AgForce Queensland Farmers Limited
ABN 57 611 736 700

Second Floor, 110 Mary Street, Brisbane, Qld, 4000
PO Box 13186, North Bank Plaza, cnr Ann & George Sts, Brisbane Qld 4003

Ph: (07) 3236 3100
Fax: (07) 3236 3077
Email: agforce@agforceqld.org.au
Web: www.agforceqld.org.au

Ref: MG/AF/GG23051

4 September 2023

Hon Dr Steven Miles
Deputy Premier

By Email: windfarms@dsdilgp.qld.gov.au

Dear Dr Miles

Re: Review of the Wind Farm Code (State Code 23) & Accompanying Guidelines

AgForce is a peak organisation representing Queensland's cane, cattle, grain and sheep, wool & goat producers. The cane, beef, broadacre cropping and sheep, wool & goat industries in Queensland generated around $10.4 billion in on-farm value of production in 2021-22. AgForce's purpose is to advance sustainable agribusiness and strives to ensure the long-term growth, viability, competitiveness and profitability of these industries. Over 6,000 farmers, individuals and businesses provide support to AgForce through membership. Our members own and manage around 55 million hectares, or a third of the state's land area. Queensland producers provide high-quality food and fibre to Australian and overseas consumers, contribute significantly to the social fabric of regional, rural and remote communities, as well as deliver stewardship of the state's natural environment.

AgForce welcomes the opportunity to make this submission to the Honourable Dr Steven Miles, in response to the review of requirements for wind farm developments in Queensland. As communicated to the Queensland Government previously in relation to land uses that compete with agriculture, such as renewable energy projects, small-holder mining and access easements through rural properties, AgForce stands by Board-endorsed Land Use Protection Principles (see Appendix 1). In line with these principles, AgForce supports Queensland Government in proactively engaging with impacted agricultural stakeholders.

1. Acoustic Amenity

AgForce sees that the acoustic criteria contained in State Code 23 ('Code 23') is contrary to best practice approaches. The World Health Organisation (WHO) guidelines for community noise recommends that during the night, bedrooms should have less than 30 dB(A) indoors to allow for good quality sleep. Noise pollution can cause significant short and long-term health consequences including fatigue, headaches, elevated blood pressure, irritability, digestive disorders and increased susceptibility to cold and other minor infections.[1] However, under Code 23 the permitted maximum noise level from wind turbines on a host property at nighttime is the greater of 45dB(A) outdoors, or the background noise (L_{A90}) plus 5dB(A). On non-host lots the permitted maximum outdoor noise level is the greater of 35dB(A) or the background noise plus 5dB(A).

Continued/ …

[1] https://www.betterhealth.vic.gov.au/health/healthyliving/workplace-safety-noise-pollution

… /Continued

Ordinarily noise is regulated by the Department of Environment & Heritage Protection (DEHP), however, wind farms are not subject to the same noise regulations that are prescribed by the *Environmental Protection Act 1994* (EP Act)/Environmental Protection (Noise) Policy 2019. This is because wind farms are not considered an Environmentally Relevant Activity (ERA) as they do not burn fuel, which AgForce sees to be at odds with the objective of Queensland's environmental protection framework. Ultimately, this means that the DEHP has no statutory powers in assessing the noise pollution emitted by wind farms and the regulation of wind farms is done solely through Code 23.

AgForce has serious concerns about the integrity of the guidelines adopted by Code 23. In a series of emails exchanged within the DEHP it has evidently ignored concerns from its own staff. In summary:

- On 24 August 2015, Paul Roff emailed David Cook regarding an enquiry received from the Deputy Premier of the Department of State Development, Infrastructure, Government & Planning (DSDILGP), explaining that the reply letter to the Deputy Premier needs to restate the DEHP's opposition to wind farms being classified as an Environmentally Relevant Activity (ERA).
- On 26 August 2015, Dr Antoine David (Technical Specialist (Noise)) from the DEHP, provided to Paul Roff (Manager Environmental Planning at the Department of Environment & Heritage Protection), a bullet point list of technical points on the Draft Wind Farm State Code after his review, which was prompted by a letter from the Deputy Premier. Dr David's concerns are attached as Appendix 2. Dr David's conclusion is that the Code 23 acoustic criteria will not protect residents or animals.
- On 7 September 2015, Tony Roberts, Deputy Director-General Environmental Policy & Planning replied to Greg Chemello, (Deputy Director-General, Planning and Property Group, Department of State Development, Infrastructure & Planning) that the draft code is based on independent technical advice and has no concerns.

AgForce sees that the DEHP should have informed DSDILGP of Dr David's concerns however, this did not occur and instead, Tony Roberts advised Greg Chemello that there are no concerns with the acoustic guidelines as they were based on independent technical advice.

AgForce takes issues with this as the acoustic consultant engaged by DSDILGP, John Savery, had no known previous experience with wind farm noise other than at the same time being engaged to provide acoustic advice for the proposed Rabbit Ridge Wind Farm at Dalveen. The Rabbit Ridge wind farm was refused by Southern Downs Regional Council in the first instance because it could not meet the requirements set by the former Noise Policy (2008) however, was later approved under the acoustic guidelines in Code 23, which were advised by John Savery. Evidently, Mr Savery had a conflict between his duty to the State of Queensland in setting the acoustic criteria in Code 23 to protect residents and animals and his duty to his client, the Rabbit Ridge Wind Farm, at the time of advising on the acoustic criteria in Code 23 and favoured his duty to his client and set acoustic criteria so that Rabbit Ridge would be approved. It is clear that the interpretation of acoustic data would have been manipulated in such a way to allow wind farms to generate greater noise levels at the cost of human and animal health and well-being.

AgForce is aware that Bryan Lyons, on behalf of Wind Energy Queensland, advised DSDILGP of this serious lack of impartiality in writing on 13 May 2014.[2] DSDILGP chose to accept the conflicted advice from John Savery over the independent advice of its own noise expert.

Continued/ …

[2] See Appendix 3.

… /Continued

It is bewildering that no response has been provided or no real review of the merits of the acoustic advice informing Code 23 has been performed, even with the conflict of duty and interest of John Savery being raised to Greg Chemello by Wind Energy Queensland.

Dr Antoine David, in his list of concerns, has also noted that the 1.5km buffer zone from the wind turbine is insufficient as this figure was based on much smaller turbines. With larger turbines being used today it would be apt that the guidelines reflect these changes through the recommended buffer distance.

Dr David has also highlighted that the concept of wind masking has been erroneously applied in Code 23 to justify increasing noise limits at the residences (background noise plus 5 dBA) with increased wind speeds at the wind turbine (at least 1.5km away). There is no guarantee that the same wind speed will be occurring at the receptor to create background noise at the receptor sufficient to mask the noise from the wind turbine. This again undermines the reasoning behind making wind turbines exempt from acoustic quality objectives set in the Environmental Protection (Noise) Policy 2008 (now repealed) and 2019.

Additionally, Code 23 does not consider the cumulative impacts of existing wind turbines to new or expanded wind farm development. Appendix 2 of Code 23 states that the noise criteria is based on the background noise level without the contribution of existing wind farms. This is extremely unacceptable and AgForce sees that the cumulative noise impact should be considered with any application made to the State Assessment Referral Agency (SARA).

AgForce also has issue with the reference to approved sensitive land use receptors with the requirement to include noise modelling and predictions of free-field acoustic levels. Appendix 2 of the Code explicitly states that temporary or mobile habitable building structures on land are not included as sensitive land use receptors. This is a particular issue to AgForce members as often mustering or harvesting contractors will bring their own accommodation with them, either as a caravan or gooseneck and AgForce is concerned that noise levels at these sites should be included otherwise landholders may lose the ability to easily engage contractors.

Furthermore, even where projects are approved, there is little onus placed upon the proponent to perform acoustic monitoring after the initial requirement placed upon approved developments by SARA to undertake operational noise monitoring within the first 12 months of the wind farm being fully operational.[3] This is unacceptable as the project could be emitting much greater amounts of noise than what has been approved. It is a flaw of the system that under the *Planning Act 2016* (Qld), SARA is charged with enforcement of the acoustic conditions of approval but SARA is set up to carry out assessment of developments, it is not set up to carry out enforcement and it does not have the noise expertise to measure compliance.

Proponents should be cautious following the precedent set by *Uren v Bald Hills Wind Farm Pty Ltd*[4] as compliance with Code 23 may not be sufficient to defend a claim in common law nuisance by neighbouring landholders. If anything, the Victorian matter should serve as an incentive for proponents to undertake proper noise monitoring throughout the course of the project's life.

AgForce is aware of excessive noise complaints at both Mt Emerald and Coopers Gap Wind Farm with a court case on noise nuisance still in progress against the Mt Emerald Wind Farm[5].

Continued/ …

[3] https://planning.statedevelopment.qld.gov.au/__data/assets/pdf_file/0027/83178/for-consultation-draft-planning-guidance-state-code-23-wind-farm-development.pdf

[4] [2002] VSC 145.

[5] *Disley v Mount Emerald Wind Farm Pty Ltd (No 2)* [2022] QSC 54.

… /Continued

Complaints are being made to the wind farm company and are being investigated by the wind farm company. In all cases the wind farms have said the noise is compliant with their permit conditions. These complaints support Dr David's comments that the Wind Farm Code and permit conditions based on the Code would not adequately protect the community from excessive wind turbine noise.

AgForce also has concerns about the impact of wind farms on livestock and the lack of consideration given to this in Code 23. There is little to no evidence rebutting the possibility of impacts to livestock production and the safety of producers using horses to shift stock. Animal behaviour expert from the University of Queensland, Andrew Tribe, stated in a report that both cattle and horses would take time to get used to the noise and movement of a wind turbine and that he would expect greater risk to horse and rider safety near the turbines. The British Horse Society Advisory Statement recommends a setback of at least 4 times the overall height away from the path of horses to minimise safety risk. This means that producers will be at greater risk when mustering on horseback near wind turbines, which is not contemplated anywhere within the code.

1.1 Recommendations in Response to Acoustic Amenity

- That a maximum of 30 dB(A) indoors (with windows open) be the permissible nighttime noise limit averaged over 10-minute intervals as to obtain an accurate average measurement.
- Ongoing requirement of noise compliance monitoring, recording and reporting.
- The low frequency noise and infrasound should be assessed as part of the wind farm assessment.
- An adequate buffer distance that reflects the size of current wind turbines should be included in the guidelines based upon advice from a more appropriate and impartial acoustician. Dr David presented a paper to the 20th International Congress on Sound and Vibration held 7 – 11 July 2013, titled 'An Underpinning Methodology To Derive Stand-Off Distances From A Wind Farm', on this issue.
- A review by an independent acoustician should be obtained to inform the guidelines.
- Further research as to the effects on livestock be conducted as to allow for adequate and appropriate compensation on impacted businesses.
- Cumulative noise should be considered when further turbines are built on an existing wind farm.
- The concept of wind masking should not be used in the Code.
- AgForce has received information from Les Huson, acoustician, who recommends that the acoustic assessment should be performed on acoustically hard ground, as is the preferred method in South Australia and New South Wales.
- Ultimately, wind farms should achieve the objectives set out in the Environment Protection (Noise) Policy 2019.

2. Decommissioning

The Code does consider that at the end of the project the requirement that the wind farm site will be returned, as much as practically possible, to its original condition. However, there is little guidance and protection provided to landholders in this space.

AgForce takes issue with the lack of guidelines surrounding the decommissioning of wind farms within Code 23.

Whilst it is a condition of the development approval that the preparation of an end of operation decommissioning management plan be submitted to SARA before the wind farm is decommissioned,[6] we do not see that this is sufficient to adequately protect the interest of landholders.

Continued/ …

[6] https://planning.statedevelopment.qld.gov.au/__data/assets/pdf_file/0027/83178/for-consultation-draft-planning-guidance-state-code-23-wind-farm-development.pdf

… /Continued

Although some project operators include a clause in their contracts to create a trust fund to deposit the funds to decommission the project into, this is usually not contemplated to commence until towards the end of the project life, such as year 15, 20 or 25. This opens the landholder up to a number of risks.

The Australian Energy Infrastructure Commissioner has referred to the event where the project owner defaults on the agreed conditions which therefore results in the liability for decommissioning the project falling to the landholder.[7] Under section 73 of the Planning Act, the development approval binds the original owner of the premises, the owners' successors in title and any occupier of the premises. The ramifications of such an occurrence are manifold. The AEIC has also highlighted that the project operator may sell the project to another company over the course of the life of the project, which could easily result in the arrangement to fund the decommissioning being lost and the enforceability of the agreement being eroded over time. There is nothing in the Planning Act to provide for the development approval to bind the wind farm proponent/developer once it transfers the wind farm, or the successors in title to the wind farm or the holding company of the proponent. Often the wind farm proponent/developer is a $2 subsidiary of a publicly listed company with no resources to fulfill the conditions – particularly the decommissioning condition.

The AEIC website states that the cost to decommission each wind turbine ranges from $400,000-$600,000, depending on the size of the turbine.[8] This cost could increase vastly if there are structural failures or is unstable, where the AEIC states it could cost millions to remove each turbine from the project site. Concerningly, if the cost to decommission the wind farm did fall upon the landholder, there would likely be no avenue for the landholder to recover the costs of decommissioning the project as they would not have ownership over the project's assets. AgForce sees that if such a cost was put onto the landholder that this would be overly burdensome and almost impossible to undertake in some circumstances. Plainly, it is completely unacceptable that this is even a possibility with the current guidelines.

