and are considered small by today's standards. Tree planting has failed to prevent shadow flicker, glint and glint flicker, or the visual intrusion of spinning blades onto or into our house.

Flora and Fauna.

- Birds cannot be protected from wind turbines literally slicing and dicing them in an area covering several thousand hectares. A ridiculously proposed 100m buffer zone will not protect the Diamond Firetail and Hooded Robin.
- A 500m buffer zone will not protect the Wedge-tailed Eagle nest for returning birds, nor protect the eggs within the nest, nor the fledglings.
- Raptor biologists recommend 2 km buffer to reduce breeding disturbance and fledgling mortality. -Dr Stephen Debus, Ian Falkenberg (DEWNR)
- Disturbances due to vehicle movements, dust covering habitat and feeding areas, levelling, excavation, disturbance of topsoil, powerlines, noise from turbines, vibration, shadow flicker from turbines and alteration of habitat create unacceptable levels of disturbance to local species.
- At CB, other wf's and at this possible project; native, significant natural vegetation and habitats are being sacrificed and cannot be replaced or rehabilitated. At Cape Bridgewater a wedge tailed eagle nesting tree was wrongfully and quietly destroyed to allow infrastructure to be erected at the same spot.
- There is no independent monitoring of bird kills at the site.

Water.

- Moving the water source (??) will not protect birds, insects, soil biodiversity etc from harm.
- A 'specialised approach' by the developer does not provide evidence that ground and surface water will not be impacted or contaminated by the operations, underground cabling, concrete bases, access roads and sonic vibrations of this industrial complex.
- Natural Springs, water tables, rainwater tank collection or any water supplies in the area should not be interfered with by blasting or likely impacts from vibrating turbines and water sources must be investigated for unusual conditions and any risks to water supply averted. Turbine spills have contaminated water sources at CB.
- Any water used by the developer should be sourced outside the region and should be paid at usual rates and in full, by the developer.

Electromagnetic Radiation

- Electromagnetic Interference (EMI) impacts on television reception, radio, emergency services communications, GPS and point to point communications.

- Acousticians at Cape Bridgewater found there was interference to noise data collections in proximity to the wind farm, this causes blank spots in graphs, and no data is able to be recorded during the period of interference. This also impacts on post construction noise reports and Sonus is well aware of the problem. Independent investigators into noise recognise the issue.
- No-one actually independently monitors or proves that there are safe levels of EMR at wind energy projects, no-one guarantees our health is not impacted. I have witnessed a corona over the high voltage transmission lines at CB, loudly buzzing power poles and voltage meters being activated inside even when all power is shut off to the house. Coronas are a fire and health hazard.
- An independent assessor should verify when EMI interferes with residents' television or radio reception, and measure pre and post construction interference. Any verification should not be determined by neoen and their proposed 'survey' within the vicinity of the project. Cape Bridgewater experienced reception difficulties losing either Victorian or South Australian reception depending on the weather conditions impacting on wind farm operations which interfered with transmissions.

Roads.

- Roads cover a vast area of the proposed project to cause dust, more traffic, traffic noise, pollution, rubbish, road closures, long delays, roadkill, and the construction disturbances to residents continue during maintenance of the turbines and intrusions last for the lifetime of the project.
- Wind development traffic intrudes on safety near school buses and impacts on school bus timetables and routines.
- Roads are widened to allow easier movement for long, large vehicles, destroying roadside vegetation and creating additional expense for Councils to maintain over the lifetime of the project.

Emergencies and Site Hazards

- Emergencies and breakdowns occur at any time and not only within the sites working hours of 7 am to 6pm which means not only is it a long day for residents being impacted by movements at and to and from the wind farm but, disturbances will occur during the night with lights and noise and additional traffic and movements of super-sized components of the turbines etc in the area affecting sleep and normal rural night life.
- Fire Hazards. At CB and other Australian wf's turbines are not shut down on fire danger days and are not shut down during bushfires in the area. I have watched live ash carried on the wind, falling onto our land and the turbines on the Cape.
- I have witnessed a farmer doing a large burn off beneath the operating turbines and its inherent chemicals, defying common sense with total disregard to the hazard. These are potential problems likely to occur at or near the Crystal Brook development and other wf's, causing hazard to public safety.

- Wind turbines are not like usual structures, they have moving combustible parts and chemicals and should like other farming and industrial equipment in rural areas, be turned off on high fire days and must be shut down in the event of a fire so crews can safely get into the area.
- Improved access tracks are always locked at wind farms.
- Firefighters may not be insured or trained or have the required resources to fight industrial fires in a rural setting. It has been said they are not allowed within 2km of a burning turbine due to the chemicals stored on site and the chemicals within a turbine which create a risk to them.
- When wind turbines are slowed or shut down in high temperatures or high wind speed the braking system is utilised and requires an energy source, which can cause a fire hazard and additional noise and vibration.
- Aviation Hazards-The CFS acknowledges that the presence of wind turbines can impede aerial firefighting activities, (particularly in low cloud conditions).
- Turbines cannot be sited where they will inhibit the use of aerial spraying on neighbouring farming properties.
- Wind turbines must not be compared to tall structures such as buildings or trees especially when industrial turbines are close together and with wider sweep paths, the turbulence is unpredictable.
- Wind turbines are not highly visible at night, in fog or rainy conditions.
- When there are on site spills or other emergencies the electricity generator must notify the EPA and/or other relevant health and safety bodies and be monitored to ensure decontamination etc is properly done. The on-site incident/complaints form and the complaints register, including about noise etc should be readily publicly available for scrutiny.
- Wind turbine or energy generators passing the buck or responsibility onto Contractors is unacceptable, the owner operator in this case neoen should ultimately be held to account and take responsibility for hazards caused.
- Lightning strikes at wind farms create potential hazards. At Cape Bridgewater I have witnessed lightning strike a turbine, hit the ground and move rapidly from tower to tower near the ground surface.
- As the tallest moving point in agricultural areas, turbines attract lightning strikes which can split blades and start fires showing the lightning has not been safely grounded.

Aboriginal Communities

- Developers may work with Aboriginal Communities to avoid sensitive locations and address impacts but at Cape Bridgewater the developer was responsible for causing harmful division.

One of the local Koori groups was paid money, the community was divided to the extent of a member of one group being run out of town and threatened. (reported in the media & federal Senate).

- The CB development impacted on known and protected middens located on the Great South West Walk and cliffs.

Decommissioning

- Decommissioning should involve the complete removal of all concrete and wiring and not just covered by topsoil.
- The developer should by law, set aside funding for decommissioning from the start of the project.
- Renewable energy projects should not be 'recommissioned' without further community consultation, input and review by a planning body and independent assessors.

Concluding comments.

Wind farm developers must accept that individuals, the public and community groups such as the Beetaloo Valley Association and its 43 landholders, have a democratic and moral right to give feedback, validated evidence to oppose any development in their community and have that input utilised.

Supporting SA's strategic plan to think globally while developing renewable energy is questionable while so many countries around the world cannot afford the associated cost of renewable energy and are investing in coal fired energy which is cheaper and provides cheaper electricity and simpler infrastructure.

There is no guarantee this project will meet its projections to provide reliable energy nor will it provide cheaper electricity for Australian households or businesses. Any excess energy sent to Victoria or the Northern States will be done so at additional expense to consumers. Consumers are fed up by outrageous electricity bills many are being disconnected from the grid because they can't afford the bill.

Grand sustainability plans are not fine and dandy. There is understandable political uncertainty around renewable energy. A moratorium should be placed on the construction of further wind farm development until the many recommendations of the Senate Inquiries into wind farms and those of the Waubra Foundation have been adopted.

There are cumulative impacts with adjoining wind farms and with wind turbine noise and vibration being detected over vaster distances. Whilst these cumulative impacts are becoming more researched and understood by independent acousticians, those like myself whom are sensitised by these industrial sourced noise frequencies are being further adversely impacted and our health deteriorates.

With direct experiences and knowledge of living close to a wind farm and other sources of LFN I have a moral obligation to object to wind farm developments while the problems stay buried. After 10 years living with the wf we have been forced to abandon our home for medical reasons despite all attempts to avoid having to do so by seeking resolution of the problems.

Problems of wf noise, vibrations and unwanted sensations impacting my families' health and well-being and our amenity and problems have never been resolved.

The co-operative acoustic study undertaken in our home by Pacific Hydro, Steven Cooper and the participating families cannot be ignored or dismissed by regulating authorities responsible for protecting communities from harm. This study is not alone in discovering the presence of a wind turbine signature or amplitude modulation at an infrasonic rate and confirmed 'noise' and vibration problems exist. Wind farm operations have a link with sensations causing more distress and health impacts than at other times of operation. The major impact being sleep disturbance.

Mr Cooper presented a paper to the American Society of Acousticians in New Orleans last year on a study which he conducted in his reverberation chamber, where I and other participants were exposed to sounds which we were not aware of in the silence of the chamber. We involuntarily physically reacted in various ways to those unheard sounds. I also gave a presentation at this conference on my personal experiences living near a wind farm.

The unbearable conditions since the wf was constructed in 2008 have forced my family to close the door while we continue to pay the mortgage on our devaluing land and virtually unsellable property. We reside between the two homes at added personal expense and distress while we seek a resolution to our unacceptable situation.

Negotiations arranged by the NWFC failed and so has the complaints process. Pacific Hydro has not altered operations at its wf to protect the neighbours from intrusive noise, vibration and sensation. Without changes to this industry others will suffer.

Wind energy generation has not proven to be a safe or effective energy technology and while people including elders, children or disabled are being health impacted, large scale renewable energy projects are likely to cause infliction of further pain, hardship and major impacts on other rural residents and rural families and to allow this is showing deliberate and wilful blindness to the known facts.

I request families and rural populations be protected from the building of more turbines until further in the field research into the health, social, economic and environmental impacts is independently undertaken and authentic steps are initiated in protecting people from harm.

Research must be independently undertaken in the homes of the impacted and with input from those of us who are the real-life experts. South Australia has set the example of the ineffectiveness and out of control high cost of renewables as an energy source and Victoria follows the same pattern.

Cape Bridgewater is the example of impacts of a wf on heritage and cultural and tourist values, and on the homes and lives being impacted on and desecrated by a wf. The intermittency and expense of wind, solar and their back-up systems along with ruining local environments makes the push for more renewables and the building of more turbines unacceptable and fails a duty of care to the general public particularly those of us being directly adversely impacted by wf's.

My experiences and contribution to informing others about a health affected life near a wind farm should be accepted with all seriousness for the benefit of this panel and for communities; and not only be filed away; or scrutinised by developers, who over years of such submissions, have fixed the minor nuisances to garner some kind of social licence to operate, and not fixed the (wind turbine annoyance) elephant in the room.

The annoyance and noise, vibration and sensation impacts on residents at Australian wind energy projects are not acceptable. The World Health Organisation defines health as a state of complete physical, mental, and social well-being, not just the absence of disease. (WHO 1947)

There is an obligation to recognise that poor health and annoyance near wind energy projects are not legally ignored as shown by the AAT ruling and recognition that 'WTN is complex, highly variable and has unique characteristics'. Also recognised by the NHMRC.

I am willing to provide further details to support all of my statements above. Please represent the people who are being impacted already or likely to be adversely impacted by wind energy projects by recognising peoples basic right to good health and rights to live peacefully and safely in our own homes.

Yours Sincerely,

Melissa Ware

DEVELOPMENT ACT, 1993, S49/S49A – CROWN DEVELOPMENT REPRESENTATION ON APPLICATION

Table with 2 columns: Field Name and Value. Fields include Applicant (Neoen Australia Pty Ltd), Development Number (354/V003/18), Nature of Development (Crystal Brook Energy Park - Hybrid renewable energy project...), Zone / Policy Area (Primary Industry Zone - Port Pirie Regional Council), Subject Land (32 allotments, approximately 3.5km north of Crystal Brook...), Contact Officer (Lee Webb), Phone Number (7109 7066), Close Date (Friday 29 June 2018), and a note about viewing application documentation.

My name: JOHN WILLIAMS
My phone number: 0439 681692
PRIMARY METHOD(S) OF CONTACT: Email address: jandlwilliams@ihug.com.au
Postal address: 90 196A GOODWOOD ROAD MILLSWOOD Postcode 5034

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

- My interests are:
[] owner of local property
[] occupier of local property
[] a representative of a company/other organisation affected by the proposal
[] a private citizen

The address of the property affected is 59 PALMER ROAD Postcode 5523 DEETALOD VALLEY

The specific aspects of the application to which I make comment on are: SITE OF TURBINES FAR TOO CLOSE TO MANY DWELLINGS, TURBINES MUCH TALLER AND LARGER CAPACITY THAN PREVIOUS WIND FARMS, CURRENT LEGISLATION INSUFFICIENT TO CONTROL SUCH AN INCREASE IN SIZE OF THESE INDUSTRIAL MONSTERS, OVER TIME THIS SCHEME WILL DESTROY LOCAL BUSINESSES AND COMMUNITIES, SITE OF WIND FARM IS OF SPECIAL ENVIRONMENTAL TOURISM SIGNIFILANCE - NEOEN'S SUBMISSION IS A LITANY OF MISINFORMATION AND

- I [X] wish to be heard in support of my submission FALSE ASSUMPTION
[] do not wish to be heard in support of my submission PLEASE SEE ATTACHED.
(Please tick one)
by [X] appearing personally
[] being represented by the following person :
(Cross out whichever does not apply)

Date: 24/6/2018 Signature: [Signature]
Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapreps@sa.gov.au

John Williams BA(Hons), DipArch, RAIA

59 Palmer Rd, Beetaloo Valley SA 5523

25 June 2018

Dear Planning Officer ,

DEVELOPMENT APPLICATION 354/V003/18

I request your attention, consideration and valued appropriate action in relation to the comments below and NEOEN's application to install a mass of ¼ kilometre high wind turbines, associated roads and industrial size civil works, concentrating the towers on a small portion of land immediately above the outskirts of the township of Crystal Brook and directly facing the well-established Beetaloo Valley local community. I list the following issues that I believe require due and proper consideration before any development is granted approval on this special and significant site.