2.1 Recommendations in Response to Decommissioning

- It be mandatory for the proponent/developer to commence funding a decommissioning trust fund from the project's commencement, as it would be easier to obtain significant funding earlier on in the project life.
- Developer to organise for a bank guarantee, sinking fund, trust fund or a security bond deposit to be held by the landowner throughout the life of the project, so that landholders can have confidence that funds are being put aside by the proponent/developer.
- Clarity that any agreement between the original proponent/developer will be carried over to be an agreement between the landholder and any new company that buys the project.

AgForce notes that analogous requirements exist in Queensland's mining industry legislation, the EP Act[9] and federally in the offshore mining space.

AgForce is not recommending any requirements that are not already in existence in similar circumstances, hence it would seem that such a request would be wholly reasonable to impose upon wind farm proponents/developers.

Continued/ …

[7] https://www.aeic.gov.au/observations-and-recommendations/chapter-1-host-landowner-negotiations
[8] https://www.aeic.gov.au/observations-and-recommendations/chapter-1-host-landowner-negotiations
[9] *Environmental Protection Act 1994* (Qld), Part 14, Division 2.

… /Continued

3.1 Other Important Issues

With the risk that any omission to comment on what AgForce views to be other issues with the Code to be viewed as AgForce not having any further concerns, we would also like to briefly highlight concerns regarding the below.

3.1.1 Aviation

AgForce notes that proponents are required to provide evidence that AirServices Australia, Department of Defence and the district aerodrome supervisor have been consulted with however, there is no consideration afforded to landholders who engage helicopters to muster with. It has come to AgForce's attention that the Civil Aviation Safety Authority (CASA) is likely to bring in further regulations regarding helicopters flying around wind farms. Some members around Duaringa have advised that if CASA brought in regulations the ferry would take an extra 15-20 minutes, which is an additional burden placed upon landholders. Code 23 does not consider who would wear the burden of a longer ferry to engage in a mustering job. Furthermore, other activities like aerial feral pest control, aerial seeding, aerial baiting and aerial spraying and capabilities to fight bushfires from the air will be impacted. The Code needs to consider the impacts for landholders who rely on aerial activities for the operation of their business, not just the needs of commercial flights, defence force or the wider community.

3.1.2 Electromagnetic Waves

The guidelines state 'wind turbines can block, reflect or refract electromagnetic waves effecting microwave, television, radar or radio transmissions and reception through Electromagnetic Interference (EMI)'. It is also noted that turbines can on-transmit or scatter radio communication signals. AgForce notes that it is a condition of approval for the proponent to prepare a detailed EMI report which outlines mitigation and management measures to ensure the project does not result in unacceptable EMI impacts. AgForce is concerned that what is considered to be 'unacceptable' may be in reference to the wider community with no reference to what is unacceptable to host and neighbouring landholders. UHFs and VHFs are a vital resource to landholders, especially during mustering/harvesting. They are critical in communications between workers on the ground and helicopters in the sky, in some cases they can even be lifesaving. Mobile phone use, as it increases in network, is also critical to operating. AgForce would like to see that within the EMI report submitted by proponents it is mandatory to include interreferences with UHF, VHF and mobile devices used by landholders as well as basic communications such as television and satellite internet to be considered and that the term 'unacceptable' means unacceptable to landholders, not just the broader community.

3.1.3 Natural Drainage, Bushfires, Transport Networks

Code 23 also need to address natural drainage issues as to what regulations apply to drainage basins, who owns overland flow of water and what regulations there are to ensure the flow of water is not disrupted, which could result in serious erosion. The flow of overland water needs to be especially considered if new roads are to be built with the wind farm development.

Bushfire plans also need to be clearly provided and explained to landholders as this can also cause liability issues with staff who are acting on the instructions of the landholder in the event of a bushfire. AgForce has concerns that the regulations, in supporting action P09, only make reference to the construction and operational workforces and that they are appropriately protected in the event of a bushfire.

Additionally, Code 23 does not afford any consideration to agricultural traffic. For example, in some farming areas it is possible to plant and harvest eight times per year, which increases the amount of machinery and trucks on the road during these times.

Continued/ …

… /Continued

3.1.4 Consultation with Recommended Stakeholders

The Code recommends that prior to requesting pre-lodgement advice from SARA, the applicant consults with a range of stakeholders however, AgForce has serious concerns that farmers and graziers more broadly are not mentioned in the list of stakeholders. It has become evident from other projects that there will often be major pitfalls with the development that the proponent/developer is unaware of which could easily be addressed at the planning stage before such issues become a bigger problem. AgForce recommends that farmers and graziers, other than solely the host landholder, are included in the list of stakeholders to be consulted with.

Furthermore, where there is community engagement, it has been seen that the community gathering is done in a manner that does not allow for open discussion and for other landholders to raise their concerns or their own experiences that other landholders may not be aware of. Often proponents will liaise with the crowd and not provide a seminar or informative information session, in this case there may be opportunities for individual landholders to raise concerns with the proponent however, other community members are deprived of being privy to the discussion, which may be of relevance to their own interests.

4. Conclusion

The above demonstrates not only a lack of effective community engagement, but also a lack, or deliberate omission, to consult with landholders in a broader sense. It would seem easier to discuss with the wider community and their interests, rather than the individual and niche needs of landholders, whose interests are not always aligned with the wider community eg, people in town would have no consideration of low level mustering or VHF/UHF use.

The needs of landholders need to be properly considered as it is the agricultural industry that is impacted by these developments. Furthermore, AgForce is extremely disappointed that the *Regional Planning Information Act 2014* (RPI) has not been considered by Code 23 and would recommend that any amendments to the Code are also informed by the RPI Act.

Ultimately agricultural communities are discontent with the lack of common sense being applied throughout the process of wind farm development. Common sense would dictate that the Environmental Protection (Noise) Policy 2019 should apply to wind farms, wind masking should not be used as part of the methodology, a 1.5km set back is inadequate with larger turbines, decommissioning should not fall with the landholder and more broadly, the needs of landholders need to be properly considered as it is the agricultural industry that is impacted by these developments.

AgForce thanks the Minister for the opportunity to provide feedback and looks forward to continued engagement to better practices for all stakeholders involved.

If you have any questions or require further information please contact Anna Fiskbek, Policy Advisor by email: fiskbeka@agforceqld.org.au or mobile: 0407 813 470.

Yours sincerely

Michael Guerin
Chief Executive Officer

Enc

Appendices

Appendix 1: AgForce Land use Protection Principles

As the body for agriculture, AgForce requires that alternative and potentially impacting land uses ensure:

1. There is recognition that natural capital has an inherent value
2. Human health and well-being must not be sacrificed
3. A precautionary approach that avoids negative legacy effects on natural resources including air, soil, water and biodiversity
4. There are no negative impacts on existing or future sustainable agricultural opportunities

Before:

- Recognize that resources are finite
- All projects are assessed on environmental, social and economic criteria
- There is a formal mechanism for agriculture to be involved in assessment
- Projects should not be assessed in isolation and cumulative impacts assessed
- Potential impacts need to be objectively, and accurately quantified rigorously and independently reviewed
- Agricultural landholders to have equal representation, available resources and bargaining power

During:

- All projects must have comprehensive monitoring and transparent reporting
- Non-compliance will trigger cease work
- Enforcement is primarily the responsibility of government, but landholders must have a right to compel action
- Industry and Government must proactively identify and manage cumulative impacts, both individual project cumulative impacts and multiple projects cumulative impacts

After:

- Land needs to be rehabilitated to be the pre-existing natural conditions
- Financial assurance needs to be adequate for rehabilitation

See: https://www.agforceqld.org.au/knowledgebase/article/AGF-01250/

Appendix 2

ROFF Paul

From: ROBERTS Tony
Sent: Tuesday, 8 September 2015 12:25 PM
To: WADE Lawrie
Cc: ROFF Paul
Subject: RE: Wind Farm Code

Thanks Lawrie

I agree.

Tony

Queensland Government

73(2)Irrelevant

R

From: ROBERTS Tony
Sent: Monday, 7 September 2015 9:21 PM
To: ROFF Paul; WADE Lawrie
Subject: Fwd: Wind Farm Code

Sent from my iPhone

Begin forwarded message:

73(2)Irrelevant

On 7 Sep 2015, at 5:52 pm, ROBERTS Tony <Tony.Roberts@ehp.qld.gov.au> wrote:

Greg

I got your phone message on the above. We have reviewed the draft code (noting that it is based on independent technical advice) and have no concerns.

Regards

Tony

Tony Roberts
Deputy Director-General
Environmental Policy and Planning
Department of Environment and Heritage Protection

P 07 3330 5990
400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

ROFF Paul

From: CSS
Sent: Friday, 28 August 2015 8:26 AM
To: ROFF Paul
Subject: RE: Draft Wind Farm Module.

Queensland Government Queensland Government

Hi Paul

I understand that you have been speaking with Nick Weinert regarding CSP input, but wanted to advise that the remainder of the division has come back with a NIL response – FYI.

Kind Regards

Ang

Ang Johanson
Project Officer
Office of the Deputy Director-General | Conservation & Sustainability Services
Department of Environment and Heritage Protection

P 07 3310 6241
Level 5, 400 George Street, Brisane QLD 4000
GPO Box 2454, Brisbane QLD 4001
Working Part-Time Mon, Tues & Fri

From: ROFF Paul
Sent: Monday, 24 August 2015 1:51 PM
To: Corro EHP CSS DDG
Subject: RE: Draft Wind Farm Module.

Hi Ang

I have until 28 8 to prepare reply letter. So if I could get a response by COB 26 8 that would be good.

I don't need a detailed response as the letter indicates that further consultation will follow.

Regards

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: JOHANSON Ang **On Behalf Of** Corro EHP CSS DDG
Sent: Monday, 24 August 2015 1:25 PM
To: ROFF Paul
Subject: RE: Draft Wind Farm Module.

Hi Paul

I think we may have a NIL response for our division, but I'm going to send your request out to our business units just to be sure. Could you please advise how soon you require a response from us please?

Queensland Government Queensland Government

Kind Regards
Ang

Ang Johanson
Project Officer
Office of the Deputy Director-General | Conservation & Sustainability Services
Department of Environment and Heritage Protection

P 07 3310 6241
Level 5, 400 George Street, Brisane QLD 4000
GPO Box 2454, Brisbane QLD 4001
Working Part-Time Mon, Tues & Fri

From: ROFF Paul
Sent: Monday, 24 August 2015 12:18 PM
To: ROBSON Geoff; Corro EHP ESR DDG; Corro EHP CSS DDG
Cc: WADE Lawrie; Planning Support
Subject: Draft Wind Farm Module.

Hi Geoff and DDGs for ESR and CSS.

Please find attached a letter from the Deputy Premier on the reworked draft SDAP wind farm code and planning guideline. Would you please nominate an officer I can liaise with to prepare an EHP consultation response? In the short term I will prepare a letter from our Min to the DP indicating a desire to review, and be involved in further consultation on, the reworked module and planning guideline.

Regards

Paul

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

R

ROFF Paul

From: DAVID Antoine
Sent: Wednesday, 26 August 2015 11:17 AM
To: ROFF Paul
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; Corro EHP EPP DDG; WADE Lawrie; COOK David
Subject: RE: Draft Wind Farm Module.
Attachments: Bullet points for draft wind farm state code acoustics review by Dr Antoine David 24th August.docx

Queensland Government

Hi Paul,

David Cook asked me to review the Draft Wind Farm State code supplied in Corro and provide you with a bullet point list of technical point

Please find attached the bullet point list I made and feel free to contact me in you need any clarifications or explanations on any of the points made

Kind regards

Queensland Government

Dr Antoine David PhD MEng MAAS
Technical Specialist (Noise)
Technical Support Unit | Regulatory Capability and Custormer Service
Department of Environment and Heritage Protection

P 07 3330 5574
400 George Street
Brisbane QLD 4000

From: ROFF Paul
Sent: Monday, 24 August 2015 1:22 PM
To: COOK David
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; DAVID Antoine; Corro EHP EPP DDG; WADE Lawrie
Subject: RE: Draft Wind Farm Module.

Hi David

I also have been asked to prepare a response to this letter. Lawrie Wade tells me there was a previous letter stating out position that wind farms should not be an ERA. The reply letter needs to restate out opposition to Wind Farms being an ERA.

Regards

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: COOK David
Sent: Monday, 24 August 2015 1:11 PM
To: ROFF Paul
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; DAVID Antoine
Subject: RE: Draft Wind Farm Module.

Hi Paul,

Antoine David from my team is preparing a response currently for MECS item.

CTS No: 19104/15 for your information/input concerning: wind farms / invitation for consultation on draft Wind Farm State Code and Planning Guideline / Queensland development assessment framework / development applications for new or expanded wind.

Happy for you to be cc'd into his response.

Regards

David Cook
Manager
Technical Support and Community Response
Regulatory Capability and Customer Service
Department of Environment and Heritage Protection

P 07 3330 5583 M ch4 - Personal Inform
Level 9, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: DI TULLIO Tonina **On Behalf Of** Corro EHP ESR DDG
Sent: Monday, 24 August 2015 12:54 PM
To: ROFF Paul
Cc: COOK David; Corro EHP ESR RCaCS; DELZOPPO Lindsay
Subject: RE: Draft Wind Farm Module.