- a) The proposed wind turbines have been sited far too close to a significant number of dwellings without proper consideration of future health issues, loss of amenity, visual impact and loss of value to the adjoining properties and communities. These turbines will be some of the tallest structures in Australia, very considerably larger, and in a greater concentration than previous developments, rendering all previous guidelines, set back distances, and acoustic requirements seriously outdated. Unless the time is taken to independently review the impact of these towers with their much increased foil size, height and larger capacity turbines there is the risk of having a planning disaster which seriously compromises the various communities in the area.
- b) The proposal runs the risk of reducing future value and development potential of adjoining state and commonwealth owned conservation parks, local historic infrastructure, and the iconic Heysen and Mawson trails. It also risks the hard won 'good will' associated with current tourism ventures. If this massive industrial site reduces the viability of these current operations and any future development, then any short term gain with marginal job opportunities for locals during construction may be seriously outweighed by future degradation of economic opportunities. A few individuals large monetary gain may be at the expense of the wider community's future economic wellbeing and viability.
- c) The development site is part of Beetaloo Valley. On superficial inspection Beetaloo Valley may look void or only sparsely populated by affected residences. However due to the size and nature of the land titles there is a considerable concentration of full time residents directly affected along the valley. When independent verification was requested from NEOEN on future possible disruption from low frequency noise produced by the foils and turbines of the size proposed, with the concentration of turbines in this specific location at the base of the valley, it very soon became apparent that no meaningful data would be provided from NEOEN, and the consultants approached that had the expertise in this field were unlikely to give a residents association information that could jeopardise them getting future consultancy work within the wind farm industry. These turbines are not being sited on a ridge top well away from any homes like many other wind farm developments. The grave concern for Beetaloo Valley residents is, like the Welsh hill farmer calling up the valley to speak to their neighbour who due to the acoustics can very clearly hear what is being said 2 or 3 miles down the valley, with this concentration of turbines in this location there may be a similar affect to the old wind up gramophone where a vibrating needle on a piece of vinyl directed through a horn or a sound box projects the noise across the room or in this

case up the length of the valley. Until we can independently verify the acoustic effect on homes close by to these massive turbines there is a potential of an acoustic disaster for those living near the site. We note that NEOEN appear to be distancing themselves from this scheme and any future liability by getting the land owners of the turbine sites to provide written advice that the turbines will be noisy. South Australia's EPA Act clearly defines limits allowed for noise levels emitted by industrial plant and the like. If independent verification that the EPA requirements can be met by these much larger foils and generators isn't forthcoming, then any approval given prior to this verification would surely have a level of liability. Any independent noise monitoring carried out prior to completion of turbine construction using calibrated equipment to certifiable legally admissible standards could be used for future legal action. When asked at a public meeting what ongoing liability they considered they had for the design and location of these turbines, NEOEN stated very clearly that in their consideration if state government gave approval to this scheme, liability would be passed to the government not NEOEN.

- d) If you look at a map of South Australia and the route the Goyder line takes, it will be seen to come diagonally across Eyre Peninsular across the gulf to Kadina then does a quite astounding loop north up between Port Pirie and the Flinders Ranges, then loops across the ranges at Melrose and down the eastern side as far as Kapunda, where it re-joins its original direction. The reason for noting this is to give some indication as to the very special nature of the Southern Flinders Ranges, including Beetaloo Valley and the hills immediately north of Crystal Brook. Throughout our discussions with NEOEN they seemed either not to understand or be disingenuous about the significance of their proposal on the natural environment. It also appears to be totally dismissed by the interstate landscape consultants used in NEOEN's supporting document. Many scientific establishments across Australia have grave concern for the current exponential degradation of flora and fauna across rural Australia. Flinders University are currently operating a survey to track the decline of goannas across the state. They have confirmed there are only 2 sites in this state where Lace Monitors have been consistently recorded. One is a small location on the Murray River; the other is Beetaloo Valley. If you live in Beetaloo Valley you become familiar with these large creatures and their movements up and down the valley along the creek system at different times of the year. To even contemplate blocking/disrupting the passage of wild life up and down Crystal Brook with massive industrial civil work seems incredibly short sighted at the very least. The idea that the landscape consultants suggest that as part of the planning approval the massive concrete foundations can be 'micro sited' and planting can be provided elsewhere to offset the disastrous effect of this proposal seems too ignorant and crass a statement to bear consideration. Understanding the detail of each of the separate regions of South Australia takes a lifetime of expert study. The risk of damage is too great not to get the correct level of independent expert assessment prior to any decision being made.
- e) The local residents have argued against a previous and equally ill-conceived wind farm scheme a few years ago, so inevitably there is a degree of battle weariness to go through it all again with this new proposal. The concern is that the current scheme is worthless without planning approval and will only gain legs if approval is given. If this happens we will have to fight it through the high court and beyond with all the attendant cost, time and stress. Local residents have spent very significant time and savings on building their homes in the most passive and sustainable way, and in harmony with their surroundings. If this scheme gets the go ahead their hard earned serenity will be blown apart. I can't believe that the potential

havoc wreaked by this scheme would be a fair exchange for the monetary gain of a few individuals who appear to be much happier living in Adelaide or Coffin Bay than being part of the community here.



Lace Monitor foraging, Beetaloo Valley

- f) Whenever decisions are made back in Adelaide regarding rural issues there is inevitably a feeling of loss of control by rural communities. Some decisions appear to be made without proper or with only a superficial understanding of the needs of the local community involved. When Mr Weatherill effectively told us we were part of turbine alley and we should put up and shut up in relation to any new proposal, again you felt that any decision arrived at was likely to be made without due consideration of the effect on the local community. You also felt that if towers were being proposed a similar distance away from Mr Weatherill's home they would have not a cats hope in hell of getting approval. Our expectation of a good decision should not be diminished just because we live some hours drive away from Adelaide or because we choose not to live in the metropolitan area or along the 'hills face zone'.
- g) There is also concern that short term advantage and the \$800,000 funding per year for these towers will be reducing over a relatively short period. When more effective technology like the Snowy 2.0, Tasmania's pumped hydro scheme and thermal solar plants start coming on line we will be left with a wind farm that becomes relatively less and less efficient and looks more like rusting dinosaurs marching across the landscape. The Netherlands currently has problems with competing on the European power network. They rely heavily on expensively constructed wind turbines providing electrical output that can't economically compete with other European countries' hydro technology and the like that are able to be turned on when

electricity prices peak and turned off immediately they drop. It seems we are at a stage where less incentive should be given to companies from the other side of the world to make huge profits from South Australia for wind turbines and recoup their construction costs through state funded subsidies within only a few months not years. We request that the state government and the SCAP as their representatives are rigorous in reviewing the viability of this scheme, including any potential problems, before giving approval and the ensuing subsidies. Please make sure in planning terms any approvals from here on in are able to future proof the power network in South Australia. No dinosaurs in our back yard please.

- h) The science is yet to be carried out on the health risk of low frequency noise at the level made by turbines of this size. Again to say that there is no known health risk as NEOEN's submission does is disingenuous to say the least. The wind turbine industry is beginning to get a reputation for tracking down and taking legal action against individuals that question the risks associated with their developments. Consultants that wish to remain on the payroll have to toe the industry's line. If we don't carry out independent assessment of turbines of this size prior to giving approval there is a very significant chance that we will be left with a whole range of problems on completion of construction that are impossible to resolve. Can you please make sure that all the necessary independent expert planning and consultation on this complex application is complete before planning approval is given?
- i) It is revealing to note the projections indicated in Tasmania Hydro's executive summary in support of their latest power network announcement. It clearly shows South Australia's ability to provide peak power, by wind turbines, bumping along the bottom of the graph compared to other states. It is also clear from this report that chemical batteries will never provide sufficient buffer to even out the troughs in supply that wind turbines experience in this state. If subsidies and planning approvals reflect a path best suited for wind farm profits by international companies rather than the best interest of south Australia's electricity users, where then will the money come for the alternative schemes that will solve the problem. Tasmania and many European countries have wind profiles that suit peak power requirements, what we have that Tasmania doesn't is clear skies for solar thermal production during peak power periods. Where will South Australia be when the current batch of wind farms are at end of life and they haven't produced the quality of peak power to sustain viability in this state.
- j) Chemical batteries are unlikely to solve an ailing power system. If Hydro Tasmania's report is correct, even by 2050 they will only be able to maintain a few hours backup nothing like the 24+ hours required to level out the troughs in wind turbine delivery. Federal government is also supporting the Snowy 2.0 planning report. The Tasmanian government is funding the equivalent pumped hydro report for their state, does South Australia have a comprehensive verifiable power network plan specific to our needs to guide planning authorities, or are we just guessing that the current grants to foreign companies, who are making massive instant profits, will give us a long term solution here in this state. Putting a defibrillator outside every pub or food outlet selling high sugar content processed foods may save lives and kick start someone after a heart attack but isn't it better to solve the core problem and have less heart attacks to deal with. Focus on the companies that make large profits from pushing alcohol and sugar intake. Likewise a well-balanced electrical network rather than one heavily loaded in favour of a single system that needs chemical batteries to kick start it back to life after a system failure.

- k) Too many wind farms will cause the problem not solve it. Again if Hydro Tasmania's projections are correct SA will not be able to keep up with the other states for peak power demand if they stick to building more and more wind farms. In planning terms money must be directed into diversification either by solar thermal or even SA's own pumped hydro scheme. If all tax payers' money is directed toward wind farms we are potentially planning for a failure.
- l) Site photos of much smaller turbines show the massive amount of work that goes into forming a footing. These turbines will require 20,000 tons of concrete each plus a quite staggering amount of reinforcement, prior to pouring the concrete steel reinforcement looks like a bird nest covering the whole massive foundation. These turbines are much closer together than previous projects and are being crammed together on the iconic Heysen Trail. As the Heysen Trail travels up through South Australia it picks up most of the best and iconic sites this state has to offer. When it reaches the Bundaleer Forest it takes a dramatic turn west to pick up Crystal Brook and the route up Beetaloo Valley. Crystal Brook at this location is sheer magic with old river gums lining the creek bed. A worthy inclusion in the Heysen Trail which will be totally devastated by this approval. The idea from any consultant with any level of expertise that 20,000 tons of concrete with all the attendant truck and equipment movement during construction can be 'micro managed' is so utterly unbelievable on such a stunningly beautiful site. Do we really have to take any of this report seriously?
- m) Will this planning approval eventually end up turning Crystal Brook into a ghost town? When asked at a public meeting NEOEN could not give an example of a wind farm that came anything like as close to adjoining owner's homes or townships.
- n) In planning terms I can't see how NEOEN's data can be taken at face value without truly independent engineering and scientific comment. If NEOEN's data is taken as verbatim without due diligence, surely, as NEOEN suggests, liability will be passed to the state government and any signatories to this approval. It is emerging in current high profile cases that individuals that thought they were fully protected by the institutions they represent can be found individually liable and sentenced accordingly. Certainly this has already occurred in planning cases in the Europe. If this approval becomes such a disaster that people lose their homes and all their financial assets I suspect there will be an opportunity for a lawyer at some time in the future to take on a class action. If a few landowners can appoint NEOEN to take their case I suspect a much greater number of home owners could appoint a Senior Counsel to act on their behalf.

"When you find something you love, you should look after it, nurture it, and fight for it" ...

Yours faithfully,

John Williams.

DEVELOPMENT ACT, 1993, S49/S49A – CROWN DEVELOPMENT REPRESENTATION ON APPLICATION

Applicant:	Neoen Australia Pty Ltd
Development Number:	354/V003/18
Nature of Development:	Crystal Brook Energy Park - Hybrid renewable energy project comprising a wind farm (26 turbines with a capacity up to 125MW), a solar farm (400,000-500,000 solar panels with a capacity up to 150MW), an energy storage facility (Lithium-ion battery with a capacity up to 130MW / 400MWh) and associated infrastructure for connection to the electricity grid (including a 33kV/275kV substation and a 300m long 275kV transmission line between the substation and the 275kV Para-Bungama transmission line).
Zone / Policy Area:	Primary Industry Zone - Port Pirie Regional Council
Subject Land:	32 allotments, approximately 3.5km north of Crystal Brook and 23km south-east of Port Pirie.
Contact Officer:	Lee Webb
Phone Number:	7109 7066
Close Date:	Friday 29 June 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders Street, Adelaide during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

My name: LINDSEY WILLIAMS
 My phone number: 0405 559 130
 PRIMARY METHOD(S) OF CONTACT: Email address: lwilliams@ihug.com.au
 Postal address: _____
 _____ Postcode: _____

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

- My interests are:
- owner of local property
 - occupier of local property
 - a representative of a company/other organisation affected by the proposal
 - a private citizen

The address of the property affected is 59 PALMER RD BEETALOO VALLEY Postcode 5523

The specific aspects of the application to which I make comment on are: PLEASE REFER TO ATTACHED LETTER (5 PAGES)

.....

.....

.....

- I wish to be heard in support of my submission
 do not wish to be heard in support of my submission
 (Please tick one)
- by appearing personally
 being represented by the following person : _____
 (Cross out whichever does not apply)

Date: ... 25/6/2018 Signature: Lindsey Williams

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapreps@sa.gov.au

Lindsey Williams
williams@ihug.com.au
25 June 2018

TO: SCAP
scapreps@sa.gov.au

REPRESENTATION ON APPLICATION

I write regarding Development Application 354/V003/18.

I am completely supportive of the solar farm and battery storage aspects of the proposal. However I have significant concerns regarding the proposed windfarm component.

The proposed turbines are to be located on the southernmost tip of the Flinders Ranges. The beautiful landscape of the Flinders is an iconic natural feature in South Australia and an important state, national and international eco-tourism destination. It is also a magnificent and serene environment in which to live. We all need to be rigorous about the preservation of our remaining natural heritage and landscapes, not just for ourselves but for our grandchildren's grandchildren. To do this we must be prepared to look at the big picture, and call out inappropriate development in iconic settings. This is a proposal where short term gain will be at the expense of long term, irreparable physical damage. There may well be knock on effects for tourism at Crystal Brook, and there is a distinct possibility that jobs gained by the development will be offset by jobs lost in the ecotourism sector.

It is my belief that it would be reckless for the SCAP to grant approval for the application with the windfarm in this location. I consider the following aspects need to be fully resolved before any assessment is made by the Panel:

1. **Proposed development within the Rural Landscape Protection Zone**

The proposal as submitted includes at least one Wind Turbine Generator (WTG) located in Rural Landscape Protection Zone (RLPZ) Policy Area 12. This is totally at odds with the desired character of the zone as described by the Port Pirie Council Development Plan, consolidated October 2017, and should be refused outright to avoid the possibility that a precedent is set for further industrial development within an zone where the intent is "to preserve the natural and rural character...of the ranges". Another 2 WTGs are proposed on land parcels that are partially or mostly within the RLPZ – due to the nature of the application it is difficult to assess whether the WTGs are within the RLPZ. These should be subject to specific conditions to ensure the zone boundary isn't traversed by micro-siting. Preferably, if permitted at all, they should be relocated well clear of this boundary. Cabling through the RLPZ both north and south of Wilkins Highway should be subject to stringent conditions regarding land parcel-specific flora and fauna surveys (no survey appears to have been carried out north of the Wilkins Highway), construction methods and reparation proposals, to ensure the long term integrity of this zone. NEOEN's application states categorically that the proposed development is within the Primary Production Zone and does not include any acknowledgement of the WTGs or cabling routes within or immediately adjacent to the RLPZ.

2. Height of WTGs as proposed

NEOEN has advised that the WTGs may be up to **240m** in height. The proposed height of **hubs** (161m) is only 4 m short of the **total** height proposed at Palmer Wind Farm, which itself is well above the next tallest turbines approved in South Australia, and twice as tall as the majority of WTGs in this state. Most WTGs in South Australia are 100 – 140m high to blade tip, with hub heights of 60 - 90 m. 240m is only just short of some of the tallest buildings in Australia, and nearly twice as high as Westpac house (132m), the tallest building in Adelaide. That they are **twice as high** as others along Highway 1, ie, Snowtown, Clements Gap, approved Pt Augusta wind farm, indicates that this is perhaps not the best site for wind generation. The need for this enormous height is not explained anywhere except in relation to towers on flat land to the east of the ranges. I note also that 2 allotments nominated as WTG locations have none shown. Approaching the wind farm from either direction on the Wilkins Highway, the WTG closest to the road will be in the order of 290m – 300m above the road, and within the same distance set back. From Crystal Brook township, they will be 390m above the height of the main street. The Landscape Visual Impact Assessment (LVIA) asserts that that the project will not have a significant visual effect on the character of surrounding residential localities. That is a subjective viewpoint, at odds with the assessment of many local residents. The wind aspect (and therefore the application as submitted) should not be approved at all unless the maximum permissible height is significantly reduced and strictly enforced.

3. Spacing of WTGs as proposed

The WTGs are shown irregularly spaced, between 400m and 730m apart as scaled from the mud maps provided in the application. Regular spacing is an explicit principle of Wind Farm development in terms of visual impact, refer p76 of the Port Pirie Council Development Plan, consolidated October 2017 and SA Windfarm Development Guidelines 2014. The proposal is therefore non-compliant. Spacing in the windward direction for 160m high turbines at Pt Augusta is 500m, so by interpolation these should be 750m apart to have the same density effect. Similarly, by interpolation, the regular rows should be a minimum of 1.2 km apart. Clearly these figures are based on achieving a similar density to a similar current project, where turbines will be only 60% of the height of the Crystal Brook proposal. I do not presume to suggest optimum spacing for wind turbulence or noise output minimisation and the like. Visually, the spacing needs to be regular. At the proposed height, there needs to be a much greater & enforceable, space between the WTGs.

4. Inaccuracies, errors and omissions in documentation

Whilst reading the application, I noted a considerable number of errors and inaccuracies in the documentation submitted. Although these items might appear petty or minor, it seems to me that they are indicative of a proposal that is lacking in clarity and detail. Examples include: erroneous nomenclature such as the "Crystal Brook ranges" (they are the Flinders Ranges), erroneous information regarding the route of the Crystal Brook and Heysen trail route, lack of consistency in proposal between different site layouts. Table 3.1 calls up wind "s and n of Wilkins Highway". Two CTs are called up in the land parcel list for WTGs with no turbines noted on any of the site layouts. There is no site plan showing the CTs, which I understand to be a standard requirement for Development Applications. There is no standard format scale nominated on the site layouts provided. NEOEN's application does not include any reference to the fact that aspects of the project including turbines and cabling

are clearly located in the Rural Landscape Protection Zone, and states categorically on the application cover page that the proposed development is within the Primary Production Zone.

I note that all site layouts are labelled DRAFT. There are no identifiers against the WTGs in the primary document (Vol 1), and connection routes, private access roads including junctions with public roads, fence lines around various elements and the like are not identified on site layouts. Several of the WTGs appear to be located extremely close to public roads, and there is no indication of what safety measures will be in place to protect the general public from failure of towers or blades, or what actual setback is proposed. No geotech studies have been reported, so the "micrositing" of WTGs may become "macrositing" in order to find satisfactory founding material and provide cost-effective footing structures.

The LVIA assesses the characteristics of a number of properties as high sensitivity, high duration, high or moderate extent and high overall magnitude, but grades these properties as having only moderate visual effect. This seems an unlikely result. High + high + high + high would normally indicate a resultant outcome of high. The LVIA in its summary of visual impact notes that "2 of the 14 locations" would experience a moderate to high visual impact; however 1 of these "locations" refers to 15 individual dwellings, so in fact 16 of the 30 properties (more than 50%) assessed would experience a moderate to high visual impact. There are at least two other properties along Beetaloo Valley Rd, within a couple of hundred metres of H19 but located at higher elevations, which would have a constant, significant view of all turbine hubs and blades. These have not been mentioned in the assessment. The idea that the difference between views at 3 km and 3.2 km is so great as to render the latter undeserving of assessment would be laughable if it weren't so sad for the residents. All assessments take into account all three aspects of the development, i.e. solar farm and battery storage as well as wind farm even where the former are known to not be visible due to their relatively low height and intervening landforms. However these aspects are still used to downgrade the overall visual effect. This is disingenuous at least, and could be considered deceitful.

It seems unreasonable to expect that the Panel can properly assess a DRAFT layout. It could be inferred that this is something of an ambit application, submitted in a scramble just one day before expiry of Crown sponsorship.

5. Inaccurate reporting and bias

The report uses poll data without qualification. The results of the poll trumpeted on page 3 of the application could (mathematically) be responses from as few as 43 individuals living more than 20 km from the site. There is no indication of when the poll was conducted, how long it ran for, whether multiple votes could come from 1 computer/user, or what the readership of the particular newsletter is. The poll should be discounted as an indication of local support for the project, particularly in light of the more than 800 signatories to a local petition against the wind farm component that was presented to the state government last year. The application also insinuates the BVA as troublemakers, not as residents who have a valid vested interest in the outcome of the proposal.

As would be expected, the various consultants' reports have been paid for by NEOEN or the proponent landholder. Naturally, each report has been constructed and edited to provide the best possible slant on the data collected. But there are omissions in reporting – such as the acoustic consultant's refusal to provide a copy of raw data collected to the households where sound monitoring was carried out, and the plethora of wildflowers which were not blooming when the landscape data was collected. The windfarm best practice guidelines for flora study advise that it should be carried out in spring when the majority of wildflowers are in growth/blooming. NEOEN have been working on this proposal for more than 12 months so had the opportunity to accomplish this but didn't.

I acknowledge the community consultation that was carried out by NEOEN in respect of the property owners and residents of Beetaloo Valley. However the residents of Crystal Brook were not recipients of anything like the same level of genuine consultation. In fact the revised scheme as submitted, with significantly higher impact on the township and surrounding rural households than the initial scheme, was shown to residents without overarching explanation (eg public meeting/presentation), just a display on a weekday to individuals as they came along, and without the benefit of a public forum, THREE DAYS before the application was submitted. This is hardly community consultation let alone best practice consultation. Although NEOEN claim that this was the third public display in Crystal Brook, I can find no record, including on NEOEN's Crystal Brook Energy Park website, of the 2nd open day they claim to have held in August 2017. I was certainly not aware of it at the time. The open day held back on March 2017 was for a significantly different proposal.

NEOEN acknowledge that there may be interference to TV reception, but propose to "maybe choose" to do something about it. How will NEOEN come to a decision about whether they choose to make reparation for disruption of TV reception? The people of Crystal Brook and others in direct line of the Bluff south and east of the proposed WTGS deserve to be able to access local TV content as they can at present, and which is not available via Satellite TV. There is no mention in any report about whether there will be interference with mobile phone coverage – this is already an issue in this area and must not be reduced by the proposed development.

6. Inappropriate or naïve proposals

My understanding of fauna movement is that it varies according to season and available food and water sources, and relies on flora corridors rather than discrete patch habitats. How will diamond firetails know to stay within 100m of the habitat assigned to them?

How will the assessment be made as to whether turbine footing requirements outweigh the requirements of native flora and fauna habitat? If 20,000 tonnes or more of concrete is required for each footing, this can hardly be expected not to displace local native vegetation and disrupt local fauna habitat.

With WTGs 240m high, on top of hills which sit significantly above adjacent roads, towns and individual residences, how can any assessment of visual impact come up with a finding of moderate? The whole landscape of the Flinders Ranges immediately north of Crystal Brook will be massively affected.

I note the intent to address potential impacts to Aboriginal Heritage during construction phase. By the time constructions starts surely it will be too late to do this.

Conclusion

In conclusion, I reiterate my belief that locating a windfarm on the Flinders ranges is ill-judged, short-sighted and driven by the greed of a handful of local landowners to the detriment of hundreds of other local people including the property owners and residents of Crystal Brook, Beetaloo Valley and Gladstone. The Crystal Brook Energy Park should not be approved to proceed in its current form.

Lindsey Williams
25 June 2018

DEVELOPMENT ACT, 1993, S49/S49A - CROWN DEVELOPMENT REPRESENTATION ON APPLICATION

Applicant:	Neoen Australia Pty Ltd
Development Number:	354/V003/18
Nature of Development:	Crystal Brook Energy Park - Hybrid renewable energy project comprising a wind farm (26 turbines with a capacity up to 125MW), a solar farm (400,000-500,000 solar panels with a capacity up to 150MW), an energy storage facility (Lithium-ion battery with a capacity up to 130MW / 400MWh) and associated infrastructure for connection to the electricity grid (including a 33kV/275kV substation and a 300m long 275kV transmission line between the substation and the 275kV Para-Bungama transmission line).
Zone / Policy Area:	Primary Industry Zone - Port Pirie Regional Council
Subject Land:	32 allotments, approximately 3.5km north of Crystal Brook and 23km south-east of Port Pirie.
Contact Officer:	Lee Webb
Phone Number:	7109 7066
Close Date:	Friday 29 June 2018
During the notification period, hard copies of the application documentation can be viewed at the Department of Planning, Transport and Infrastructure, Level 5, 50 Flinders Street, Adelaide during normal business hours. Application documentation may also be viewed during normal business hours at the local Council office (if identified on the public notice).	

My name: WESLEY NEIL CRISP

My phone number: 0427 802 673

PRIMARY METHOD(S) OF CONTACT: Email address: wncrisp@gmail.com

Postal address: 335 BEETALOO VALLEY ROAD
BEETALOO VALLEY SA Postcode 5523

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

- My interests are:
- owner of local property
 - occupier of local property
 - a representative of a company/other organisation effected by the proposal
 - a private citizen

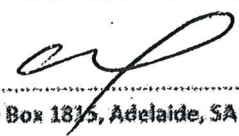
The address of the property affected is 335 BEETALOO VALLEY ROAD, BEETALOO VALLEY Postcode 5523

The specific aspects of the application to which I make comment on are:

PLEASE REFER TO ATTACHMENT.