Hi Paul

The ESR contact would be David Cook, Manager, Technical Support and Community Response on x25583.

Kind regards
tdt

Tonina Di Tullio
Project Officer
Office of the Deputy Director-General
Environmental Services and Regulation
Department of Environment and Heritage Protection

P 07 3330 5549
Level 13, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: ROFF Paul
Sent: Monday, 24 August 2015 12:18 PM
To: ROBSON Geoff; Corro EHP ESR DDG; Corro EHP CSS DDG

Bullet points for Draft Wind Farm State Code acoustics review

- Acoustics problem associated with wind-farms are due to the infrasonic and low frequencies harmonics and their interaction between several turbines. Those generates annoyances and to higher intensities health effects.
- By using both a time average and frequency weighting, by definition, all those harmonics disappear and as such no assessments of the impact of those harmonics can be made.
- To assess those harmonics, it is necessary to use unfiltered data and no time average.
- The low frequencies and infrasound effects cannot be assessed by dBA. By designed, the A filtering process takes away low frequency and infrasound. Low frequencies and infrasound need to be assessed by dBlin which is unfiltered data according to frequency.
- Annoyance has not been considered in either guideline
- Wind masking has been applied as if it was masking noise of similar frequencies and this is not the case.
- The distance of 1500m as a buffer will not be sufficient for the current size of wind turbine. This distance had originated years ago for much smaller size turbines and at the time was probably a correct distance.
- The noise criteria proposed in the draft wind farm sate code is most likely not protect residents for their health and well-being and will not protect their environmental values.
- It is uncertain and unlikely that the noise criteria proposed in the draft wind farm sate code will protect animals such as farmed animals for their health and well-being from low and infrasonic noise exposure.

ROFF Paul

From: ROBSON Geoff
Sent: Tuesday, 25 August 2015 10:59 AM
To: ROFF Paul
Cc: HODGMAN Laurie; ROSIER Maria
Subject: Re: Draft Wind Farm Module.
Attachments: image003.png; image004.png

Hi Paul
Pls see below
Geoff

Sent from my iPhone

On 25 Aug 2015, at 9:29 am, HODGMAN Laurie <Laurie.Hodgman@ehp.qld.gov.au> wrote:

> Geoff, I've had a quick look and I don't think we'll need a lot of involvement at this stage because there's no mention of looking at an ERA under the EP Act for windfarms. But I think we could nominate Maria to receive further communications on it.
>
> Laurie
>
> <image003.png>**Laurie Hodgman**
> **Director**
> **Environmental Policy and Legislation**
> Department of Environment and Heritage Protection
> P 07 3330 5896 ch4 - Personal Inform
> Level 10, 400 George St, Brisbane Qld 4000
> GPO Box 2454, Brisbane Qld 4001
>
> ---
>
> **From:** ROBSON Geoff
> **Sent:** Monday, 24 August 2015 1:50 PM
> **To:** HODGMAN Laurie
> **Subject:** FW: Draft Wind Farm Module.
>
> Hi Laurie
>
> Somewhat ironically it would probably be Lawrie W we'd nominate.
>
> However, is this one that Rachel could look at, to the extent we need to be involved?
>
> Thanks
> Geoff
>
> ---
>
> **From:** ROFF Paul
> **Sent:** Monday, 24 August 2015 12:18 PM
> **To:** ROBSON Geoff; Corro EHP ESR DDG; Corro EHP CSS DDG
> **Cc:** WADE Lawrie; Planning Support
> **Subject:** Draft Wind Farm Module.
>
> Hi Geoff and DDGs for ESR and CSS.

Please find attached a letter from the Deputy Premier on the reworked draft SDAP wind farm code and planning guideline. Would you please nominate an officer I can liaise with to prepare an EHP consultation response? In the short term I will prepare a letter from our Min to the DP indicating a desire to review, and be involved in further consultation on, the reworked module and planning guideline.

Regards

Paul

<image004.png>**Paul Roff**
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

ROFF Paul

From: COOK David
Sent: Monday, 24 August 2015 1:11 PM
To: ROFF Paul
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; DAVID Antoine
Subject: RE: Draft Wind Farm Module.

Queensland Government

Hi Paul,

Antoine David from my team is preparing a response currently for MECS item.

CTS No: 19104/15 for your information/input concerning: wind farms / invitation for consultation on draft Wind Farm State Code and Planning Guideline / Queensland development assessment framework / development applications for new or expanded wind.

Happy for you to be cc'd into his response.

Regards

David Cook
Manager
Technical Support and Community Response
Regulatory Capability and Customer Service
Department of Environment and Heritage Protection

P 07 3330 5583 **M** 4 - Personal Infor
Level 9, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

Queensland Government

From: DI TULLIO Tonina **On Behalf Of** Corro EHP ESR DDG
Sent: Monday, 24 August 2015 12:54 PM
To: ROFF Paul
Cc: COOK David; Corro EHP ESR RCaCS; DELZOPPO Lindsay
Subject: RE: Draft Wind Farm Module.

Hi Paul

The ESR contact would be David Cook, Manager, Technical Support and Community Response on x25583.

Kind regards
tdt

Tonina Di Tullio
Project Officer
Office of the Deputy Director-General
Environmental Services and Regulation
Department of Environment and Heritage Protection

P 07 3330 5549
Level 13, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

Queensland Government

From: ROFF Paul
Sent: Monday, 24 August 2015 12:18 PM
To: ROBSON Geoff; Corro EHP ESR DDG; Corro EHP CSS DDG
Cc: WADE Lawrie; Planning Support
Subject: Draft Wind Farm Module.

Hi Geoff and DDGs for ESR and CSS.

Please find attached a letter from the Deputy Premier on the reworked draft SDAP wind farm code and planning guideline. Would you please nominate an officer I can liaise with to prepare an EHP consultation response? In the short term I will prepare a letter from our Min to the DP indicating a desire to review, and be involved in further consultation on, the reworked module and planning guideline.

Regards

Paul

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

Cc: WADE Lawrie; Planning Support
Subject: Draft Wind Farm Module.

Hi Geoff and DDGs for ESR and CSS.

Please find attached a letter from the Deputy Premier on the reworked draft SDAP wind farm code and planning guideline. Would you please nominate an officer I can liaise with to prepare an EHP consultation response? In the short term I will prepare a letter from our Min to the DP indicating a desire to review, and be involved in further consultation on, the reworked module and planning guideline.

Regards

Paul

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection
P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

GREGORY Pauline

73(2)Irrelevant

From: DAVID Antoine
Sent: Wednesday, 26 August 2015 11:17 AM
To: ROFF Paul
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; Corro EHP EPP DDG; WADE Lawrie; COOK David
Subject: RE: Draft Wind Farm Module.

Hi Paul,

David Cook asked me to review the Draft Wind Farm State code supplied in Corro and provide you with a bullet point list of technical point

Please find attached the bullet point list I made and feel free to contact me in you need any clarifications or explanations on any of the points made

Kind regards

R

Queensland Government
Queensland Government

Dr Antoine David PhD MEng MAAS
Technical Specialist (Noise)
Technical Support Unit | Regulatory Capability and Custormer Service
Department of Environment and Heritage Protection
P 07 3330 5574
400 George Street
Brisbane QLD 4000

From: ROFF Paul
Sent: Monday, 24 August 2015 1:22 PM
To: COOK David
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; DAVID Antoine; Corro EHP EPP DDG; WADE Lawrie
Subject: RE: Draft Wind Farm Module.

Hi David

I also have been asked to prepare a response to this letter. Lawrie Wade tells me there was a previous letter stating out position that wind farms should not be an ERA. The reply letter needs to restate out opposition to Wind Farms being an ERA.

Regards

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection
P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: COOK David
Sent: Monday, 24 August 2015 1:11 PM
To: ROFF Paul
Cc: Corro EHP ESR RCaCS; DELZOPPO Lindsay; DAVID Antoine
Subject: RE: Draft Wind Farm Module.

Hi Paul,

Antoine David from my team is preparing a response currently for MECS item.

CTS No: 19104/15 for your information/input concerning: wind farms / invitation for consultation on draft Wind Farm State Code and Planning Guideline / Queensland development assessment framework / development applications for new or expanded wind.

Happy for you to be cc'd into his response.

Regards

Queensland Government Queensland Government Queensland Government

David Cook
Manager
Technical Support and Community Response
Regulatory Capability and Customer Service
Department of Environment and Heritage Protection

P 07 3330 5583 M 4 - Personal Info
Level 9, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: DI TULLIO Tonina **On Behalf Of** Corro EHP ESR DDG
Sent: Monday, 24 August 2015 12:54 PM
To: ROFF Paul
Cc: COOK David; Corro EHP ESR RCaCS; DELZOPPO Lindsay
Subject: RE: Draft Wind Farm Module.

Hi Paul

The ESR contact would be David Cook, Manager, Technical Support and Community Response on x25583.

Kind regards
tdt

Tonina Di Tullio
Project Officer
Office of the Deputy Director-General
Environmental Services and Regulation
Department of Environment and Heritage Protection

P 07 3330 5549
Level 13, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: ROFF Paul
Sent: Monday, 24 August 2015 12:18 PM
To: ROBSON Geoff; Corro EHP ESR DDG; Corro EHP CSS DDG
Cc: WADE Lawrie; Planning Support
Subject: Draft Wind Farm Module.

Hi Geoff and DDGs for ESR and CSS.

Please find attached a letter from the Deputy Premier on the reworked draft SDAP wind farm code and planning guideline. Would you please nominate an officer I can liaise with to prepare an EHP consultation response? In the short term I will prepare a letter from our Min to the DP indicating a desire to review, and be involved in further consultation on, the reworked module and planning guideline.

Regards

Paul

Paul Roff
Manager
Environmental Planning
Department of Environment and Heritage Protection

P 07 3330 5776
Level 10, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

R

Bullet points for Draft Wind Farm State Code acoustics review

- Acoustics problem associated with wind-farms are due to the infrasonic and low frequencies harmonics and their interaction between several turbines. Those generates annoyances and to higher intensities health effects.
- By using both a time average and frequency weighting, by definition, all those harmonics disappear and as such no assessments of the impact of those harmonics can be made.
- To assess those harmonics, it is necessary to use unfiltered data and no time average.
- The low frequencies and infrasound effects cannot be assessed by dBA. By designed, the A filtering process takes away low frequency and infrasound. Low frequencies and infrasound need to be assessed by dBlin which is unfiltered data according to frequency.
- Annoyance has not been considered in either guideline
- Wind masking has been applied as if it was masking noise of similar frequencies and this is not the case.
- The distance of 1500m as a buffer will not be sufficient for the current size of wind turbine. This distance had originated years ago for much smaller size turbines and at the time was probably a correct distance.
- The noise criteria proposed in the draft wind farm sate code is most likely not protect residents for their health and well-being and will not protect their environmental values.
- It is uncertain and unlikely that the noise criteria proposed in the draft wind farm sate code will protect animals such as farmed animals for their health and well-being from low and infrasonic noise exposure.

R

Appendix 3

Wind Farm State Code and Planning Guidelines
Submission by Wind Energy Queensland
13th May 2014

Wind Energy Queensland (WEQ) Representing:-
Alice Creek Community
Cooranga North Concerned Citizens Group
Crows Nest Community
Dalveen Community
Mt Emerald Community
Spokesperson: Mr Bryan Lyons

SUBMISSIONS

Summary

"Uncertainty for the community"

The following statement was included in the Deputy Premier's Media Release on the draft Wind Farm Codes.

"*This document, once finalised and integrated into the State Development Assessment Provisions, will provide consistent guidelines for the potential development of wind farms in Queensland and certainty for the community*".

Greg Chemello via email 24.4.2014 provided the following statements:-

"*The way that the State Assessment and Referral Agency (SARA) operates under the Sustainable Planning Act is that we are not bound to comply with any other legislative provisions. This applies to all the issues that we call "state interests" in land use planning and development assessment - transport, heritage, native vegetation, fisheries, noise etc. So SARA is not obligated to comply with the Environmental Protection (Noise) Policy 2008 (and indeed a whole range of other legislation).*

That is why we prepare the State Development Assessment Provisions (SDAP) to define the issues that we generally do take account of in assessing development. The draft wind farm state code will become a module of SDAP.

SARA is not bound by SDAP. The legislation states that we "may have regard to" the relevant provisions of SDAP in making a decision. However, SDAP is obviously our "default" position.

We believe the draft wind farm state code adequately deals with noise related issues for wind farms. Obviously, if you believe this can be improved, please let us know in your formal submission on the draft.

Regards

Greg Chemello
Deputy Director-General
Planning and Property Group
Department of State Development, Infrastructure and Planning
Queensland Government
tel

The Development Approval Process giving SARA the discretion to apply or not apply the Code and Planning Guidelines, is already legislated in the relevant Regulations and so the community has no certainty that the Code will be applied.

Even if the draft Code and Planning Guidelines are applied, the draft Code and Planning Guidelines, at this point, are so uncertain in their drafting and contain so many deficiencies, that it is itself uncertain in many areas.

The fact that wind farm development applications are even to be assessed by SARA when there is the uncertainty of whether SARA will or will not have regard to the Wind Farm Code and Planning Guidelines and the uncertainties arising from the deficiencies in the Code and Planning Guidelines create **GROSS UNCERTAINTY**.

As a result, the Code and Planning Guidelines fail to deliver on the Deputy Premier's statement claiming certainty for communities.

These uncertainties are not acceptable to Qld communities for an industry that offers greatly increased electricity production costs and no greenhouse gas emission savings and overall will become a liability to Qld the same as roof top solar has. This has been highlighted by Energy Minister Mark McArdle. The Qld Treasurer is constantly reminding us that Qld does not need more liabilities.

Draft Wind Farm State Code and Planning Guidelines will not protect Qld communities:

The Code and Planning Guidelines apply as the typical case an assumption in relation to masking that defies common sense. That assumption is contained in the second limb of Acceptable Outcome A08.1 which allows the noise limit at the sensitive receiver to be increased as the wind speed at the wind turbine increases i.e. it assumes that at all times, there is a correlation between wind speed at the wind farm and background noise at the receiver (the wind masking assumption). WEQ objects because there is no requirement for the wind speed to be measured at the sensitive receiver to ensure that the same wind that is driving the turbine is also present at, and increases the background noise at, the sensitive receiver to provide a masking effect. If the wind speed is less at the sensitive receiver then masking will not be as effective as assumed. At topographically diverse wind farm sites common sense tells us that the wind speed will often be different at the wind turbine and the receiver and therefore masking will be unreliable.

Ministers McArdle and Powell, Coordinator General, Barry Broe at the Toowoomba community cabinet meeting, Messrs Greg Chemello and James Coutts of DSDIP at a meeting in Brisbane, all agreed it was commonsense that the wind masking assumption should not be allowed. When they give advice to the effect that "wind will not always be consistent at the turbine and the receptor", the Qld Government Noise Experts are also agreeing that the wind masking assumption is invalid. Other Senior and respected acousticians in Australia who also consider the wind masking assumption is invalid include Mr Les Huson, Dr Bob Thorne, Mr Steven Cooper and Emeritus Professor Colin Hansen of the Adelaide University. Even the Guidelines recognize this "*In most situations there will be different wind directions and speeds between each WTG on a Wind Farm site and the relevant receiver.*" (Section A5.4 under the heading Propagation Model). "*For large or topographically diverse Wind Farm sites, the suitability of the wind speed measurement location may need to be confirmed as part of the development assessment process*" (Section A5.3 Wind

Speed Measurement under the heading Measurement Location). The Guidelines provide guidance for the **a-typical** situation (where wind speeds at the wind farm and the receiver are always the same) but not for the **typical** situation (where the wind speeds at the wind farm and the receiver are not always the same).

Basic traditional planning principles that apply to noise emitting industries have been shared with Qld communities by 2 Noise Experts employed by the Qld Government. The principles are that noise is noise; wind farms make noise; and wind farm noise should be assessed against the same limits as any other noise. The draft Code and Guidelines fail to meet these principles advised by the Qld Government Noise Experts. The same senior acousticians in Australia (listed above) agree with the advice of the Qld Government Noise Experts.

All Qld communities currently dealing with wind farm proposals have relied upon advice on wind farm noise from Mr Les Huson a qualified acoustician who has approximately 9 years of experience measuring wind farm noise and studying the impacts of wind farm noise on surrounding communities. Mr Huson consults to Stanwell Corporation and CS Energy and has been performing compliance checking at Callide and Tarong Power Stations for approximately 14 years. Given Mr Huson's established credibility with Qld Government entities, WEQ submits that the Qld Government should take notice of Mr Huson's views on regulating wind farm noise particularly where his views support those of the Qld Government Noise Experts.

As required by the Environmental Protection (Noise) Policy 2008 for all new development, wind farm noise should not exceed 30 dB(A) indoors at the sensitive receptor at night. Any outdoor noise targets must reflect the actual attenuation of the building to meet this noise limit. The Code and Guidelines wrongly assume attenuation of at least 5 dB(A) in all cases.

As a result of these assumptions, the Code and Guidelines do not provide the level of regulatory protection needed to avoid the impacts that are currently being felt by communities living near wind farms in other Australian States and overseas. This includes impacts on families who host wind turbines; benefit financially; but are formally complaining about being impacted by excessive wind turbine noise.

Wind Energy Queensland (WEQ) therefore has no confidence in the draft Code and Guidelines and submit that, in the best interest of Qld communities, the Codes and Guidelines be redrafted applying traditional planning principles in line with advice already provided to Qld communities by the Qld Government's Noise Experts.

Code and Guidelines are Biased in favour of Wind Farms

The 2 assumptions in the draft Code and Guidelines regarding wind masking and attenuation, incorporate into the Code and Guidelines the same bias in favour of Wind Farms as Guidelines in other States and countries. This is an opportunity for Qld to apply the correct traditional planning principles to protect their communities from an industry which has developed planning principles biased in their favour and convinced other States and countries to apply them.

A further bias in the Code and Guidelines in favour of the Wind Farms is the requirement for outdoor noise measurements. The Code should require indoor noise measurements and permit out door measurements and assumptions in relation to attenuation only if an affected neighbour will not allow access. Outdoor measurements make it impossible in high speed winds at the receptor to test compliance because microphones can't be sufficiently shielded against the wind.

A further bias is contained in the Guidelines when:-

1. they provide guidance for the a-typical situation but not for the typical situation. An unsuspecting assessment manager is likely to apply the guidance in the Guidelines for an a-typical wind farm site (a flat site with no wind barriers between the site and the receivers) to a typical site (large or topographically diverse Wind Farm site) for which no guidance is provided.
2. they purport to limit the sensitive land uses (see Code) that need to be monitored for assessment of approval and compliance to Relevant Receiver Locations (a much narrower term and therefore requiring monitoring at much fewer sights);
3. they fail to require the developer to provide security for:-
    a. remediation;
    b. enforcement; and
    c. compliance monitoring;
4. they fail to require retention of all data and sound recordings of noise generated by the wind farm until a reasonable period after completion of remediation and disclosure of same to the assessment manager and complainants;
5. etc.

WEQ objected to the appointment of Savery & Associates to draft the Code and Guidelines because Savery & Associates have a conflict of interest and duty arising from their current consulting to the developer at Rabbit Road Wind Farm in an appeal against rejection of that wind farm.

Renewable Energy Target (RET) Review:

The review of the RET by the Federal Government is expected to deliver a much reduced or abolished RET subsidy to wind farms. A lesser RET subsidy will remove the commercial viability of wind farm developments in Qld. The RET review is expected in the next couple of months. For the Qld Government to invest more resources into developing a wind farm code seems unwise given the likelihood that a Code will not be required if new wind farms cease to be viable.

Precedent for higher noise levels in Qld:

The Code is setting a precedent for higher noise levels in Qld. The main justification for this seems to be wind masking by background noise that is similar to the noise generated by wind farms. As wind masking involves an invalid assumption, other industries can easily argue they should also be allowed to produce a maximum of 35 dB(A) outdoors. Up till the publication of the Code, no industry has been allowed

under the Environmental Protection (Noise) Policy 2008, to produce outdoor noise as high as 35 dB(A) at night at the nearest relevant receiver location.

WEQ submit that it is not in the best interest of the state to adopt a Code setting the precedent for higher outdoor and indoor noise levels for wind farms than has been previously allowed for any other industry in Qld.

State Interest:

WEQ submit that the economic and environmental benefits of wind farms have not been fully and properly assessed against the social and environmental costs of wind farms, by the Qld Government, and if the cost benefit analysis was properly done, wind farms would not be considered as state interest.

Submission:

WEQ submits that the Qld Government should not adopt the current draft Code and Planning Guidelines and should draft and adopt a code and planning guidelines that properly protects all Queenslanders.

The Qld Government Noise Experts should be involved in the drafting of any future Codes and Guidelines. External Consultants engaged in the process should have experience in measuring wind farm noise, be independent of the wind industry and not have an interest in promoting the wind industry.

Detailed Submission

1. **The Code and Planning Guidelines do not protect the people of Queensland**
    a. Objectives of the Code and Guidelines
        i. **Section 1.1** ***sets out the two objects of the Code and Guidelines "The Wind farm state code is intended:-***
            1. ***to facilitate the development of new wind farms or the expansion of existing wind farms in appropriate locations; and***
            2. ***to ensure potential adverse impacts on the community and environment are avoided during the construction, operation and decommissioning of a wind farm."***
        ii. Too much of the Code and Guidelines is directed to the former while nowhere in the Code and Guidelines is it specified what will avoid adverse impacts on communities.
        iii. The Code and Planning guidelines do not specify how the criteria it proposes will avoid adverse impacts.
        iv. The second objective of the Code and Planning Guidelines is therefore not adequately dealt with.
    b. Rural environments
        i. Rural environments are typically quieter than Suburban environments.
        ii. Wind Farms are typically constructed in rural environments.
        iii. The WHO guideline of 30 dB(A) indoors at night is designed to protect sleep in a suburban environment with traffic noise.
        iv. With quieter background in rural areas, noise will be annoying at noise levels lower than in suburban areas.
        v. Therefore the noise limit criteria for wind farms must be less than the WHO guideline.
2. **Savery & Associates**
    a. Savery & Associates are engaged by the Department of State Development and Infrastructure Planning ("DSDIP") to draft the Wind Farm State Code (the "Code") and Wind Farm State Code Planning Guidelines (the "Planning Guidelines").
    b. Savery & Associates are engaged by the developer of the Dalveen Wind Farm also known as the Rabbit Ridge Wind Farm, approval for which was refused and is now under appeal.
    c. Savery & Associates have an obvious conflict of interest and duty:-
        i. Their interest in acting for wind farm developers now and in the future;
        ii. Their duty to the people of Queensland to draft a Code that will be appropriate for all Queenslanders.
    d. It is a good principle not to engage consultants with a conflict of interest and duty as there is a risk that the conflict may cause the

consultant to err consciously or unconsciously in favor of their interest or their duty.

e. Wind Energy Queensland objected to the employment of Savery & Associates prior to their producing the Code and Planning Guidelines.

3. **Code and Planning Guidelines confused, convoluted and need redrafting**

a. The Code and Planning Guidelines do not produce an outcome that is appropriate for all Queenslanders and favors the Wind Farm Developers in that, they, inter alia permit the WHO recommended sleep protection noise limit of 30 dB(A) indoors at night (adjusted for special audible characteristics) to be breached in a number of ways e.g.:-

i. The application of the principle of Masking is a-typical in Queensland but the Code and Planning Guidelines provide for the background noise limit in the second limb of acceptable outcome A08.1 to be set applying Masking as the general rule and inadequately provide for the typical application in Queensland where Masking does not apply.

ii. Where Masking applies, the method of setting the baseline background noise criteria to which 5 dB(A) is added to set the background noise limits, does not exclude all intermittent noises and does not even exclude insect noises as recommended by "The case for spectral measurement of ambient Noise Levels in the Assessment of Wind Farms" by Matthew Terlich of Savery and Associates Pty Ltd.

iii. The criteria of 35 dB(A) outdoors above the WHO indoor limit of 30 dBA when attenuation of residences with windows open is known to be less than 5 dB(A) in many instances.

iv. The methodology for assessing compliance with the applicable noise limit permits maximum noise to be generated at the wind farm but may exclude measurement of that noise at the Receiver because the wind speed at the Receiver is greater than 5 meters per second;

v. If the sum of the base background noise level and the applicable increase at the prevailing wind speed is higher than 25 dB(A), the noise permitted at the Receiver, by adding 5 dB(A), is higher than the WHO limit.

vi. The Noise limit is adjusted only for tonality and not for all special audible characteristics (which term includes amplitude modulation, tonality, impulsiveness etc.). It should be adjusted for all special audible characteristics.

vii. It makes no allowance for noise from additional sources which together with background noise, wind farm noise etc increase the total noise indoors at a sensitive receiver to a level in excess of 30 dB(A).

viii. On average, background noise will be quieter at night than during the day. Under Sections 5.2 and 5.5, regression analysis is used to determine the background noise. Regression involves averaging over a period including many days and nights. By the definition in the Planning Guidelines, background noise should exclude all noise that is not present 90% of the time i.e. the background noise level is the noise level at the quietest time. Therefore the methodology for determining background noise involving regression analysis will not determine the background noise level as defined. That method (involving averaging resulting in a noise level above the quietest time) must result in a figure higher than the background noise level as defined. This is another bias enabling the wind farms to cheat the stated criteria let alone enabling wind farms to generate noise greater than the WHO Guideline. Regression analysis should not be applied to determine the background noise level.

ix.

b. Many of these defects could be avoided by providing for indoor noise measurements but the Planning Guidelines require all relevant measurements to be outdoors (Section A 5.2 under the heading Background Noise Measurement Position and Section A5.3) and the application of a very convoluted system set out in those sections for determining:-
   i. the relevant background noise limit;
   ii. compliance assessment;

   at different wind speeds at the wind farm/WTG notwithstanding that those wind speeds are likely to be unrelated to the wind speed at the receiver.

c. A separate section (see paragraph 7.h) of this submission refutes the arguments for using external noise measurements. That section concludes that the use of outdoor measurements makes it easier for wind farms to avoid adverse compliance assessment because breaches of noise limits typically occur in high speed winds at the wind farm and lower speed winds at the receiver. This is a clear bias in favor of wind farms.

d. However, it is worth pointing out that in relation to low frequency noise, indoor noise measurements are envisaged (see Section A5.13 first bullet point) highlighting the inconsistencies and again suggesting the requirement for external noise measurements is a bias in favor of wind farm developers.