- I wish to be heard in support of my submission
 do not wish to be heard in support of my submission
(Please tick one)

- by appearing personally
 being represented by the following person:
(Cross out whichever does not apply)

Date: 28 / 06 / 2018 Signature: 

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapreps@sa.gov.au

Attachment referring to Development Number 354/V003/18

My objections to Neoen's proposed wind farm are as follows:

- Neoen want to erect their 240 metre high turbines on the Southern Flinders Ranges. The ranges that they want to install their turbines on are at least 240 metres above sea level. The surrounding country to the south, west and north of the turbines, where most of the local population reside, is approximately 100 metres or lower above sea level. This means that the turbines will be at least 380 metres in height above sea level. This represents a massive degradation of the visual amenity of the Southern Flinders Ranges. The potential for Neoen to adversely effect the long term revenue generated by tourism and its support industries is huge. Converting the attractive and much loved natural landscape of the Southern Flinders Ranges into an industrial backdrop will also have far reaching negative impacts on a myriad of issues pertaining to the liveability of the local region.

- The height/size of the turbines (at least twice the height of existing wind farm tower/turbine combinations), their potential output and the condensed placement of the turbines (industry standard at least 10 blade lengths separation between turbines, Neoen propose as low as 3 blade length separation) up against the outskirts of Crystal Brook and multiple rural residences are **unprecedented**. The closest turbine is only approximately 3.5 kilometres from the centre of Crystal Brook (a town with a significant rural population of more than 1500 people). The proximity of a turbine to one rural residence is only approximately 1.3 kilometres. There are no other wind farms in Australia with these sorts of proximities to established towns or residences. The potential for Neoen to initiate a myriad of health and lifestyle problems associated with their wind farm is immense.

- The **unprecedented** nature of the size and output of the turbines along with the condensed nature of their arrangement means that Neoen's potential to produce noise pollution, low frequency infrasound, amplitude modulation, vibration and associated negative health impacts is massive. The EPA already identify noise complaints as increasing, for existing wind farms. EPA research has also found the accuracy of the current software used for modelling noise impacts on residences is unsatisfactory, noting discrepancies between predicted results and those actually recorded on site. The number of peer reviewed studies stating the diverse range of serious negative health impacts associated with living in close proximity to the generation of certain types and frequencies of noise, linked to wind farms, is growing rapidly.

- The lack of background noise monitoring conducted by Neoen. Virtually no noise monitoring was conducted at non affiliated residences.

- The poor quality and lack of transparency of Neoen's background noise monitoring data collection techniques. They refused to allow independent review of the data collected. They only collected data for a short period over harvest, when local vehicular traffic was at its peak, supposedly in an attempt to skew results to their advantage.

- Neoen's wind farm proposal will bring about a real financial loss to all non associated residences, both in Crystal Brook and adjacent rural residences, because of the fact that residential properties in proximity to current wind farm developments are hard to sell, get sold for lower than market price or do not get sold at all and owners are forced to abandon their properties. This will mean that the local real estate market will get flooded with devalued residences driving down all local resale values and virtually wiping out the potential for all future residential development.

- Neoen's proposal contains a disproportionately large number of errors, inaccuracies, blatant falsehoods, and omissions of fact. That, coupled with the fact that they submitted their proposal days after the due date of their application extension had expired, presents a level of bewildering incompetence that evaporates all remaining confidence that the wind farm could possibly be executed in a fashion that would meet even the lowest industry standards. This alone should be sufficient to disintegrate Neoen's application.

DEVELOPMENT ACT, 1993, S49/S49A – CROWN DEVELOPMENT REPRESENTATION ON APPLICATION

Applicant:	Neoen Australia Pty Ltd
Development Number:	354/V003/18
Nature of Development:	Crystal Brook Energy Park - Hybrid renewable energy project comprising a wind farm (26 turbines with a capacity up to 125MW), a solar farm (400,000-500,000 solar panels with a capacity up to 150MW), an energy storage facility (Lithium-ion battery with a capacity up to 130MW / 400MWh) and associated infrastructure for connection to the electricity grid (including a 33kV/275kV substation and a 300m long 275kV transmission line between the substation and the 275kV Para-Bungama transmission line).
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My name: ANITA CRISP
 My phone number: 0427 609 404
 PRIMARY METHOD(S) OF CONTACT: Email address: anita.crisp@bigpond.com
 Postal address: 335 Beetaloo Valley Road
BEETALOO VALLEY VIA CRYSTAL BROOK Postcode 5523

You may be contacted via your nominated PRIMARY METHOD(S) OF CONTACT if you indicate below that you wish to be heard in support of your submission.

- My interests are:
- owner of local property
 - occupier of local property
 - a representative of a company/other organisation affected by the proposal
 - a private citizen

The address of the property affected is 335 Beetaloo Valley Road, Beetaloo Valley..Postcode 5523

The specific aspects of the application to which I make comment on are:

.....

Please refer to attachment

.....

.....

I wish to be heard in support of my submission
 do not wish to be heard in support of my submission
 (Please tick one)

by appearing personally
 being represented by the following person :

(Cross out whichever does not apply)

Date: 27/06/2018 Signature: 

Return Address: The Secretary, State Commission Assessment Panel, GPO Box 1815, Adelaide, SA 5001 or scapreps@sa.gov.au

It is recommended that the windfarm component of development application 354/V003/18 be refused on the following grounds:

1. The application is significantly at variance with the following sections of the Port Pirie Council Development Plan:

Port Pirie Council Development Plan Consolidated - 31 October 2017	Variance
<p><u>Rural Landscape Protection Zone</u> OBJECTIVES 1 Preservation of the natural and rural character and scenic, scientific, and heritage features of the zone whilst accommodating established pastoral, agricultural and forestry activities.</p> <p>2 Low-intensity rural activities (cropping and grazing) on large land holdings together with public/private open space and where structures are located and designed in such a way as to:</p> <p>(a) preserve and enhance the natural character or assist in the re-establishment of a natural character in the zone</p> <p>(b) limit the visual intrusion of development in the zone, particularly when viewed from public spaces, and in particular National Highway 1 and/or Scenic Drive</p> <p>4 Provision of opportunities for the public to experience and appreciate the significance of the native vegetation and original remnant natural habitat of the area through low impact recreational activity.</p> <p>5 Development that contributes to the desired character of the zone.</p> <p>DESIRED CHARACTER The western slopes of the southern Flinders Ranges are an important natural asset to both the agricultural and tourism industries. Development which is undertaken in this zone should be small scale and be sited unobtrusively so as to blend with and preserve the character and amenity of the locality and be landscaped with the use of local endemic species to screen development from public view.</p> <p>Furthermore, development should not only preserve but should also enhance the natural character of the zone or assist in the re-establishment of a natural character. The term "natural character" refers to the natural topography, native vegetation and colours, such as greens and browns of non-reflective earthen tones, normally associated with a natural landscape.</p> <p>The natural character of the established agricultural areas refers to the open character of the land in those</p>	<p>One wind turbine is located within the Landscape Protection zone. This will set an unacceptable precedent for incompatible development in this zone, which extends across five Council districts continuously along the Southern Flinders Range to Hawker.</p> <p>All wind turbines in the Primary Production zone are located immediately adjacent to the Landscape Protection Zone and will have a significant visual intrusion into this zone.</p> <p>Industrial wind turbines do not contribute to the desired character of the Landscape Protection Zone.</p>

<p>areas of the zone where cropping and grazing currently predominates.</p> <p>The Heysen Trail passes through the zone and the southern section of the Mount Remarkable National Park is situated within the northern portion of the zone and consist a large area of intact native vegetation.</p> <p>The extent of native vegetation and open grassland, the steep slopes and the difficulty of access combine to make this zone a high fire risk area. It is important that development incorporates fire protection measures to minimise the fire risk. While vegetation management is an important part of minimising the fire risk, the destruction of existing native vegetation and failure to provide landscaping as to screen buildings and improve the amenity of the zone are not considered acceptable fire protection measures.</p> <p>Activities and projects by State and local agencies which are considered necessary in this zone should be located, sited, constructed and maintained to promote the objectives for the zone and complement the principles of development control relating to this zone.</p> <p>The conservation of the scenic, scientific and heritage, features of the environment is intended as the paramount objective when assessing future development proposals in the Ranges Zone. There has been a long-standing, harmonious, marriage between conservation and other rural uses in this part of the Ranges which is intended to continue and not be put at risk by new forms of development.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL</p> <p>Land Use</p> <p>1 The following forms of development are envisaged in the zone:</p> <ul style="list-style-type: none"> ▪ low intensity farming and grazing ▪ recreation and tourist infrastructure for the interpretation and appreciation of the natural features of the zone ▪ supplementation of existing farming activities through small scale tourist accommodation <p>Form and Character</p> <p>4 Development should not be undertaken unless it is consistent with the desired character for the zone.</p> <p>7 Development should not be undertaken unless:</p> <p>(a) it is associated with a low intensity agricultural activity, a public open space area or a private use of an open character</p> <p>(b) together with associated native landscaping, it preserves and enhances the natural character of the zone or assists in the re-establishment of a natural character.</p> <p>9 Pipelines and transmission lines should not be routed through the Rural Landscape Protection Zone unless no practical alternative exists.</p>	<p>Industrial wind turbines are not visaged form of development in this zone.</p> <p>Industrial wind turbines are not consistent with the desired character of this zone.</p> <p>Industrial wind turbines are not consistent with the required form of development for this zone.</p> <p>Transmissions lines are proposed to be routed through the Rural Landscape Protection zone.</p>
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Renewable Energy Facilities

OBJECTIVES

3 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.

PRINCIPLES OF DEVELOPMENT CONTROL

Wind Farms and Ancillary Development

2 The visual impacts of wind farms and ancillary development (such as substations, maintenance sheds, access roads and wind monitoring masts) should be managed through:

- (a) wind turbine generators being:
 - (i) setback at least 1000 metres from non-associated (non-stakeholder) dwellings and tourist accommodation
 - (ii) setback at least 2000 metres from defined and zoned township, settlement or urban areas (including deferred urban areas)
 - (iii) regularly spaced
 - (iv) uniform in colour, size and shape and blade rotation direction

3 Wind farms and ancillary development should avoid or minimise the following impacts on nearby property owners / occupiers, road users and wildlife:

(a) shadowing, flickering, reflection or glint

(b) excessive noise

One wind turbine is located in Landscape Protection zone, with remaining turbines also having a direct and substantial visual impact on this zone.

Turbine height, output and condensed layout in proximity to township, rural living and rural settlements are unprecedented, with amplitude modulation, low frequency, infrasound and vibration impact on residences not addressed.

Site is located within endangered Peppermint Box Grassy Woodland ecological community. Vegetation surveys were conducted over summer/autumn period and not in the required spring period relevant for EPBC referrals. Fauna assessments are incomplete.

Spacing between turbines is not regular and is extremely condensed, in some cases only 3 times the rotor diameter. These distances are much closer than manufacturer and industry guidelines that recommend spacing of 10 times.

No assessment of shadowing, flickering, reflection or glint on road users along adjacent Wilkins Highway, Hughes Gap Road, or Beetaloo Valley Road was undertaken.

The two shadow flicker assessments are inconsistent in their findings.

Amplitude modulation, low frequency and infrasound impact on residences are not addressed¹.

EPA research has found software accuracy for noise impact from wind farms is unsatisfactory, noting discrepancies up to 10dBA between predicted results and in situ measurements². The true certified sound power levels and operational conditions and wind speed data for each turbine type to be installed has not been provided³.