e. The draft Code and Planning Guidelines are so unclear and confused to indicate either insufficient time was allowed to draft the Code and Planning Guidelines, incompetence or bias towards the wind industry.

f. No greater example of this lack of clarity and confusion is needed than in the drafting of the acceptable outcome noise limit in column 2 of item P08 in the draft Code:-

i. The predicted equivalent noise level (LAeq, adj,10min), including tonality adjustment, does not exceed, whichever is the greater of:

1. 35dB(A) at relevant sensitive land uses, or

2. the background noise (LA90,10min) by more than 5dB(A);

for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between.

ii. The confusions include:-

1. The use of the word "predicted" in the first line which precludes actual noise measurements in compliance assessment because actual noise measurements are not part of the relevant noise limit;
2. The term "equivalent noise level" is used and defined in the Planning Guidelines but nowhere in the acceptable outcome is the dominant relevant source of the noise level identified. Words to the effect of "with the dominant noise level generated by any WTG in the Wind Farm or the Wind Farm as a whole" need to be added to qualify the words "noise level".
3. The qualification "*at relevant sensitive land uses"* applies only to the nominated noise limit of 35 dB(A). Obviously, that qualification should apply to the equivalent noise level in the first line and to the background noise limit if it is applicable i.e. higher than 35 dB(A).
4. Section A5.1 of the Planning Guidelines purports to quote the acceptable outcome from P08 of the Code but uses "sensitive receptors" in lieu of "sensitive land uses" used in P08 of the Code. "Sensitive receptors" is term used in the Environment Protection (Noise) Policy 2008 (the "Noise Policy") – a Freudian slip in the context of Bias. It is not the term used elsewhere in the Planning Guidelines, namely "Relevant Receiver Locations".
5. There are different background noise limits for each receiver but in assessing compliance at a receiver only the background noise limit at the receiver for the relevant wind speed should be applied. The formulation of the acceptable outcome does not state this.
6. In any ordinary reading of the criteria, the last paragraph "*for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in*

between" qualifies the 2 previous sub-paragraphs when, obviously, it should be relevant only to the background noise limit;

7. It seems that it is intended that the second limb of the noise limit in A08.1 of the Code, be a number of dB(A) equal to the total of:-
    a. the base background noise level (LA90,10min) at the relevant sensitive land use;
    b. the number equal to a measured increase in background noise at wind speeds (at the relevant sensitive land use location), from cut-in to rated power of the wind turbine generator and each integer wind speed in between determined prior to approval; plus
    c. 5 dB(A).
8. This is not clear from the drafting of the second limb.

g. Further examples of confusion in the Planning Guidelines are as follows:-
    i. Part 2 Assessment Criteria of the Planning Guidelines states, "The supporting actions provide useful ways of responding to the performance outcomes and acceptable outcomes; however, they may be modified to suit individual project and site circumstances as appropriate". One would expect that the typical wind farm position in Queensland would be provided for but the Planning Guidelines provide mainly for the a-typical position.
    ii. Section A5.1 Audible Noise states:-

    "***Meeting the criteria***

    This section describes the steps to be taken for assessing whether wind farm noise reaching receivers at relevant locations will comply with the criteria of these guidelines."

    iii. Comments on confusion of language
        1. "assessing":-
            a. Is this referring to approval assessment or compliance assessment or both?;
        2. What should be assessed is:-
            a. **<u>At the time of assessment for approval</u>**:-
                i. the base background noise level (prior to the construction of the wind farm);
                ii. the increases to be applied to that number having regard to the wind speed;

            for the purpose of determining one component of the second limb of the Acceptable Outcome in A08.1 of the Code at different wind speeds. Currently the Code provides for the noise limit to be the higher of 2 numbers, the second alternative

number appears to be intended to be the sum of base background noise level plus an increase depending upon wind speed plus 5 dB(A), but even the definition of the second limb of the noise limit in Acceptable Outcome A08.1 of the Code is confused;

b. **At the time of assessment for compliance**, the background noise limit at the wind speed prevailing at the time of the assessment. To determine the noise limit at the time of compliance, it appears to be intended (though not clearly and accurately stated) that the assessor must first determine whether the second limb number is higher than the first limb number, i.e. higher than 35 dB(A). To make that determination, the assessor must know the prevailing wind speed at the time of compliance assessment and then add the appropriate predetermined increase in noise level for that wind speed to the base background noise level. Then the assessor can assess the measured wind farm noise reaching the RRL against the noise limit and determine whether or not that noise level breaches the noises limit.

3. The steps described in Section A5.1 can result in "assessing whether wind farm noise reaching receivers at relevant locations will comply with the criteria of these guidelines" but the statement is too cryptic because it implies a number of intervening steps which are not clearly stated.
4. "relevant receiver locations"("RRL"). This term is used only for noise assessment in the Planning Guidelines. The term is not used in any other part of the Planning guidelines or the Code. The Code and the State Planning Policy use the term "sensitive land uses". The term "Sensitive land uses" is defined in the State Planning Policy. For consistency, the Planning Guidelines should use the same term. RRLs are defined in Appendix 5 in a confused, inexact way and reduce the number of sensitive land use locations considered in assessment for both approval and compliance significantly. This is very dangerous for a sensitive land use that is not an RRL. To add to confusion even the term "relevant receiver locations" is not used consistently. Once "receivers at relevant locations" is used. Often "relevant receivers" is the

term used. In appendix 4 “receptor” is used. Etc Are all these terms used to describe the same thing?

5. “Criteria of these guidelines”:-
    a. The criteria are set by the Code and not by the Planning Guidelines. Therefore “criteria of these guidelines” is incorrect and misleading.
    b. The criteria for Noise in Appendix 5 of the Planning Guidelines is not the same as the criteria in Acceptable outcome A08.1 in the Code:-
        i. The Code sets the criteria. Only the Code is part of the SDAP;
        ii. Acceptable Outcome A08.1 refers to sensitive land uses.
        iii. The Planning Guidelines state a criteria in Section A5.1 that refers to “relevant sensitive receptors”. “Relevant Sensitive receptors” is not defined in the Planning Guidelines and is used only once in the Planning Guidelines. The Planning Guidelines should use the same term as the Code i.e. “sensitive land uses”.
        iv. All sensitive land uses should be assessed at approval and commissioning and ongoing compliance assessment and all sensitive land uses resulting in complaints should be available for assessment of compliance even if the relevant sensitive land use is not an RRL. Section A 5.11 Excessive noise purports to prohibit this when it states “The operation of the wind farm should comply with the criteria at all relevant receivers. The extent of relevant receivers is confined to those identified during the development assessment stage (including proposed developments near the wind farm which have approved development applications).” This statement should be deleted or at least corrected.

iv. Section A5.1 Audible Noise continues and states

“Background noise is measured at relevant receiver locations at continuous 10-minute intervals and particularly over the range of wind speeds at which the Wind Turbine Generator's (WTG) operate. The data must adequately represent conditions at the site and cover approximately 2,000 intervals.

Wind speed is measured in intervals that correlate with the background noise measurements at relevant receiver locations. The wind speed data, together with the manufacturer's noise data for the WTG and using a suitable model, is then used to predict noise levels at each integer wind speed from cut-in to rated power.

The correlated wind speed and background noise data are plotted to give a standard graph for background noise at each relevant receiver. This graph is then used in conjunction with the predicted noise levels to assess whether the wind farm will meet the criteria of these guidelines."

1. Comments on confusion of language
    a. "Background noise is measured":-
        i. When is background noise measured? Background noise should be measured at the quietest time of the year – usually winter when insect and frog noises are not heard.
        ii. Background noise should be measured before the wind farm construction commences.
    b. "Site" – another new term which can lead to inconsistency and confusion. Does this mean each RRL or the wind farm site?
    c. "Wind speed" – where?:-
        i. At each of the RRLs or the Wind Farm site?
        ii. If at the Wind Farm site, where at the Wind Farm site?
    d. There seems to be a desire to measure wind speed for assessment of approval and compliance at only one location but this is not clearly stated. See:-
        i. "If wind data from the single wind speed monitor are not representative for all of the noise monitoring locations, the wind speed should be measured separately at each of the locations." (Section A5.2 Background Noise under the heading "Data Collection"). Presumably if there is a single wind speed monitor, it will be at the wind farm. It can't be at each RRL.
        ii. "noise monitoring locations" is another new term which is not defined. Should the term be followed by the words "at

each Relevant Receiver Location" to clarify the meaning.

iii. "Data not adversely affected by the effects of wind or rain should be collected for a sufficient period to cover the range of wind speeds and directions generally expected at the Wind Farm site." (Section A5.2 Background Noise under the heading "Data").

iv. "Wind speeds (in m/s) should be measured at the WTG hub height. For the purpose of the guidelines it is permitted to report wind speeds at other heights where wind speed at the hub height can be accurately calculated (refer to the text below). The noise level data for each WTG is used as the basis for predicting the total noise level from a Wind Farm. Wind speed at the Wind Farm site and background noise at the relevant receiver must be correlated so that background noise and Wind Farm noise can be compared." (Section A5.3 Wind Speed Measurement).

v. "*The same location should be used for measuring wind speed and direction for all of the following procedures:*

1. *background noise measurements*
2. *noise predictions*
3. *compliance checking.*

vi. *Therefore the wind speed measurement location at the Wind Farm site should not:*

vii. • *be significantly affected by the operation of the WTGs in their final location;*

viii. • *provide lower wind speed results than other locations on the Wind Farm site, where those locations will house WTGs that affect the noise level at a relevant receiver.*"(Section A5.3 Wind Speed Measurement under the heading Measurement Location)

e. Confusion is compounded when wind speeds at the noise measurement location are discussed in Section A5.2 but in these discussions in the Planning Guidelines, the references to "wind speed" appear to be relevant only in relation to

windshield of the microphone used to measure the noise level.

f. The apparent desire in the Planning Guidelines, for a single wind speed measurement location, can be only to save the applicant/developer the cost of measuring wind speed where it is relevant i.e. at the RRL and shows bias.

g. "*Wind speed is measured in intervals that correlate with the background noise measurements at relevant receiver locations*". "Wind speed" is singular when wind speed will vary over time and at different locations.

h. If the wind speed is greater than 5 m/s, measurement of the background noise can become impossible because of the problem of windshield of the microphone measuring the noise.

i. "*The correlated wind speed and background noise data*":-

   i. this statement assumes that the 2 can be correlated.

   ii. Does correlated mean as the wind speed increases the background noise increases in a consistent correlated manner and vice versa? We assume so.

   iii. If "wind speed" means wind speed at the wind farm site and background noise data refers to background noise at the RRL, it is unlikely that the two concepts can be correlated. This is acknowledged in the Planning Guidelines "In most situations there will be different wind directions and speeds between each WTG on a Wind Farm site and the relevant receiver." (Section A5.4 under the heading Propagation Model).

   iv. If the wind speed at the wind farm and the wind speed at the RRL are not the same at all times (or at least statistically – 90% of the time), it is unlikely that the two will correlate.

j. Typically:-

   i. wind farms are constructed on high ground (hills, mountains, ridges);

   ii. RRLs are on much lower ground than the wind farm;

iii. With different wind directions, the wind farm will often be exposed to the wind when the RRL is protected from the wind;
iv. Wind speed at the wind farm and background noise at the RRL will not correlate at all times throughout the year.

k. The possibility that the wind speed at the wind farm and the wind speed at the RRL will not be the same is further acknowledged in the Planning Guidelines but not provided for as the typical situation of wind farms:-
   i. "*For large or topographically diverse Wind Farm sites, the suitability of the wind speed measurement location may need to be confirmed as part of the development assessment process*" (Section A5.3 Wind Speed Measurement under the heading Measurement Location).

l. The methodology for assessment of what noise limit is applied at approval and compliance should protect the relevant Queenslanders at all times throughout the year ("the so called worst case scenario") and not just when the assumption as to correlation between wind speed at the wind farm and background noise at the RRL, is correct.

2. The Guidelines do not provide guidance for the typical situation where the wind speed at the Wind Farm is not correlated with the background noise at the relevant receiver location. Unless SARA recognises this, SARA may fall into the trap of applying the a-typical solution in the guidelines to the typical situation incorrectly.
3. Neither the Code nor the Planning Guidelines clearly state that if there is no correlation between wind speed at the wind farm and background noise at the RRL, only the first limb of Acceptable Outcome A08.1 is the noise limit.
4. "*This graph is then used in conjunction with the predicted noise levels to assess whether the wind farm will meet the criteria of these guidelines*.":-
   a. Again this sentence confuses determining the noise limit for assessment at approval or compliance with assessing compliance with the noise limit.
   b. It seems that what is intended is that the graph is used to determine the number which is a component of the second limb of the noise limit

in Acceptable Outcome A08.1 of the Code, namely the amount of the increase in that number to allow for increase in the noise limit appropriate for the increased prevailing wind speed. This number needs to be determined before assessment can be made as to whether or not the actual or predicted noise at the prevailing wind speed, complies with the noise limit.

h. Insufficient time, Incompetence or Bias is further indicated by:-
    i. The failure of the Code and Planning Guidelines to reflect John Savery's advice to Bryan Lyons on the 6 June 2013, recorded in handwritten notes made at the time, that:
        1. The Qld Noise Policy limits are too high for quiet rural environments;
        2. 30 dBA will not protect amenity in a quiet area;
        3. Background ambient levels you would expect to be around 20 dBA. 35 dBA ambient levels would not be right.
        4. Attenuation level of 10 dBA for a Queenslander home is far too high.
    ii. Savery & Associates stated in their report for Dalveen Wind Farm that the Department of Environment Heritage Protection ("EHP") had said it was ok to use the South Australian Noise Guidelines for a wind farm in Queensland.
    iii. Bryan Lyons contacted John Savery on the 6 June 2013 and asked him about the advice from EHP and he said he had no documentation to support the advice they reported to have received from EHP.
    iv. The EHP Noise Expert advised Bryan Lyons, at a meeting in Brisbane on 31 January 2012, that the South Australian Noise Guidelines does not apply in Queensland and that there are many sections of the South Australian Noise Guidelines that he does not agree with.
    v. The failure to require an EMP to include:-
        1. a requirement for the proponent to provide security for the cost of decommissioning.
        2. a requirement for the operator to disclose to the assessment and the enforcement managers and complainants, all data in relation to all performance outcomes that comes into its possession or control.
    vi. The failure to provide for;-
        1. the entity responsible for enforcement of the conditions of approval and compliance with the Code and Planning Guidelines.