¹ Lenchine VV (2009) *Amplitude modulation in wind turbine noise*, 2009, Australian Acoustical Society

² Lenchine VV (2009) *Amendment for Wind Farms Environmental Noise Guidelines*, in *Acoustics Australia Vol. 37 April (2009) No. 1 – 25*, Science & Sustainability Division, Environment Protection Authority, GPO Box 2670 Adelaide SA 5001, Australia

³ Thorne B (2018) *Noise Impact Assessment Commentary – Crystal Brook Wind Farm South Australia*; Report No 4154 20 June 2018, prepared by Noise Measurement Services

<p>(c) interference with television and radio signals and geographic positioning systems</p> <p>(d) interference with low altitude aircraft movements associated with agriculture</p> <p>(e) modification of vegetation, soils and habitats</p> <p>(f) striking of birds and bats.</p> <p>4 Wind turbine generators should be setback from dwellings, tourist accommodation and frequently visited public places (such as viewing platforms) a distance that will ensure that failure does not present an unacceptable risk to safety.</p>	<p>No baseline noise monitoring at the closest non-associated residences was conducted. Condensed spacing of turbines far in excess of the manufacturers guidelines and will increase turbulence and noise impact.</p> <p>Interference with television and wireless broadband is identified as anticipated however nominated solution of connection to satellite services does not avoid or minimise the impact for residences.</p> <p>Interference with agricultural aerial spraying is identified as anticipated, with no solution proposed to avoid or minimise this impact, rather the conclusion that it needs to be 'accepted'.</p> <p>Modification of endangered Peppermint Box Grassy Woodland habitat is anticipated, however vegetation surveys were conducted over summer/autumn period and not in the required spring period and comprehensive fauna surveys have not been undertaken. Without comprehensive assessment, strategies to avoid or minimise impact cannot be undertaken.</p> <p>Extent of soil modification and associated erosion and waterway sedimentation during construction have not been addressed.</p> <p>Bird and bat species lists are incomplete, with a number of species listed as 'unlikely' being sighted and known within and adjacent the project footprint.</p> <p>Turbines will be located within very close proximity to Wilkins Highway. No risk assessment is provided that considers public/driver safety due to turbine failure.</p>
<p><u>Industrial Development</u></p> <p>OBJECTIVES</p> <p>4 Industrial development occurring without adverse effects on the health and amenity of occupiers of land in adjoining zones.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL</p> <p>6 Industrial development should minimise significant adverse impact on adjoining uses due to hours of operation, traffic, noise, fumes, smell, dust, paint or other chemical over-spray, vibration, glare or light spill,</p>	<p>No assessment of the adverse effects of wind turbines on the health of occupiers in adjoining township, rural living and landscape protection zone has been provided.</p> <p>No separate night-time noise assessment was undertaken or restriction on hours of operation of the 26 industrial wind turbines proposed.</p>

<p>electronic interference, ash or other harmful or nuisance creating impacts.</p>	<p>Amplitude modulation, low frequency and infrasound and vibration impact on nearby residences have not been assessed or addressed.</p>
<p><u>Hazards</u></p> <p>PRINCIPLES OF DEVELOPMENT CONTROL 1 Development should be excluded from areas that are vulnerable to, and cannot be adequately and effectively protected from, the risk of hazards.</p> <p>Bushfire 10 Buildings and structures should be located away from areas that pose an unacceptable bushfire risk as a result of one or more of the following: (a) vegetation cover comprising trees and/or shrubs (b) poor access (c) rugged terrain (d) inability to provide an adequate building protection zone (e) inability to provide an adequate supply of water for fire fighting purposes.</p>	<p>Statements contradict advice from the CFS regarding bushfire hazard.⁴</p> <p>Wind turbines are proposed to be located in close proximity to an explosives manufacturing and testing ground, which contains quantities of unexploded military ordnates. This has not been identified as a risk or any impact on emergency response undertaken, including in the event of bushfire in the locality.</p>
<p><u>Historic Conservation Area</u></p> <p>OBJECTIVES 2 Development that promotes, conserves and enhances the cultural significance and historic character of identified places and areas.</p> <p>3 Development that complements the historic significance of the area.</p> <p>5 Development that contributes to desired character</p> <p>DESIRED CHARACTER Area 2 Crystal Brook is an area of historic importance where the heritage value needs to be conserved and reinforced. The distinctive historic character of Area 2 Crystal Brook is created and enhanced by the interaction between built form, spaces, plantings and general street pattern within the area.</p>	<p>Turbine blades/tips are identified as being potentially visible from the entire Crystal Brook township. No accurate or thorough assessment of impact on the character of the historic conservation area has been undertaken.</p>
<p><u>Infrastructure</u></p> <p>OBJECTIVES 2 The visual impact of infrastructure facilities minimised.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL 9 Electricity infrastructure should be designed and located to minimise visual and environmental impacts.</p>	<p>Wind turbine infrastructure will have significant visual impact. The visual assessment contains a number of contradictions, anomalies and omissions.</p> <p>Details of windfarm access roads and tracks and associated assessment of impact on vegetation and biodiversity have not been provided.</p>

⁴ Country Fire Service SA, Aerial Firefighting; http://www.cfs.sa.gov.au/site/about/aerial_firefighting/aerial_firefighting; accessed January 2018

<p>10 Utilities and services, including access roads and tracks, should be sited on areas already cleared of native vegetation. If this is not possible, their siting should cause minimal interference or disturbance to existing native vegetation and biodiversity.</p>	
<p><u>Interface Between Land Uses</u></p> <p>OBJECTIVES</p> <p>1 Development located and designed to minimise adverse impact and conflict between land uses.</p> <p>2 Protect community health and amenity from adverse impacts of development.</p> <p>3 Protect desired land uses from the encroachment of incompatible development.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL</p> <p>1 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:</p> <ul style="list-style-type: none"> (b) noise (c) vibration (d) electrical interference (e) light spill (f) glare (g) hours of operation (h) traffic impacts. <p>2 Development should be sited and designed to minimise negative impacts on existing and potential future land uses desired in the locality.</p> <p>5 Sensitive uses likely to conflict with the continuation of lawfully existing developments and land uses desired for the zone should be designed to minimise negative impacts.</p> <p>6 Non-residential development on land abutting a residential zone should be designed to minimise noise impacts to achieve adequate levels of compatibility between existing and proposed uses.</p> <p>Noise Generating Activities</p> <p>7 Development that emits noise (other than music noise) should include noise attenuation measures that achieve the relevant <i>Environment Protection (Noise) Policy</i> criteria when assessed at the nearest existing noise sensitive premises.</p> <p>8 Development with the potential to emit significant noise (e.g. industry) should incorporate noise attenuation measures that prevent noise from causing unreasonable interference with the amenity of noise sensitive premises.</p>	<p>One wind turbine is located in Landscape Protection zone, with remaining turbines having a direct and substantial visual impact on this zone.</p> <p>No assessment of the effects of wind turbines on the health of nearby residents has been provided.</p> <p>Turbine height, output and condensed layout in proximity to township, rural living and rural settlements are unprecedented, with amplitude modulation, low frequency, infrasound and vibration impact on residences not addressed.</p> <p>Turbines located within the Landscape Protection zone will set an unacceptable precedent for incompatible development in this zone, which extends continuously along the Southern Flinders Range to Hawker.</p> <p>Construction of 26 industrial wind turbines will create adverse visual impacts from arterial roads (Wilkins Highway, Highway One, Scenic Drive, Goyder Highway, Hughes Gap Road), on the Landscape Protection zone and the Crystal Brook township zone.</p> <p>No night-time restriction on hours of operation of the 26 industrial wind turbines are proposed. Amplitude modulation, low frequency and infrasound and vibration impact on nearby residences have not been assessed or addressed.</p> <p>Baseline noise monitoring has not been undertaken at the three closest non-associated residences.</p> <p>The EPA identify windfarm noise complaints as increasing due to low frequency, infrasound and amplitude modulation⁵.</p> <p>Amplitude modulation, low frequency and infrasound impact on residences have not been addressed⁶.</p> <p>EPA research has found software accuracy for noise impact from wind farms is unsatisfactory, noting</p>

⁵ Environment Protection Authority (2013) State of the Environment South Australia pp 41-42; Lenchine VV (2009) Amendment for Wind Farms Environmental Noise Guidelines, in *Acoustics Australia* Vol. 37 April (2009) No. 1 – 25, Science & Sustainability Division, Environment Protection Authority, GPO Box 2670 Adelaide SA 5001, Australia

⁶ [15] V.V. LENCHINE, *Amplitude modulation in wind turbine noise*, 2009, Australian Acoustical Society

	<p>discrepancies up to 10dBA between predicted results and in situ measurements⁷.</p> <p>The true certified sound power levels and operational conditions and wind speed data for each turbine type to be installed has not been provided⁸.</p> <p>Condensed spacing of turbines is far in excess of the manufacturers guidelines and will increase turbulence and noise impact.</p> <p>Proposed turbine height, output and condensed layout in proximity to township, rural living and rural settlements are unprecedented.</p> <p>No assessment of the effects of wind turbines on the health of nearby residents has been provided.</p>
<p>Natural Resources OBJECTIVES</p> <p>1 Retention, protection and restoration of the natural resources and environment.</p> <p>2 Protection of the quality and quantity of South Australia's surface waters, including inland, marine and estuarine and underground waters.</p> <p>4 Natural hydrological systems and environmental flows reinstated, and maintained and enhanced.</p> <p>6 Development sited and designed to: (a) protect natural ecological systems</p> <p>8 Native flora, fauna and ecosystems protected, retained, conserved and restored.</p> <p>9 Restoration, expansion and linking of existing native vegetation to facilitate habitat corridors for ease of movement of fauna.</p> <p>10 Minimal disturbance and modification of the natural landform.</p> <p>12 Protection of areas prone to erosion or other land degradation processes from inappropriate development.</p> <p>13 Protection of the scenic qualities of natural and rural landscapes.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL</p> <p>1 Development should be undertaken with minimum impact on the natural environment, including air and water quality, land, soil, biodiversity, and scenically attractive areas.</p>	<p>There is a significant anomaly with the timing of vegetation assessments which were all undertaken over summer/autumn to maximise identification of understory and groundcover species.</p> <p>The recommended spring time assessment for EPBC and State Veg assessment has not been undertaken.</p> <p>One turbine is located in the Landscape protection zone, with all remaining turbines having a level of visual intrusion into this zone.</p> <p>As above</p>

⁷ Lenchine VV (2009) *Amendment for Wind Farms Environmental Noise Guidelines*, in *Acoustics Australia* Vol. 37 April (2009) No. 1 – 25, Science & Sustainability Division, Environment Protection Authority, GPO Box 2670 Adelaide SA 5001, Australia

⁸ Thorne B (2018) *Noise Impact Assessment Commentary – Crystal Brook Wind Farm South Australia*; Report No 4154 20 June 2018, prepared by Noise Measurement Services

<p>4 Development should be appropriate to land capability and the protection and conservation of water resources and biodiversity.</p> <p>Water Catchment Areas</p> <p>17 Development should ensure watercourses and their beds, banks, wetlands and floodplains are not damaged or modified and are retained in their natural state, except where modification is required for essential access or maintenance purposes.</p> <p>21 No development should be located within 50 metres of:</p> <p>(a) a watercourse identified as a blue line on a current series 1:50 000 SA topographic map (b) any river, stream, creek or channel in which water is contained or flows permanently, intermittently or occasionally.</p> <p>Biodiversity and Native Vegetation</p> <p>29 Development should be designed and sited to minimise the loss and disturbance of native flora and fauna, including marine animals and plants, and their breeding grounds and habitats.</p> <p>30 Native vegetation should be conserved and its conservation value and function not compromised by development if the native vegetation does any of the following:</p> <p>(b) has a high plant species diversity or includes rare, vulnerable or endangered plant species or plant associations and communities (c) provides an important seed bank for locally indigenous vegetation (d) has high amenity value and/or significantly contributes to the landscape quality of an area, including the screening of buildings and unsightly views (e) has high value as a remnant of vegetation associations characteristic of a district or region prior to extensive clearance for agriculture</p> <p>32 Development that proposes the clearance of native vegetation should address or consider the implications that removing the native vegetation will have on the following:</p> <p>(a) provision for linkages and wildlife corridors (b) erosion along watercourses (c) the amenity of the locality (d) bushfire safety (e) the net loss of native vegetation and biodiversity.</p> <p>34 Development should be located and occur in a manner which:</p> <p>(a) does not increase the potential for, or result in, the spread of pest plants, or the spread of any non-indigenous plants into areas of native vegetation or a conservation zone</p>	<p>Waterways within the project area have not been correctly located.</p> <p>Turbine distance from Crystal Brook waterway has not been identified.</p> <p>The project site is within the endangered Peppermint Box Grassy Woodland habitat.</p> <p>Vegetation surveys were conducted over summer/autumn period and not in the required spring period and comprehensive fauna surveys have not been undertaken. Without comprehensive assessment, strategies to avoid or minimise impact cannot be undertaken.</p> <p>Bird (including migratory and raptor) and bat species lists are incomplete, with a number of species listed as 'unlikely' being sighted and known within and adjacent the project footprint.</p> <p>One turbine is located in the Landscape Protection zone, that extends continuously along the Southern Flinders Ranges to Hawker.</p> <p>Vegetation within the wind turbine footprint is part of the endangered Peppermint Box Grassy Woodland habitat and is located at the southern end of the Southern Flinders Large Remnant – a significant continuous block of vegetation extending from Crystal Brook through to northern part of the Mount Remarkable/Mambray Creek National Parks near Wilmington.⁹</p> <p>Details regarding the native vegetation set aside and rehabilitation requirements have not been provided.</p> <p>Weed management plan has not been provided.</p>
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⁹ Graham A, Opperman A, Inn RS (2001) *Biodiversity Plan for the Northern Agricultural Districts*; Department of Environment and Heritage, South Australia

<p>(c) incorporates a separation distance and/or buffer area to protect wildlife habitats and other features of nature conservation significance.</p> <p>Soil Conservation 40 Development should be designed and sited to prevent erosion.</p> <p>42 Development should minimise the loss of soil from a site through soil erosion or siltation during the construction phase of any development and following the commencement of an activity.</p>	<p>Species lists inaccurately determine the status of several species. As a result consideration of buffers is incomplete.</p> <p>Soil modification and associated erosion and waterway sedimentation during construction have not been addressed.</p>
<p><u>Orderly and Sustainable Development</u> OBJECTIVES 3 Development that does not jeopardise the continuance of adjoining authorised land uses.</p> <p>4 Development that does not prejudice the achievement of the provisions of the Development Plan.</p> <p>5 Development abutting adjoining Council areas having regard to the policies of that Council's Development Plan.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL 1 Development should not prejudice the development of a zone for its intended purpose.</p> <p>2 Land outside of townships and settlements should primarily be used for primary production and conservation purposes.</p>	<p>One wind turbine is located within the Landscape Protection zone. This will set an unacceptable precedent for incompatible development in this zone, which extends across five Council districts continuously along the Southern Flinders Range to Hawker.</p> <p>Wind turbines will have an impact on future residential development along the northern township and rural living zones.</p> <p>Wind turbines are not consistent with this principle.</p>
<p><u>Siting and Visibility</u> OBJECTIVES 1 Protection of scenically attractive areas, particularly natural, rural and coastal landscapes.</p> <p>PRINCIPLES OF DEVELOPMENT CONTROL 1 Development should be sited and designed to minimise its visual impact on: (a) the natural, rural or heritage character of the area (b) areas of high visual or scenic value, particularly rural and coastal areas (c) views from the coast, near-shore waters, public reserves, tourist routes and walking trails (e) public trails such as the Heysen and Mawson Trails.</p>	<p>One wind turbine is located within the Landscape Protection zone. This will set an unacceptable precedent for incompatible development in this zone, which extends across five Council districts continuously along the Southern Flinders Range to Hawker.</p> <p>All wind turbines proposed for this development will have a significant visual intrusion into the Landscape Protection Zone.</p> <p>The Heysen trail traverses the entire wind turbine footprint along the Crystal Brook waterway, from Bowman Park to Beetaloo Valley. Several turbines will be located in very close proximity both sides of the trail along the entire length of this footprint. No visual assessment/photomontage has been provided.</p> <p>6 turbines are within a 2km radius from Bowmans Park campground and all 26 turbines are within 5km of Bowmans Park. No visual assessment/photomontage has been provided.</p>

Primary Production Zone

OBJECTIVES

4 Protection of primary production from encroachment by incompatible land uses and protection of scenic qualities of rural landscapes.