2. The provision by the proponent of security for the cost to be incurred by the enforcement authority in compliance assessment.

vii. Not requiring the proponent to measure background noise at the quietest time of the year as filters cannot properly exclude all intermittent noises e.g. frogs which makes sounds in the same range as wind farms.

viii. Failure to deal with infrasound (which is excluded by the definition of low frequency sound). The NHMRC recommends further research in this area.

ix. Failure to require the EMP to include provision for new compliance requirements to meet recommendations of NHMRC as a result of further research.

x. The Failure to provide in Section A5.13 for a noise limit in relation to low frequency sound.

xi. Etc.

i. For these reasons, the draft Code and Planning Guidelines should be abandoned and a new independent consultant engaged with sufficient time to produce a Code that is appropriate for all Queenslanders.

4. **<u>State Interest in Wind Farms</u>**

a. Wind Farms in Qld with a capacity over 500 kilowatts will be assessed by SARA. Therefore there will be deemed to be a state interest in wind farms with a capacity over 500 kilowatts.

b. A state interest is defined in Schedule 3 of the SPA as:

> *(a) an interest that the Minister considers affects an economic or environmental interest of the State or a part of the State, including sustainable development; or*
>
> *(b) an interest that the Minister considers affects the interest of ensuring there is an efficient, effective and accountable planning and development assessment system.*

c. The Deputy Premier, Jeff Seeney, has recently issued a proposed call in notice for Mt Emerald Wind Farm in North Qld. In the call in notice Mr Seeney stated the following:-

"I am proposing to call in this development application, as I consider the Mount Emerald Wind Farm development involves state interests, namely economic and environmental interests to the state, or part of the state as the:"

Economic:"

i. In summary, Mr Seeney considered the main economic benefit was that 158 jobs are expected to be created during the 2 year construction period of the wind farm. It is also suggested that additional indirect economic benefits will arise.

ii. Submissions in relation to the stated economic benefits:-

1. The suggestion of new jobs should not be assumed as complete evidence of economic benefit. The impact on existing electricity generators should be fully investigated and the economic impacts be offset. Renewable energy is mandated to have first access to the electricity grid giving it an unfair competitive advantage against the fossil fuelled generators. This then has a negative effect on fossil fuelled electricity generators who are already burdened by an oversupply of electricity generation in their industry as is evidenced by the mothballing of 50% of the generation capacity at Tarong Power Station.
2. Wind Farms have a huge impact on the road infrastructure during the construction, maintenance and decommissioning phases. This has been evidenced recently at Macarthur Wind Farm in Victoria where the Council assessed the damage to the Council roads alone at 14 million dollars and the proponent has only agreed to pay 1.2 million dollars. The damage to state controlled roads was also evident but was not assessed.
3. To simply state that jobs are a valid reason to grant a wind farm state interest is not acceptable. It should be demonstrated that the jobs will provide a net economic benefit to the state. Where there is existing electricity generation capacity that is already operating in an oversupplied industry it is difficult to understand the benefits to the state of allowing the development of more electricity generation unless it can replace the existing generators which in this case it clearly cannot because wind farms require fossil fuelled backup.
4. Children with buckets of rocks can create jobs fixing windows but these jobs will not create a net benefit to the state. This is also the case for wind farms.

d. Mr Seeney's call in notice continues under the heading "*Environmental":*

"*The Australian Government under the RET has committed to ensuring that 20 per cent of Australia's electricity supply will come from renewable sources by 2020. The government is currently undertaking a review of the RET, to be completed by mid-2014, to ensure it is operating efficiently and effectively.*

The utilisation of renewable energy sources has intangible environmental benefits which also contribute to the identified state interest. Developing renewable energy resources provides for the avoidance of greenhouse gas emissions associated with conventional fossil fuel generation, insulates the electricity market from fluctuations in fuel prices by increasing the diversity of the energy system; and

wind farm electricity generation requires comparatively little natural inputs such as water consumption."

e. Submissions in relation to the stated environmental benefits:-
   i. The Qld Government should wait for the result of the Federal Government review of the RET before legislating that wind farms should be considered as state interest in Qld.
   ii. The RET review will examine if the RET is operating effectively. To be operating effectively it must be reducing greenhouse gas emissions. We know from comments made by Stanwell Corporation and the Minister for Energy, Mark McArdle, reported in The Australian newspaper on the 19.9.2012 that intermittent renewable energy sources are not reducing greenhouse gas emissions because they are requiring fossil fuelled backup. Minister McArdle was reported to have said the following, "*There is some evidence to suggest the unreliable nature of renewable energy has resulted in coal-fired electricity generation to be maintained at pre RET levels and claims carbon abatement inflated by the federal government to justify its commitment to renewable energy*".
   iii. The statement from the call in notice, "*Developing renewable energy resources provides for the avoidance of greenhouse gas emissions associated with conventional fossil fuel generation*" is in conflict with the statements made by the Energy Minister, Mark McArdle as reported in The Australian. This should be addressed by the 2 relevant Ministers and Departments as one is clearly wrong.
   iv. WEQ agree with the Energy Minister's statements and consider the statement in the call in notice to be inaccurate and wrong.
   v. The statement in the call in notice "*wind farm electricity generation requires comparatively little natural inputs such as water consumption*", fails to deal with the reality that wind energy does not replace or reduce the need for fossil fuelled electricity generation. This is a nonsense statement and statements like this that are made without proper substantiation should not be used as reasons to grant wind farms state interest.

f. It is not in the state's interest to encourage the development of renewable energy developments such as wind farms when they are not effective at reducing greenhouse gas emissions and they significantly increase the cost of electricity to consumers.

g. It is expected the RET review will recognize the cost and ineffectiveness of intermittent renewable energy sources (wind and solar) that are currently being encouraged as the primary means of meeting the RET.

h. When this occurs it would be wrong for the Qld Government to consider a wind farm as state interest on economic or environmental grounds.
i. Given that the RET review is expected to be completed in the next couple of months and that all potential wind farm developments are reliant on the outcome of the review anyway it would be logical for the Qld Government to consider the results of the RET review prior to finalizing legislation for assessing wind farms.
j. It is highly probable that the RET will be reduced or scrapped making it impossible to establish a business case to develop a wind farm.
k. The RET review will likely mean there will be no wind farms proposed and a Wind Farm Code will not be needed in the foreseeable future.
l. WEQ believe that State interest should not be granted to wind farms.
m. WEQ believe the Wind Farm Code is not acceptable and the outcome of the RET review should be considered prior to recommencing the development of a new wind farm code.

5. **Worst Case Scenario**
   a. The Planning Guidelines often refer to the "worst case" and therefore acknowledge that the Code and Planning Guidelines should set standards which protect the people of Queensland in all circumstances.
   b. That is the best case for the people of Queensland.
   c. "Worst Case" implies an assessment of the interests of the element being described having regard to the interests of one or more people. The element itself has no interest and therefore the comparison is a nonsense e.g. "Worst case wind direction", a term used many times in Section A5.6, relative to whose interests is the "Worst case" to be assessed, the developer applicant, the people at the Receivers or the wind itself?
   d. The worst case from the point of view of the people of Queensland may be the best case from the point of view of the interests of the developer.
   e. Therefore the term "worst case" is ambiguous
   f. The Planning Guidelines should either avoid the sloppy and unneeded drafting involved in the use of the term "Worst case" or define it generally or for each use of the term so that it is clear that use of the term "worst case" is providing for the best interests for the relevant people of Queensland as opposed to the developer applicant.
   g. In the example quoted, "worst case wind speed" it is probably intended to mean the wind direction directly from a WTG to a Receiver or as near thereto as occurs. Such an expression would avoid any risk that the worst case for the people at the Receivers be applied.

6. **Masking – A5.1**

a. According to the Planning Guidelines, "Masking" is the sole reason for taking into account background noise. Under the heading in S A5.2, "Why is background noise important?" the Guidelines state:-

> *"Background noise can mask the noise effects of new development such as a wind farm and the level of masking is a critical factor in assessing the impact of a Wind Farm.*
>
> *Wind generated noise can provide a masking effect; particularly as it has similar characteristics to wind farm generated noise."*

b. Section A5.3 under the heading "Wind Speed Measurement", states "*Wind speed at the Wind Farm site and background noise at the relevant receiver must be correlated so that background noise and Wind Farm noise can be compared. Therefore, wind speed measurements must be made in 10-minute intervals that correlate/synchronise with the background noise data collection.*"

c. Background noise at one location can mask Wind Farm noise only at the same location.

d. Compliance with the Code, Planning Guidelines and conditions of approval, must occur at the Receiver.

e. Wind Farm noise at the Receiver can be masked only by background noise at the Receiver.

f. Increased wind speed can increase background noise.

g. However background noise at the Receiver can be increased only by increased wind speed at the Receiver.

h. Therefore wind speed at the Wind Farm:-

   i. is relevant to increases in background noise at the Receiver; and

   ii. can be correlated;

   only if the wind speeds at both locations, the Wind Farm and the Receiver, are the same.

i. Often when the wind speed is high at the Wind Farm, there will be no wind at the receiver because of topography and barriers and the higher noise at the Wind Farm will still affect the receiver but without any reduced effect due to masking.

j. Therefore to apply a worst case scenario, Masking should be taken into account only if the Wind Farm Developer can establish that the wind speed will be the same at both the Wind Farm and the Receiver, at all times.

k. After or in the definition of Relevant Receiver Locations under the heading "Background Noise Measurement Locations" in Section A 5.2, the Planning Guidelines state "*The only exception is a receiver within 1,500 metres of the Wind Farm site that is in an area unlikely to be exposed to a windy environment. This specific circumstance should be discussed with relevant referral agency.*"

l. This statement is the only provision for the circumstances where Masking does not apply. This statement is in the Planning Guidelines and cannot overrule the application of the background criteria in the Code.

m. It is a nonsense that the background criteria continues to apply when there is no correlation between wind speeds at the Wind Farm and background noise at the Receiver either because:-

   i. There is no increase in the background noise at the receiver; or

   ii. The winds are so high at the Receiver when the measurement is taken for the purposes of determining the relevant components of the background noise limit, that the noise can't be measured due to the inability to windshield the microphone.

n. In Queensland, typically wind farm sites will be in high locations (i.e. on mountains, ridges and hills) because that is where the winds needed to drive wind farms, are strongest.

o. Typically, sensitive land uses, such as dwellings, are much lower down and protected from the high speed winds.

p. The wind speeds in the higher locations are very seldom the same as the wind speeds in the lower locations all year round. This is acknowledged in the Planning Guidelines "*In most situations there will be different wind directions and speeds between each WTG on a Wind Farm site and the relevant receiver*." (Section A5.4 under the heading Propagation Model).

q. Therefore, typically, the wind speeds at the Wind Farm and the background noise at the Receiver will not be able to be correlated.

r. The Code and Planning Guidelines provide for the **a-typical** situation as if it was the typical situation and fail to provide for the typical situation other than to require discussion with the "relevant referral agency" which is undefined and which may not even exist.

s. The NZS 6808-2010 permits an assumption in relation to wind masking

t. In planning a wind farm, the New Zealand Standard permits the assumption that wind speeds at the sensitive receptor will be the same as at the wind turbine. (Sec 7.4.2 "Find the regression curve that gives the best correlation coefficient between sound level (i.e. background sound level at the sensitive receptor) and wind speed (i.e. wind speed at the wind farm) for each scatter plot and use it to describe (i.e. predict) the average background sound level at different wind speeds.")

u. An exception to this permission to use the assumption is if there is a poor co-relation between wind speed at the wind farm and background sound levels at the sensitive receptor. This may occur if the background sound level (at the sensitive receptor may be low at times when there are higher wind speeds at the wind farm, which will therefore be generating sound. (Sec 7.4.3). In other words the

exception (to use of the assumption) applies when the wind speeds are different at the sensitive receptor from that at the wind farm.

v. The NZS 6808-2010 permits the assumption in many circumstances where the assumption is not valid:-
    i. Advice from Queensland Governments own Noise Expert 31.1.2012 – "the potential for wind speeds to be different at a wind turbine from that at a receptor."
    ii. Examples from operating wind farms:-
        1. Evidence from Peter Day (neighbour to the Proponent's Oakland Hill Wind Farm), has been compensated by THE PROPONENT for effects of excessive noise – double glazing of windows valued at $70,000. Mr Day says the noise is worst when the turbines are working and there is no wind at the house to mask the noise.
        2. Clive Gare hosts 19 turbines at the proponent's Hallett Wind Farm and receives $150,000 per annum rent. He has complained to the proponent in writing regularly over the last 4 years regarding sleep disturbance from excessive wind turbine noise that is worst when the turbines are working and there is no wind at the house.

w. At a Community Cabinet Meeting in Toowoomba on 24 November 2013, Ministers, Powell and McArdle and Coordinator General Mr Barry Broe agreed that:-
    i. there is significant potential for wind speeds to be different at a wind turbine from that at a receptor as per advice provided by the EHP Noise Expert 31.1.2012 copied above, as well as a matter of common sense.
    ii. For the purpose of planning a wind farm in Qld, it should not be assumed the wind speed will always be the same at the wind turbine and the receptor (the assumption implicit in the concept of wind masking).

x. At a meeting held at 9th Floor, 63 George Street, Brisbane on 22 January 2014, Mr Greg Chemello, Mr James Coutts and Ms Kristiane Davidson agreed that the assumption implicit in the concept of wind masking set out above, was not a valid assumption.

y. A recent and typical example of this lack of correlation between wind speeds at the Wind Farm and the background noise at the Receiver, can be found in the current application for approval of the Mt Emerald Wind Farm.

z. Marshall Day Acoustics at page 19 of 62 in their Noise Impact Assessment contained in Appendix 5 of the recent Response to Information Request for Mt Emerald Wind Farm (April 2014) acknowledge this situation:-

"*As noted in the NMA Report, the results of the two-week monitoring surveys show comparatively low levels of correlation between background noise levels and wind speed. The NMA Report notes*

that the poor correlations may be due to the significant difference in elevation, approximately 300m, between the wind farm met mast and the noise monitoring locations. It should also be noted that the background noise levels were measured at 15 minute intervals rather than the 10 minute intervals required by NZS6808:2010.