PRINCIPLES OF DEVELOPMENT CONTROL

Form and Character

13 Development on land situated between National Highway 1 and Landscape Protection Policy Area 10 should be designed and sited to ensure the natural view of the ranges is not impaired.

Land Division

14 For land not within a policy area, land division, including boundary realignments, should only occur where it:

(a) will promote economically productive, efficient and sustainable primary production and not create any allotment less than 40 hectares in area.

15 Land division involving boundary realignments should only occur where the number of resulting allotments of less than 40 hectares is not greater than the number that existed prior to the realignment.

All wind turbines proposed for this development will have a significant visual intrusion from National Highway 1 into the Landscape Protection Zone.

Land division for the siting of wind turbines is below the required allotment size of 40 hectares

2. The development application contains numerous errors, omissions, inconsistencies and contradictions that do not allow for a complete and thorough assessment. These include:

Development Application Citation	Anomaly/Contradiction
V1, pg 1: <i>Zone/Policy Area - Primary Industry Zone - Port Pirie Regional Council</i>	One wind turbine is located in the Landscape Protection zone.
V1 pg 5: <i>The area is located across Port Pirie Regional Council.</i>	CT5516/886 and CT6187/686 located in Northern Areas Council
V1 pg 3: <i>no BVA dwelling is any closer than 2.9km to a turbine, with the majority at a distance well over 5km.</i>	One Beetaloo Valley household is 1.3km from turbines and is one of the closest non-associated residence to the windfarm. A further seven Beetaloo Valley residences are located within 3.5km of turbines.
V1 pg 12: <i>As with previous investigations, the project area does not contain species that would trigger a controlled action under the EPBC Act.</i>	The project area is located in the critically endangered Peppermint Box (<i>Eucalyptus odorata</i>) Grassy Woodland. No project vegetation surveys were conducted during the required spring period when species identification is maximised. All surveys were undertaken during summer or autumn
V1 pg 13: <i>Figure 2-2 provides an overview of the final project arrangements and layout.</i>	Contradicts Figure 2.2 and all subsequent project layouts which are listed as draft. No final layouts are provided.
V1 pg 17: <i>Table 3.1 wind turbines 'Extending along the ranges, south and north of Wilkins Highway'</i> <i>Property: CT6141/640, CT5784/13, CT5608/107, CT6006/298, CT6007/133, CT6183/620, CT5404/285, CT6007/134, CT6007/134, CT6007/133, CT5476/921, CT5566/295, CT5516/886, CT6187/686</i>	Contradicts other text, tables and maps that state turbines are not located north of the highway. Property CTs in this table contradict those indicated earlier on page 7 and 8 indicated as: CT6141/640, CT5784/13, CT5608/107, CT6006/298, CT6007/133, CT6183/620, CT5404/285, CT6007/134, CT5476/921, CT5566/295
V1 pg 27: <i>The wind farm will be accessed via Hughes Gap road, Pipe Line Track/Heads Road and the Heaslip Highway</i>	Contradicts other texts and maps that do not indicate Heaslip Highway being utilised as an access point.
V1 pg 32: <i>The portion of the site covered by the Port Pirie Development Plan is within the 'Primary Production Zone'. The boundary of the Primary Production Zone follows the alignment of the gas pipeline which means that the whole of the project is location with in this zone.</i>	The stated boundary of the Primary Production zone is incorrect. One turbine is located in Landscape Protection Zone.
V1 pg 37: <i>Overall this LVIA concludes that the Project would not have an unreasonable impact on the landscape character, or the visual amenity of people living, working, or travelling through the landscape surrounding the Project Site.</i>	No visual assessment undertaken from northern/southern residences on ridgetops/hills, Heysen Trail/Bowman Park within the turbine footprint, or from Scenic Drive or Goyder Highway (Clare Road) towards the Landscape Protection zone. Photomontages state that images are likely to appear larger in real life. True-to-life representation of visual amenity has not been provided.

V1 p 37: Visual impacts at the northern edge of the Crystal Brook township may tend toward moderate.	Contradicts other texts and household assessments that concludes there would be a high visual impact.
V1 pg 37: This LVIA identified 14 non-host residential dwellings within 3 km of the wind turbines and determined that the majority of these would not experience a significant (high) visual effect as a result of the Project.	Contradicts other texts and household assessments that conclude there would be a high visual impact.
V1 pg 38: noise monitoring which occurred at 5 locations in the vicinity of the proposed wind farm between 7 December 2017 and 24 January 2018. The results of the modelling are represented in Figure 5-1 and has predicted that all identified residences will be compliant in relation to the allowable noise criterion as identified by the Environment Protection (Noise) Policy 2007.	Of the 5 monitored sites, 2 were involved landholders. The three closest non-associated residences have not had noise monitoring. Baseline noise monitoring was conducted during grain harvesting period, which has higher than usual day and nighttime background noise. No separation of night-time noise levels has been provided.
V1 pg 40: Preliminary inspection and measurement of the proposed site access point and key intersections which will be used to access Crystal Brook Energy Park did not reveal any substantial safety or sight distance issues.	Contradicts statements in the traffic plan which identifies significant sight distance safety issues accessing the project site from Wilkins Highway. Inconsistencies noted in the site access roads nominated between various project documents and maps.
V1 pg 40: A number of field investigations have been undertaken within the project area both by Origin and Neoen. None have ever indicated the requirement for a referral under the Environment Biodiversity and Conservation Act 1999.	All surveys were undertaken in summer or autumn, not in Spring which is the recommended period for assessing understory and groundcover diversity, which is the basis for EPBC referral.
V1 pg 43: The risk of fire at wind farms is very low because 1. Flammable elements are located high above the ground; 2. Each turbine is situated next to a cleared construction pad reducing the available fuel load.	Turbines will be an unprecedented 240 m high. Flammable elements falling to the ground are likely to land in flammable vegetation surrounding the cleared construction pad.
V1, pg 44: Wind farms are not considered to pose any special hazards when it comes to fighting fires from the air.	Directly contradicts South Australian CFS ¹⁰ advice that vertical obstructions such as wind turbines close to a fire area may limit aerial firefighting operations and that in some cases aircraft will not be utilised because risks caused by vertical obstructions exceed safe operating conditions.
V1 pg 45: A letter has been provided from the involved land owner of residence H15 detailing their understanding of the impact relating to the proximity of their residence to the nearest turbine located on their property. The involved land owner of residence H13 has also written a letter indicating their intent to demolish the H13 residence when Neoen reach financial close for the proposed Crystal Brook Energy Park	Both impacted land owners will not reside near the windfarm and, as financial beneficiaries, have compensatory means for relocation. The three closest non-associated residences have had no noise impact assessment undertaken. Neoen declined to undertake noise monitoring at several non-associated residences when residents requested the company to provide sound data collected at the property and the use of an independent acoustician.

¹⁰ Country Fire Service SA, Aerial Firefighting; http://www.cfs.sa.gov.au/site/about/aerial_firefighting/aerial_firefighting; accessed January 2018

V1 pg 46: Neoen may choose to conduct a survey on wireless broadband and TV signal reception within the vicinity of the proposed Energy Park (1) before construction, and (2) after construction to verify any complaints by local residents.	No indication of pre and post monitoring is provided.
V1 pg 49: It is acknowledged that this development will introduce a significant change to the visual appearance of the land involved and will have a visual impact in the context of the immediate locality.	Contradicts earlier statements that the development will not have an unreasonable impact on the landscape character. Visual assessment has not been undertaken from highway 1 viewing the turbine site through to the Landscape protection zone, nor from key tourist routes such as the access to Bowman Park, Goyder Highway (Clare Road) or from southern/northern residences located on ridgetops.
V1, Appendix B, pg 1: There are 4 participant landholders involved in the project.	Contradicts earlier statements of 7 landholders involved.
V1, Appendix B, pg 1: The project has achieved strong community support from host landholders, local and regional contractors, Crystal Brook residents and Aboriginal representatives.	Widespread concern from Beetaloo Valley residents to the northern end of the project and concern expressed by over 600 people who petitioned against the development has been omitted.
V1, Appendix B, pg 3: Following concerns being raised by the Port Pirie Council and the Beetaloo Valley Association regarding locating wind turbines in the Ranges Zone, Neoen made further changes to the project design, removing all wind turbines in this zone.	One turbine remains located in the Ranges (Landscape Protection) zone.
V1; Appendix B; pg 6: Neoen removed all turbines located in land zoned 'Landscape Protection Zone' under the Northern Areas Council Development Plan, and all turbines located north of Collaby Hill Road	One turbine remains located in the Ranges (Landscape Protection) zone.
V1, Appendix B, pg 7: The redesign of the project also took into account concerns expressed by the Beetaloo Valley Association, with the result being that no BVA dwelling is any closer than 2.9km to a turbine, with the majority at a distance well over 5km.	One Beetaloo Valley household is 1.3km from turbines and is one of the closest non-associated residence to the windfarm. A further seven Beetaloo residences are located within 3.5km to turbines.
V1, Appendix B, Pg 9: Throughout the development of Crystal Brook Energy Park, one of Neoen's major priorities in engaging with communities has been to communicate the potential benefits of the project to local economies. These benefits can be divided into several categories: Local employment during construction (between 100-200 jobs for 1-2 years) and operation (between 8-15 jobs for the life of the project); Potential benefits to tourism	No assessment of negative impact on local employment losses due to residents moving out of the district or diminished land values or construction of new residences along the northern township zone of Crystal Brook No assessment of negative impact on Southern Flinders eco-tourism, including 6 gorges initiative, Bowman Park, Heysen Trail, nor broader impact on the Flinders as precedent for more windfarms across this area.
V1; Appendix B, pg 11: A comprehensive Visual and Landscape Assessment has been undertaken to assess the visual impact of the project. Additional photomontages have been created to clearly show the	No photomontages provided from Highway 1 taking into account visual intrusion into the Ranges zone to north of Wilkins Hwy, or from Bowman Park or Goyder Highway (Clare Road), noting 6 turbines within a 2km radius of the Bowman Park campground.

level of effect from additional vantage points within the locality.	
V1; Appendix B, pg 11: <i>project design has been amended to remove all wind turbines north of the Wilkins Highway, including all those located in land zoned 'Landscape Protection' and 'Ranges'.</i>	One turbine remains located in the Ranges (Landscape Protection) zone. Remaining turbines will all have significant visual intrusion into the Ranges zone.
V1; Appendix B, pg 1: <i>there is no scientific data to suggest that the levels of low frequency noise emitted by wind turbines make humans sick. Research to date has not shown any negative health effects at the noise levels produced by operational wind turbines.</i>	The SA EPA ¹¹ specifically identifies that noise above safe levels leads to a number of known health impacts such as stress, high blood pressure, loss of sleep, inability to concentrate and loss of productivity and that there has been an increase in noise complaints associated with low frequency sound output of the wind farm. The link between windfarm noise emissions and health has been recognised by the Administrative Appeals Tribunal ¹² , concluding that field evidence of measured wind turbine noise levels exceeding limits is known to induce noise annoyance leading to health impacts; and that the current regulatory framework for wind turbine noise is inadequate. This includes a 2015 study by windfarm operator Pacific Hydro into the health impact of noise at their Cape Bridgewater wind farm ¹³
V1; pg 105: <i>The development will be located on a number of allotments primarily used for cropping and grazing which will involve 7 landowners who reside in the locality.</i>	1 of the landowners does not currently reside in the region. 1 landowner has stated intention to relocate out of the region.
V1; Appendix B, pg 11: <i>Studies into the potential impact of wind farm developments on property prices, including by the NSW Valuer-General (2009) and Urbis (2016), have concluded that there is insufficient evidence to suggest that wind farms can be linked to adverse impacts on property prices.</i>	Contradicts sales information from Elders Rural Services that there is between 30-50% loss of value for properties adjoining wind towers as a result of noise, visual amenity and diminished ambience ¹⁴
V1, Appendix B, pg 13: <i>Turbines and associated infrastructure such as access roads will not be sited on the Heysen Trail itself, and will instead be sited so as to minimise visual or noise impacts upon it. Due to topography and vegetation, turbines will be visible to walkers only over a relatively small section.</i>	The Heysen trail traverses the entire wind turbine footprint along the Crystal Brook waterway, from Bowman Park to Beetaloo Valley. Several turbines will be located in very close proximity both sides of the trail along the entire length of this footprint. 6 turbines are within a 2km radius from Bowmans Park campground and all 26 turbines are within 5km of Bowmans Park.

¹¹ Environment Protection Authority (2013) State of the Environment South Australia pp 41-42;

¹² Waubra Foundation and Commissioner of Australian Charities and Not-for-profits Commission [2017] AATA 2424 (4 December 2017). The Tribunal consisted of the Honourable Justice White, Deputy President and Deputy President K Bean. The official link to the AAT decision on the Austlii website is here: <http://www.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/AATA/2017/2424.html>

¹³ Schomer PD, Hessler G (2015) The Results of an Acoustic Testing Program, Cape Bridgewater Wind Farm, Prepared for Energy Pacific by Steve Cooper, The Acoustic Group A Review of this Study and Where It Is Leading Paul D. Schomer, Ph.D., P.E.; Schomer and Associates, Inc.; Standards Director, Acoustical Society of America George Hessler, Hessler Associates, Inc. 10 February 2015

¹⁴ McIntyre S (2015) Evidence to Senate select committee on wind turbines; Commonwealth of Australia Official committee hansard

V1, Appendix C, pg 13: <i>The project is located within the Port Pirie Regional and Northern Areas Council areas.</i>	Contradicts earlier statements that project is completely within the Port Pirie district.
V1, Appendix C, pg 17: <i>The Beetaloo Valley is a cluster of properties located on the western side of the ranges and north of the Wilkins Highway</i>	Location is incorrect. Beetaloo Valley is located on the eastern side of the Ranges.
V1, Appendix C, pg 17: <i>The development will be located on a number of allotments primarily used for cropping and grazing which will involve 7 landowners who reside in the locality.</i>	Contradicts earlier statement that only 4 landholders are involved. 1 landholder does not live in the district. 1 landholder has publicly stated intent to relocate.
V1, Appendix C, pg 17: <i>The only watercourse that feeds directly into the Broughton River system is Crystal Brook/Mercowie watercourse, which is located at the southern end of the project area and runs through the township of Crystal Brook.</i>	The waterway location has been incorrectly identified. Crystal brook/Mercowie extends from Beetaloo Valley in the north through the entire wind turbine area to Bowman Park and Crystal Brook township.
V2, pg 14: <i>The EPBC Protected Matters database identified Eucalyptus odorata (Peppermint Box) Grassy woodlands of South Australia as being a nationally threatened ecological community covering approximately 18 ha of the overall site and was determined as possibly qualifying as a TEC, if surveyed at an optimal time of the year.</i>	Contradicts earlier statements that surveys determined that EPBC referral was not required. All surveys were conducted over summer/autumn when there is minimal groundcover/herbage species active for identification. EPBC guidelines for this threatened community require vegetation surveys during spring.
V2 pg 15: <i>Species likelihood of occurrence 'unlikely'</i>	A number of species identified as 'unlikely' in the assessment are known and regularly sighted in the locality.
V2 landscape and visual assessment pg 7: <i>LVIA has determined that the visual effect of the Project is likely to be moderate from the majority of publicly accessible locations surrounding the Project, and</i> <input type="checkbox"/> <i>would have an overall moderate visual effect on the Crystal Brook township and the small number of localities beyond the Project Site</i> <input type="checkbox"/> <i>would have no significant visual effect on view locations within Port Pirie located around 22 kilometres to the north west of the Project Site</i> <input type="checkbox"/> <i>would result in low to moderate effects on views from the Princes and Wilkins Highway</i> <input type="checkbox"/> <i>would result in generally low visual effects on short duration views from the majority of local roads, including the Gladstone and Beetaloo Valley Roads,</i> <input type="checkbox"/> <i>would not have a significant, or long term, visual effect from local public reserves, recreational areas and walking tracks, including any available views from state significant landscape areas such as State Reserves and National Parks</i> <input type="checkbox"/> <i>would not result in significant cumulative visual impacts given the visual separation distance to other operational wind farm projects</i> <input type="checkbox"/> <i>would not result in any significant level of shadow flicker for non-host residential dwellings.</i>	Contradicts earlier statement that the development will introduce a significant change to the visual appearance of the land involved and will have a visual impact in the context of the immediate locality. Photomontages state that images are likely to appear larger in real life. True-to-life representation of visual amenity has not been provided. No assessment or photomontages provided from Highway 1/Scenic Drive taking into account visual intrusion into the Ranges zone to north of Wilkins Hwy, or from Bowman Park or Goyder Highway (Clare Road), noting 6 turbines within a 2km radius of the Bowman Park campground. No visual assessment has been undertaken from northern/southern residences on ridgetops/hills. No assessment or photomontages are provided from the Heysen Trail, which traverses the length of the wind turbine footprint and will have turbines located in close proximity both sides of the trail. No actual assessment or photomontage of the cumulative impact of the Crystal Brook turbines to the overall landscape has been undertaken, noting

	<p>they will be located midway between the existing Hornsdale, Clements Gap and Snowtown developments.</p> <p>The closest non-host dwellings were not assessed for shadow flicker.</p>
V2 Pg 48 and 49, Figure 20 and 21	Maps indicate all turbine hubs and tips will be visible across Crystal Brook township, Highway 1 and most surrounding non associated dwellings. This is inconsistent with assessment summary.
V2 pg 29, Figure 22 Maroona Windfarm	Incorrect windfarm/locality shown
V2 Pg 56: <i>Some residential dwellings within Crystal Brook, and those toward the fringe of the township may have greater visual exposure toward the Project Site resulting in Moderate visual effects. The visual effect of the Project (and wind turbines) will tend to Moderate from residential dwelling locations within the southern portion of the Beetaloo Valley</i>	<p>Contradicts earlier statement that the development will introduce a significant change to the visual appearance of the land involved and will have a visual impact in the context of the immediate locality.</p> <p>Photomontages state that images are likely to appear larger in real life. True-to-life representation of visual amenity has not been provided.</p> <p>No assessment or photomontages provided from Highway 1 /Scenic Drive taking into account visual intrusion into the Ranges zone to north of Wilkins Hwy, or from Bowman Park or Goyder Highway (Clare Rd), noting 6 turbines within a 2km radius of the Bowman Park campground.</p> <p>No visual assessment has been undertaken from residences on ridgetops/hills.</p> <p>No assessment or photomontages are provided from the Heysen Trail, which traverses the length of the wind turbine footprint and will have turbines located in close proximity both sides of the trail.</p> <p>No actual assessment or photomontage of the cumulative impact of the Crystal Brook turbines to the overall landscape has been undertaken, noting they will be located midway between the existing Hornsdale, Clements Gap and Snowtown developments.</p> <p>The closest non-host dwellings were not assessed for shadow flicker.</p>
V2 pg 48, 49, 60, Figure 5, 20, 21, 24 lists H18 as host dwelling.	Inconsistent with other commentary about hosts and siting of project north of Wilkins Highway.
V2 pg 59: <i>Publicly accessible locations, other than road corridors, include various public open spaces (including Bowman Park, Crystal Brook and the Heysen Trail), recreational areas, reserves or public meeting places. The majority of public open spaces and recreational areas are those associated and located within surrounding urban localities, where the influence of both distance and existing vegetative cover is likely to screen any potential views toward the Project Site.</i>	<p>No assessment or photomontages provided from Bowman Park or Goyder Highway (Clare Rd), noting 6 turbines within a 2km radius of the Bowman Park campground.</p> <p>No assessment or photomontages are provided from the Heysen Trail, which traverses the length of the wind turbine footprint and will have turbines located in close proximity both sides of the trail.</p>

<p>V2 pg 59: Existing residential dwellings illustrated in Figure 24 include dwellings on lots that are not associated with the Project as well as those that are. For the purpose of this LVIA only non-associated (non-host) dwellings have been incorporated into the Residential Visual Effect Matrix in Table 14.</p>	<p>Inconsistent with other commentary about which dwellings are hosts and whether parts of the project are still being sited north of Wilkins Highway.</p>
<p>V2 og 73: This LVIA identified a combined total of 14 non-host residential dwellings, and a group of 15 dwellings between Talbots Road and Crystal Brook Valley Road, within the Project's 3km viewshed.</p>	<p>No assessment undertaken of residences on hilltops around Goulter Road or Gladstone Rd.</p> <p>Inconsistent with assessment of Talbot Road/CB Creek residences on page 149 listed as moderate-high impact.</p>
<p>V2, pg 73: The majority of residential dwellings located beyond 3km of the wind turbines are unlikely to be significantly impacted by the Project.</p>	<p>No ridge/hilltop dwellings included in the assessment from either Beetaloo Valley or Crystal Brook where visual impact is likely to be direct and significant.</p>
<p>V2, Pg 77: The results of the shadow flicker assessment for the proposed project determined that 5 residential view locations, four of which are host residential dwellings and one non-host residential dwelling, may be subject to some levels of shadow flicker.</p>	<p>Contradicts statement in the later shadow flicker report that only 3 associated dwellings will be impacted.</p> <p>No assessment was undertaken in this shadow flicker report at the other three closest non-associated residences.</p> <p>H18 is listed as an associated residence. This contradicts other parts of DA where it is listed as a non-associated residence.</p>
<p>V2, Pg 80: this LVIA acknowledges that large scale objects in the landscape can appear smaller in photomontage than in real life</p>	<p>No realistic visual impact photo-representation is provided.</p>
<p>V2 pg 92: this LVIA concludes that the Project would not have an unreasonable impact on the landscape character, or the visual amenity of people living, working, or travelling through the landscape surrounding the Project Site.</p>	<p>Contradicts earlier statement that the development will introduce a significant change to the visual appearance of the land involved and will have a visual impact in the context of the immediate locality.</p> <p>Photomontages state that images are likely to appear larger in real life. True-to-life representation of visual amenity has not been provided.</p> <p>No assessment or photomontages provided from Highway 1 taking into account visual intrusion into the Ranges zone to north of Wilkins Hwy, or from Bowman Park or Goyder Highway, noting 6 turbines within a 2km radius of the Bowman Park campground.</p> <p>No visual assessment has been undertaken from residences on ridgetops/hills.</p> <p>No assessment or photomontages are provided from the Heysen Trail, which traverses the length of the wind turbine footprint and will have turbines located in close proximity both sides of the trail.</p>
<p>V2 Noise pg 5: The project site is proposed to be located on land which spans Primary Production and</p>	<p>Contradicts earlier statements that the project is located fully within the Primary Production zone.</p>

Rural Landscape Protection Zones within the Port Pirie Regional Council Development Plan.	Contradicts other maps and CT references indicating part of the project is within the Northern Areas Council.
V2 noise pg 7: Compliance with the contemporary 2009 Guidelines is considered to satisfy the relevant provisions of the Development Plan that relate to wind farm noise.	The development plan requirement is to avoid excessive noise, not comply with the guidelines, noting the guidelines are deficient in relation to consideration of amplitude modulation, infrasound or low frequency sound identified by the EPA as the main causes of windfarm noise impact.
V2 noise pg 13: To determine the background noise levels at various wind speeds, background noise monitoring was conducted at 5 locations in the vicinity of the proposed wind farm between 7 December 2017 and 24 January 2018. The background noise monitoring was conducted in accordance with the 2009 Guidelines.	2 of the 5 locations monitored were beneficiaries. The 3 closes non-associated residences were not monitored. No separation of night-time background noise data is provided. Background noise monitoring was conducted during harvest period when there is much higher than usual background noise.
V2 noise pg 19: Table 10 and Appendix G indicate that the wind farm complies with the 2009 Guidelines and therefore satisfies the Development Plan at all dwellings.	The development plan requirement is to avoid excessive noise, not comply with the guidelines, noting the guidelines do not consider amplitude modulation, infrasound or low frequency sound identified by the EPA as the main causes of windfarm noise impact. No baseline noise monitoring at closest non-associated residences was conducted.
V2 noise pg 21: Based on the predictions, the requirements of the Environment Protection (Noise) Policy 2007 and Wind Farms Environmental Noise Guidelines 2009 can be achieved at all surrounding dwellings A final assessment will be made during the detailed design stage of the project to confirm that the final equipment selections will comply with the project criteria. Based on the above it is considered that the proposal is located and designed to minimise adverse impact and does not detrimentally affect the amenity of the locality, satisfying the relevant provisions of the Port Pirie Regional Council Development Plan.	Contradictory statement that the project can comply, yet final equipment and noise assessments are not yet undertaken. EPA research has found the software accuracy for the noise impact from wind farms is unsatisfactory, noting discrepancies up to 10dBA between predicted results and in situ measurements, is not rare ¹⁵ . The true certified sound power levels and operational conditions and wind speed data for each turbine type to be installed has not been provided ¹⁶ . Condensed spacing of turbines far in excess of the manufacturers guidelines and will increase turbulence and noise impact.
V2 noise pg 34: House 18 identified as turbine host	Contradicts other maps and text that identifies House 18 as a non-associated residence.
V2 Traffic pg 19: A review of the crash data from Location SA Map Viewer (2015) indicates the span of the section of road between Collaby Hill Road and Goyder Highway recording 7 crashes, with 2 of these	Reference sources have not been made available