In light of these issues it is considered appropriate at this stage that predicted noise from the MEWF be assessed using the 40 dB L,Neq base noise level limit at all relevant wind speeds."

aa. Because the correlation was poor, Marshall Day Acoustics decided not to assess the predicted noise impacts against the background noise criteria.

bb. The sole reason to provide for Masking is to favor the Wind Farm developer.

cc. No other new industry seeking approval in Queensland is permitted to apply and take advantage of the principle of Masking even though they will produce noise at times of high wind speeds.

dd. The application of the principle of Masking as the general rule is to be seen in the second limb of the Noise Limit expressed in the acceptable outcomes column opposite P08 in the Code.

ee. The application of the principle of Masking as the general rule indicates intentional or unintentional Bias in favor of the wind industry in the Code and Planning Guidelines.

ff. Special need of the Wind Industry:-

i. It is said that the Wind Industry is special and needs a special Code because the noise generated by the Wind Farm is similar to the background noise generated by the wind.

ii. Presumably this may make it difficult to identify the noise generated by Wind Farms from the broad spectrum background noise in higher wind speeds.

iii. The Planning Guidelines acknowledge that the noise generated by a Wind Farm has a signature (See Section A5.4 of the Planning Guidelines under the heading "Sound Power Data" "*The sound power level can be thought of as the noise signature for the WTG model proposed for the wind farm.*" Comment – doesn't the signature of a WTG involve frequency measured in Hz as well possibly as sound power level measured in dB?).

iv. If the noise from a WTG has a signature, then by necessary implication, the WTG which is the source of the noise can be identified by that signature in the noise recording.

v. In relation to the identification of the noise generated by a Wind Farm as a whole, the source of the dominant noise can be identified by measuring the ambient background with the Wind Farm in operation and then turning off the Wind Farm. The noise that is absent in the subsequent readings is obviously the noise of the Wind Farm.

vi. It is not unreasonable to require a WTG or a Wind Farm to be shut down and parked for the purpose of testing compliance as the parking and restarting of the Wind Farm can be achieved in a relatively short period of time.

vii. The possible need for parking of a WTG is acknowledged in the Planning Guidelines (see the last paragraph of Section A5.8).

viii. Accordingly, there does not seem to be any special case for treating Wind Farms differently from other new industries.

gg. As:-

i. the only reason for taking background noise into account is "masking"; and

ii. For the application of masking, there is a need for there to be a correlation between wind speeds at the Wind Farm and background Noise at the Receiver;

then, in order to protect the people of Queensland at the Receivers (the "Worst Case" for the Developer/applicant), the noise limit relating to background noise should only apply if the Wind Farm Developer can establish that the wind speed will be the same at both the Wind Farm and the Receiver, **at all times**.

7. The Noise Limit – Acceptable Outcome

a. The Code provides the following outcome to be acceptable:-

i. The **predicted** equivalent noise level (LAeq, adj,10min), including tonality adjustment, does not exceed, whichever is the greater of:

1. 35dB(A) at relevant sensitive receptors, or
2. the background noise (LA90,10min) by more than 5dB(A);

for wind speed from cut-in to rated power of the wind turbine generator and each integer wind speed in between.

b. The points made at paragraphs 3.e are referred to and incorporated as if they were repeated here.

c. Background plus 5 dB(A):-

i. The increased background noise due to increased wind speed is enough to tolerate by itself and any additional noise should not be allowed to exceed the noise that already exists.

ii. It is bad enough that nature may exceed the WHO recommendations by itself but it is madness to allow additional noise of 5 dB(A) to a relatively high background noise level.

iii. No other industry is allowed to do this. All industries experience times of increased background noise but none are allowed to produce additional noise at these times.

d. Why predicted in the criteria? The criteria should refer to actual and not predicted noise levels as the criteria applies for assessment of approval of the wind farm and assessment of compliance when actual noise levels can be measured. Prediction is only necessary at

the approval assessment stage because the wind farm has not then been built and the noise actually generated by it, cannot be measured.

e. This is recognized under Section A5.4 of the Planning Guidelines under the heading "Tonality" where it states "*If tonality is a characteristic of the WTG noise, 5dB(A) should be added to the **predicted or measured** noise level from the wind farm."*

f. Paragraph A5.4 of the Guidelines states, "*The noise level associated with the Wind Farm should be predicted at all locations identified as relevant receivers under these guidelines, for wind speeds from cut-in speed to the speed of the rated power and each integer speed in between.*" This statement needs to be amended to ensure that it applies only to the assessment stage. The Guidelines should be amended to make provision for actual measurements of noise generated by the wind farm at all Receivers (not just Relevant receiver locations) for compliance assessment during operation.

g. What is the reference to (e) in the 4th dotted sub-paragraph, in Paragraph A5.12 under the heading "Predicted Noise from a Wind Farm"? There does not seem to be any paragraph whose identification includes (e). Ditto for (f) and (h) in the next sub-paragraphs?

h. If the Developer **cannot** satisfy the onus of proof that the wind speed will be the same at both the Wind Farm and the Receiver:-

   i. The noise limit should be only one number, namely the nominated noise limit (i.e. in the Code 35 dB(A)) at any and all times and not the current higher of 2 numbers;

   ii. measurement of background noise at the Receiver for the purpose of the setting a noise limit, is unnecessary;

   iii. measurement of wind speed at the Receiver for the purpose of the setting a noise limit, is unnecessary.

   iv. If indoor noise measurements are adopted, the nominated noise limit for audible noise should not be greater than 30 dB(A) and in fact should be something less to allow for the cumulative effect of a number of new noise sources.

   v. If the requirement for outdoor noise measurements continues, the nominated noise limit for audible noise should be calculated by adding the actual attenuation level of the building to the indoor level and make allowance for the cumulative effect of a number of new noise sources.

   vi. The noise limit should make no reference to a noise limit varying with background noise.

   vii. If it is considered that the possibility of the developer applicant satisfying this onus is very low, much of the Planning Guidelines providing for the convoluted method of determining background noise at higher wind speeds and correlation between wind speeds at the wind farm with background noise at the receiver can be removed. Otherwise these provisions

(but dramatically redrawn to remove confusion and clearly provide for relevant requirements) can remain but limited in their application to circumstances where the application of masking is justified.

i. If the Developer **can** satisfy this onus of proof and this is to be addressed in the Planning Guidelines:-
    i. baseline background noise:-
        1. The definition of "baseline background noise" should be amended to read "is the lull in the ambient noise environment at zero wind speed measured at the **receiver** excluding each and every Intermittent noise event such as from aircraft, dogs barking, mobile farm machinery, **insects, frogs, rain** and the occasional vehicle travelling along a nearby road unless the intermittent noise is present for at least 90% of the time **all year round**."
        2. Baseline background noise must be determined at the quietest time of the year to properly protect all Queenslanders in the locations of receivers.
        3. Typically the quietest time is winter when the activity of insects and frogs is less frequent.
        4. Typically, wind farm developers wish to lodge their applications promptly and do not allow consultants sufficient time to measure background noise at the quietest time.
        5. It is not always possible to obtain a true background determination if measurements are taken at a time other than the quietest time because not all intermittent noise events can be filtered.
        6. Applications based upon noise impact reports that do not measure background noise at the quietest time of the year should be rejected peremptorily.
    ii. Background noise should only be relevant to the noise limit when:-
        1. the baseline background noise level exceeds the nominated noise level, presently 35 dB(A).
        2. a wind speed at the Receiver causes an increase in background noise level at the Receiver so that the sum of:-
            a. the baseline background noise level at the receptor; and
            b. the increase (in background noise level caused at that speed));

            exceeds the nominated noise limit, presently 35 dB(A).

iii. Otherwise the wind farm generated noise measured at the Receiver should be assessed against the nominated noise limit, presently 35 dB(A).

iv. Accordingly, the noise limit while expressed in 2 paragraphs, will in fact be the higher of two numbers i.e.:-

1. 35dB(A) (the nominated noise limit); and
2. another number being the relevant one of a set of numbers which increase with wind speed (the background noise limit being the baseline background noise level plus the amount by which the background noise level increases as a result of the actual wind speed at the Receiver) plus 5 dB(A).

v. However, the requirements under the Guidelines in relation to background noise are unclear and confused.

vi. For the purposes of both assessment for approval and for compliance (after approval and construction), care must be taken to specify where the wind speeds and noises are measured as set out above. The Guidelines are not expressed clearly in this regard and can lead to confusion and additional permitted exceedance of noise limits.

vii. For the purposes of determining the baseline background noise limit the noise measurements must be taken at the Receiver before the application is lodged and before the Wind Farm becomes operational, and set only once for the background noise at the quietest time of the year or if feasible, filtered to match the quietest time of the year.

viii. For the purposes of determining the increase in background noise limit at each integer of wind speed:-

1. the noise measurements and wind speed measurements must be taken at the Receiver.
2. As noise measurements at wind speeds above 5m/s may have to be discarded, the increases relative to wind speeds above that wind speed will flat line at the level for 5 m/s and will not increase.

ix. Noise must be measured at the Receiver and some noise monitoring equipment can measure wind speed as well as noise. Therefore, at least for the purposes of determining the baseline background noise level and the increases to be provided for in the background noise limit (to be applied at any compliance assessment time), wind speed at the Receiver and not wind speed at the WTG hub should be measured. The Guidelines need to be amended to make this clear.

x. Of course, if indoor noise measurements are to be used, the background noise is less relevant.

xi. To determine the effect of masking by background noise (affected by wind) at the receptor on the impact of noise at a relevant Receiver and generated by a wind farm, a number of

concepts need to be clearly identified and applied, namely at the relevant time:-

1. What is the wind speed at the wind farm (it must be sufficient to initiate turning of the wind turbines and generation of noise)?;
2. What is the noise in dB(A) at the Receiver generated by the base wind speed at the wind farm and at each integer of the base wind speed above the base wind speed up to the wind speed at which the wind turbines turn at maximum speed? The base wind speed is the wind speed at the wind farm at which the turbines commence to turn ("cut-in speed").
3. What is the baseline background noise level?
4. What increases in background noise level at the Receiver are caused by wind speeds of a base rate of say 5 m/s at the relevant Receiver and at every integer of wind speed above the base rate?

xii. For compliance:-

1. What is the wind speed at the relevant Receiver?
2. the time correlation between wind speed at the wind farm and wind speed at the Receiver.

j. Sound Power Data:-

i. On page 35, under the heading Sound Power Data, the Planning Guidelines state:-

1. *"The sound power level data at wind speeds from cut-in speed to the speed of rated power and each integer speed in between should be specified in the development application as determined in accordance with International Electrotechnical Standard IEC 61400-11. The sound power level determined in accordance with other relevant standard or procedure might be acceptable for the purpose of the guidelines.*"

ii. The International Electrotechnical Standard IEC 61400-11 has been replaced by IEC 61400-12.

iii. The International Electrotechnical Standard IEC 61400-11 is referred to in the South Australian Guidelines so that it appears that the Planning Guidelines have adopted the South Australian statements without independent evaluation.

iv. Erik Sloth of Vestas gave a presentation titled "*Problems related to the use of the existing noise measurement standards when predicting noise from wind turbines and wind farms.*"

v. Vestas are a major manufacturer of WTGs.

vi. Erik concluded in relation to IEC 61400-12:-

1. *"The results are standardized noise levels, which are fairly comparable from measurement to measurement on a given turbine type.*

2. *The wind turbine is used as a wind speed meter through a power curve measured on an ideal site (IEC 61400-12) OBS* ***impossible if actual terrain does not fulfill conditions***
3. *Other parameters influence the noise level: relative humidity, turbulence, inflow angle, wind shear, turbine pitching are not accounted for.*
4. *The result is a fairly good tool for verification of warranties,* ***but not a good tool for predicting noise at imission points where people actually can get annoyed.***

vii. Vestas' Erik Sloth, has identified the defects in using IEC 64100-12. The Code and Planning Guidelines should not use this standard let alone a previous version of that standard.

k. Location for measuring:-

i. Noise:-

1. Background noise measurements should be carried out at locations that are relevant for assessing the impact of WTG noise on nearby premises (relevant receivers) at locations that are relevant for assessing the impact of WTG noise on nearby premises (relevant receivers). Very ambiguous. Why use a term that is different from all Sensitive Receptors as used in the Noise Policy?
2. It seems to be the intention of the Guidelines that the background noise be measured at the relevant receiver locations. This should be made clear by consistent use of terms as defined and not variations thereof.

ii. Wind:-

1. What does the following paragraph mean in terms of location of measuring wind speed?:-

> "Affected data should be identified by monitoring statistical wind speed (i.e. equalled or exceeded for 90% of the measurement time) **at the noise measurement position** (1.2-1.5 metres above ground level at the relevant receiver) over 10-minute intervals that correspond with the noise level measurement intervals. Not all wind monitoring instruments can provide the wind speed statistical parameters. In this case reporting the average wind speed to identify validity of the noise measurements is permissible. Accuracy of the wind speed measurements should be ±0.5m/s or better.
>
> If wind data from the single wind speed monitor are not representative for all of the noise

monitoring locations, the wind speed should be measured separately at each of the locations."