¹⁵ Lenchine VV (2009) Amendment for Wind Farms Environmental Noise Guidelines, in Acoustics Australia Vol. 37 April (2009) No. 1 – 25, Science & Sustainability Division, Environment Protection Authority, GPO Box 2670 Adelaide SA 5001, Australia

¹⁶ Thorne B (2018) Noise Impact Assessment Commentary – Crystal Brook Wind Farm South Australia; Report No 4154 20 June 2018, prepared by Noise Measurement Services

recorded as casualty crashes at major intersections as seen in Error! Reference source not found..	
V2 Traffic Pg 21: Crash data wilkins highway	5 of the recorded 11 crashes occurring along the stretch of road where the majority of turbine traffic and maintenance access will occur. This section of road has known visibility and risk issues.
V2 Traffic pg 36: Comparison of Existing Traffic Volumes against Estimated Traffic Generated by the Energy Farm Project	Table is blank – no data is provided.
V2 traffic pg 36: sight distance to the eastern approach fails to meets requirements for heavy vehicles, raising a substantial safety concern.	Contradicted by pg 37 statement that '...Preliminary inspection and measurement of each key intersection described in Section 4.2, revealed that in all cases, sight distance is in excess of Austroads requirements....' Contradicted in summary on pg 56 conclusion that '...Sight distance at the proposed Energy Park site access point is potentially below requirements under the Austroads guidelines...'
V2 traffic pg 40: For motorists not aware of the Energy Parks construction, it is possible that slow moving heavy vehicles may well be encountered unexpectedly. While this is a safety issue in itself, there is also the possibility that the low speed of vehicles delivery heavy equipment would also frustrate following drivers into undertaking unsafe passing manoeuvres.	Contradicts later statement that '...Preliminary inspection and measurement of the proposed site access point and key intersections which will be used to access Crystal Brook Energy Park did not reveal any substantial safety or sight distance issues...'
V2 traffic pg 49: While this study gives consideration to feasible road transport routes, the final choice of route is dependent upon the final delivery location of the wind turbine equipment, the transport contractor selected, the availability and type of vehicles at the contractor's disposal, recommendations in the TMP and the route that is acceptable to authorities.	Modelling of routes and access is based on smaller turbines.
V2 traffic pg 55: The worst case increase in daily traffic generated has been estimated to occur during the fourth month of development when about 181 trips, including 36 truck trips, 4 semi-trailers, 7 over dimensional and / or over mass trips and 136 car trips. The number of vehicle movements however, will vary on a day-to-day basis depending on the construction activity and works programme.	Section has been crossed out but not removed. Unclear what this means.
V2 traffic pg 56: Sight distance at the proposed Energy Park site access point is potentially below requirements under the Austroads guidelines'	Contradicts earlier statement that '...Preliminary inspection and measurement of the proposed site access point and key intersections which will be used to access Crystal Brook Energy Park did not reveal any substantial safety or sight distance issues...'
V2 traffic pg 59: Figure 4 layout show 28 turbines, including 5 located on additional land parallel to Heaslip hghwy from Gumdale road.	Contradictory to other project maps which indicate 26 turbines. Contradicts statements that the project is fully located in the Port Pirie district, with no turbines in the Northern Areas district.

<p>V2 EMI, pg 10: Broadcast FM services are in a low frequency range and hence they are more resilient to disturbances. There is a minor chance of signal degradation for services broadcast from The Bluff for receivers in the immediate vicinity of the wind farm.</p>	<p>No mitigation strategy provided</p>
<p>V2 EMI pg 11: Cellular mobile phone interference to cellular phone coverage is anticipated to be minimal except for those users operating in close proximity to the proposed wind farm such as maintenance staff, and potentially for those travelling along Wilkins Highway through the wind farm area.</p>	<p>No mitigation strategy provided</p>
<p>V2 EMI, pg 11: Wireless Broadband is being rolled out in Crystal Brook and surrounding areas as the preferred service type provided by NBN Co. Some houses in close vicinity to the wind farm may experience a degraded service if they are located near a turbine. If the degradation of the service is too great, Neoen can facilitate a transition to NBN delivery via the satellite broadband service platform. The impact of the wind farm on wireless broadband services may be quantified by performing and recording pre and post installation signal level measurements in and around the wind farm areas; however, the mitigation measures remain the same.</p>	<p>Satellite NBN not a 'like for like' service No indication that Neoen will undertake pre-and post-installation monitoring</p>
<p>V2 EMI pg 14: Digital TV - Potential minor service degradation to local community, i.e. TV reception within 10 km of wind farm may be affected. Neoen Australia may choose to monitor TV signal reception within vicinity of proposed wind farm before and after turbine installations to verify any complaints by local residents</p>	<p>Satellite TV is not a 'like for like' service No indication that Neoen will undertake pre-and post installation monitoring</p>
<p>V2 EMI pg 15: Wireless Broadband - Potential minor service degradation to local community, i.e. wireless broadband reception within 3km west of the wind farm may be affected. Neoen Australia may choose to monitor wireless broadband signal reception within vicinity of proposed wind farm before and after turbine installations to verify any complaints by local residents</p>	<p>No indication that Neoen will undertake pre-and post-installation monitoring</p>
<p>V2 shadow flicker, pg iii: A shadow flicker assessment has been carried out at all dwelling locations in the vicinity of the Project. The results show that, for the turbine layout and dimensions considered, three dwellings are predicted to experience theoretical/actual shadow flicker durations that exceed the limit recommended by the Draft National Guidelines.</p>	<p>Contradicts earlier shadow flicker assessment that determined that four host residential dwellings and one non-host residential dwelling, may be subject to some levels of shadow flicker.</p>
<p>V2 shadow flicker, pg 1: The turbine layout provided by the Customer [3, 4] is composed of 26 turbines, with turbine base elevations ranging from approximately 214 m to 292 m.</p>	<p>Contradicts earlier statements that maximum height will be 240m.</p>
<p>V2 aerial pg 25: The Aerial Agricultural Association of Australia opposes wind farm developments unless the developer has (inter alia): Consulted in detail with local</p>	<p>Interference with agricultural aerial spraying is identified as anticipated, with no solution proposed</p>

<p><i>operators; Received independent expert advice on safety and economic impacts; and Considered the impacts on the aerial application industry</i></p>	<p>to avoid or minimise this impact, rather the conclusion that it needs to be 'accepted'.</p>
<p><i>V2 aerial pg 28: The South Australian Country Fire Service has published a fact sheet titled Understanding Aerial Firefighting which explains the use and limitations of aircraft in firefighting. The major point made is that: "The popular perception amongst much of the population is that aircraft alone can put out bushfires. This is not true. CFS firefighters and fire appliance for the vast majority of instances are the primary and only method of controlling bushfires.</i></p>	<p>Contradicts SA CFS who state that wind turbines close to a fire area may limit aerial firefighting operations.</p>

3. There are a number of process and transparency issues surrounding the development application that have not been satisfactorily resolved, including:

3.1 The validity of the application.

It was made clear by the (then) Chief Executive of the Department of Premier and Cabinet that the development application under the Crown sponsorship must be lodged with the State Planning Commission on or prior to 31 March 2018, otherwise support under Section 49(2)(c) of the Development Act 1993 for Neoen's Crystal Brook Energy Park would lapse.

Neoen's development application was not lodged until 5 April 2018.

3.2 Appeal Rights

The public consultation period has been further confused by contradictory advice regarding appeal rights.

Whilst initial advice from DPTI Officer suggested no appeal rights, the Planning Minister has since provided public advice that appeal was available¹⁷.

This advice would appear consistent with the lapsing of Crown's sponsorship on 31/03/18 and late lodgement of the application after this date, along with the locating of a wind turbine in the Landscape Protection zone and the proposal to locate turbines closer than 2km from existing dwellings not associated with the wind farm.

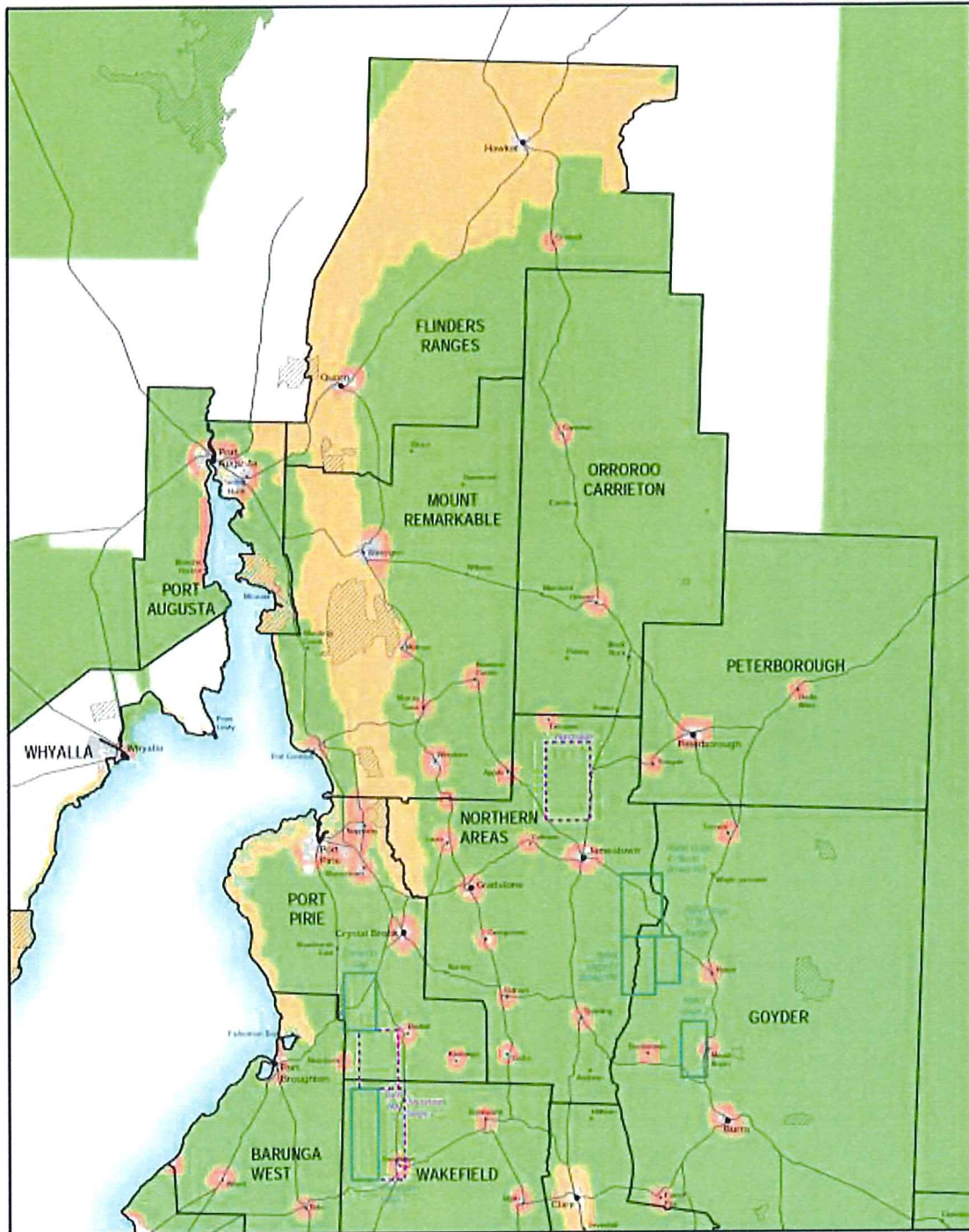
3.3 Independence and Transparency of State Commission Assessment Panel

It is noted that the Presiding Member of the SCAP has had a close previous involvement with Neoen's Hornsdale windfarm through paid association with consulting firm GHD. As many of the Crystal Brook Energy Park background reports have also been prepared by GHD but, as yet, not signed off, it is unclear whether this association has continued and whether a conflict of interest is still present.

It is also noted that South Australia's Honorary French Consul is a member of SCAP. Through this role, the level of association with French developer Neoen, and potential for conflict of interest in this instance also remains unclear.

Given the potential for substantial impact to nearby residents as a result of the Crystal Brook Energy Park wind turbines, it is imperative that the public can have confidence in the independence, transparency and diligence of the SCAP in conducting the development assessment.

¹⁷ Minister Stephan Knoll, ABC Radio 639 North & West, 06/06/18



Statewide Wind Farms DPA - Upper Mid North/Lower Flinders Ranges