2. Is this paragraph relevant only to checking the effectiveness of the windshield on the noise measuring microphone or is the wind measurement to be used to determine the effect of masking?
3. What is "worst case" in the following paragraph:-
4. "Background noise varies naturally throughout the year, with different prevailing wind directions, foliage on trees, atmospheric conditions and the like. It is advised to use the collected wind statistics and weather forecast to perform the background monitoring during periods when the percentage of the **worst-case** wind direction data is sufficiently high to collect the required number of data. If collection of the noise statistics under the worst-case wind direction requires an unreasonably long monitoring time, less data that still provides a robust correlation between the background noise and wind speed may be acceptable (generally a few hundred points)."
5. Worst case should be when the background noise is lowest not highest and this should be made clear.
6. Para A5.3 provides "Wind speeds (in m/s) should be measured at the WTG hub height.
7. Wind speed at the Wind Farm site and background noise at the relevant receiver must be correlated so that background noise and Wind Farm noise can be compared."
8. In paragraph A5.12, under the heading **Measurement and assessment of background noise, the documentation should include "**wind speed data at the noise measurement site".
9. Measurement location
    a. The same location should be used for measuring wind speed and direction for all of the following procedures:
        i. background noise measurements
        ii. noise predictions
        iii. compliance checking
10. The Code seems mixed up and unclear as to the location for measuring wind speed for the purposes of masking.

l. In determining the effect of masking, both background noise and wind speed should be measured at the relevant receiver locations.

8. **Regression Analysis**
    a. Under Sections 5.2 and 5.5, regression analysis is used to determine the background noise.

i. Regression involves averaging over a period including many days and nights.
ii. On average, background noise will be quieter at night than during the day.
iii. By the definition in the Planning Guidelines, background noise should exclude all noise that is not present 90% of the time i.e. the background noise level is the noise level at the quietest time.
iv. Therefore the methodology for determining background noise involving regression analysis will not determine the background noise level as defined.
v. That method (involving averaging resulting in a noise level above the quietest time) must result in a figure higher than the background noise level as defined.
vi. This is another bias enabling the wind farms to cheat the stated criteria let alone enabling wind farms to generate noise greater than the WHO Guideline.
vii. Regression analysis should not be applied to determine the background noise level.
viii. The methodology in Section A5.2 for determining background noise confuses 2 concepts:-
    1. the base background noise,(the concept defined as background noise; and
    2. the concept of increases in background noise with each integer of increasing wind speed.
ix. The defined term is the background noise level at the quietest time.
x. If the concept of masking is relevant, for assessment for approval and compliance, a number to allow for the increase in background noise related to each integer increase in the wind speed should be added to the background noise level at the quietest time. (Of course, under the Planning Guidelines methodology, masking should only be relevant when the wind speed at the wind farm and the receiver are the same at all times.).
xi. Regression analysis may be applicable to determine the increase i.e. the amount to be added to the base background level but not to determine the background noise level as defined i.e. the base background noise level.

b. In compliance assessment, the Planning Guidelines apply regression analysis to the data:-
    i. Regression analysis should not be applied to the data.
    ii. In compliance assessment:-
        1. the noise limit criteria should be an absolute number (even under the second limb of Acceptable Outcome A08.1).
        2. If the noise at a receiver generated by the wind farm exceeds the absolute number noise limit criteria, the wind farm has failed to comply with the noise limit criteria.

iii. Regression analysis averages noises measured at the receiver and ignores the higher noises.
iv. The graph line produced may indicate that the wind farm is compliant when in fact the higher noises (i.e. those ignored by the averaging), breach the noise limit for significant time periods.
v. Remember that the noise data points themselves are an average over 10 minutes.
vi. The application of regression analysis in compliance assessment is another bias in favour of the wind farm and does not protect the community against potential adverse impacts on health.

9. <u>Noise Measurements – indoors –v- outdoors</u>

a. The Planning Guidelines require outdoor measurements for assessment of both Approval and compliance:-
   i. Under the heading "background Noise Measurement Position" in section A5.2, the Planning Guidelines state "*All measurements should be made outdoors*."
   ii. Under the heading, "Measurement Location", in Section A5.3, the Planning Guidelines state "*The same location should be used for measuring wind speed and direction for all of the following procedures:*
      1. *background noise measurements*
      2. *noise predictions*
      3. *compliance checking."*

b. The rationale for discarding noise measurements affected by high wind speeds does not apply to indoor measurements:-
   i. In section A5.2, under the heading "Wind", the Planning Guidelines state "*If it is not possible to obtain manufacturers' data for the windshield used, then data above 5 m/s should be discarded.*"
   ii. The rationale for discarding such measurements is the inability to satisfactorily shield the microphone from the wind.
   iii. This rationale does not apply to indoor measurements where the microphone can be shielded by internal and external walls.
   iv. Presumably, it is intended that this requirement for discarding noise measurements in windy conditions, apply to measurements for both determining background noise limits and compliance assessment.
   v. The unclear drafting makes this assumption necessary.

c. The use of outdoor measurements is flawed for a number of reasons:-
   i. If the presumption is correct, outdoor measurements will be discarded and not be taken into account if the wind speed at the receiver exceeds 5 m/s. This may coincide with times when wind at the hub is greater and wind farm noise is loudest.
   ii. The use of outdoor measurements results in the need to engage in a convoluted and inaccurate process to determine:-

1. a background noise limit; and
2. actual wind farm noise levels at the receiver for compliance assessment when wind speeds at the receiver are high.

iii. Sections A5.2 to A5.4 of the Planning Guidelines attempts to express the convoluted and inaccurate process. These sections include the following statements:-
   1. "*Wind speed at the Wind Farm site and background noise at the relevant receiver must be correlated so that background noise and Wind Farm noise can be compared. Therefore, wind speed measurements must be made in 10-minute intervals that correlate/synchronise with the background noise data collection.*"
   2. *"Wind measurements at the WTG nearest to the relevant receiver should be used for compliance/complaints checking if it is not possible to perform measurements at the same location as it was used for the background noise data acquisition."*

iv. These statements assume that the wind speed at the Wind Farm/WTG will always be the same as at the receiver. This assumption cannot be made. The assumption may be valid only if the wind farm and the receiver are on a level playing field with no obstructions. Typically, wind farms are located high on ridges, mountains or hills. Typically therefore, the assumption is invalid.

v. These convoluted and inaccurate provisions are required only because outdoor measurements are required. Outdoor measurements are required only to avoid entering the residence to measure noise levels indoors.

vi. There is no need to consider wind speed with indoor measurements.

vii. Indoor measurements should be used.

viii. The use of outdoor measurements makes it easier for wind farms to avoid adverse compliance assessment because breaches of noise limits typically occur in high speed winds at the wind farm and lower speed winds at the receiver. The failure to measure the wind speed at the Receiver and compare it with the noise at the Receiver generated by the WTG is a clear bias in favor of wind farms.

d. In Appendix 5 of the Planning Guidelines, it is stated that "*The material contained in these appendices is drawn from the Wind farms environmental noise guidelines*." The Planning Guidelines do not state that the document referred to as "Wind Farms Environmental Noise Guidelines" is the South Australian Guidelines 2009 ("SA09") but a comparison of the two documents confirms that SA09 and the relevant parts of the Planning Guidelines are very similar and

accordingly it is assumed that the reference to “Wind Farms Environmental Noise Guidelines” is a reference to SA09.

e. Les Huson is a respected consulting acoustician. He is engaged by:-
   i. Stanwell Corporation Limited which is a Queensland Government Owned Corporation and a diverse energy company owning Stanwell, Tarong and Tarong North Power Stations;
   ii. CS Energy which is a major provider of electricity in the Australian national electricity market and is a Queensland Government owned corporation established in 1997 and owns Callide, Kogan Creek and Wivenhoe Power Stations..

f. Les Huson in the Flyers Creek Wind Farm Approval 25 November 2013 Review states:-
   i. “The general assessment methodology for measurement of outdoor sound levels from wind farms in Australia (eg. SA03, SA09 Guidelines and NZS6808) all derive from the method described in ETSU-R-97 'The assessment and rating of noise from wind farms' from the UK. The following extract from ETSU-R-97 considers indoor or outdoor measurements.

> "*Internal or external noise limits?*
>
> *Given that one of the aims of imposing noise limits is to protect the internal environment one might consider it appropriate to set these limits and hence monitoring locations at positions within the building. There are, however, some practicalities to take into consideration which lead us to believe that the current practice of setting external limits on noise is the more sensible approach:*

- *Monitoring of noise to demonstrate compliance with planning conditions may require data to be logged over a period of days in order to capture enough data at the required conditions. It may not always be feasible or reasonable to expect to leave equipment set up in someone's bedroom or living room for this period of time.*
- *Noise levels inside a dwelling would be extremely difficult to predict as they would depend upon the noise insulation properties of the windows, doors, roof and walls and the acoustic properties of the rooms. Each room in each property would have to be considered separately. It is simpler and as safe to predict free-field noise levels outside of the property and then make a conservative assumption on the attenuation properties of the building envelope.*
- *Noise limits, and therefore measurements, are in any event required outside the property to protect the external amenity. If internal noise levels can be inferred from these external limits then a requirement for internal measurements would place an unreasonable burden on the operator*."

ii. The first bullet point above is not valid. ETSU-R-97 page 44 states "In some circumstances access to nearest properties may prove problematical but it is the Noise Working Group's experience that in general residents are happy to allow access to monitor noise levels, particularly if monitoring is required in response to complaints." We have found that complainants have always been willing to allow access to the dwelling to take sound level measurements over many days.

iii. The first part of the second bullet point is overstated. It would involve a survey time of less than half a day to assess the attenuation levels for all rooms of a dwelling. The external noise measurement approach is not a 'safe' or conservative method to yield an accurate assessment of indoor sound levels. Modern noise modelling programs produce octave or one-third octave predicted sound levels at chosen locations. These results can easily be used with measured attenuation levels to provide a better estimate of expected indoor noise exposure.

iv. The Achilles heel of setting outdoor noise targets as a proxy for indoor sound levels is the `conservative assumption' (in the second bullet point above) used for the acoustic attenuation of a dwelling with windows open. ETSU-R-97 uses an allowance of 10dB(A) for the attenuation into a dwelling. This has been shown to be incorrect for Australian and New Zealand rural dwellings. Furthermore, ETSU-R-97 states "The potential for "hot-spots" due to particular building configurations should be discussed with the EHO during the initial site assessment. For example, courtyards with an open side facing the site of the proposed wind farm will require special consideration." Such building layouts that may cause 'hot-spots' of enhanced sound levels are not considered in Australian wind farm assessments or the proposed noise conditions of this Approval.

v. The third bullet point provides no justification for only setting outdoor sound level targets since internal sound levels using a simplistic 10 dBA attenuation have been shown to be flawed. However, if real measured attenuations are used then there is no reason why outdoor proxy levels cannot be set. We do not see where any unreasonable burden is applied to an operator.

vi. Considering that the outdoor measurement methodology requires long term monitoring, that typically takes over 30 days in total (background plus compliance testing), it would be less of a cost burden to simply measure indoor compliance against the suggested target of 30 dB(A) indoors. It is the indoor noise target that forms the basis (for health protection) of all the wind farm assessment methods used in Australia. This is the preferred assessment methodology in the SA wind farm guidelines 2009 (note at end of section 2.3) for turbine

hosts. We believe this approach should also apply to other potentially affected residents.

vii. Another advantage of indoor measurements is that low frequency noise can also be assessed in accordance with the 'Procedure for the assessment of low frequency noise complaints' Feb 2005, DEFRA contract NANR45 developed in the UK. This procedure is also referenced in the draft NSW wind farm guidelines."

g. This submission adopts the logic expressed by Les Huson:-

i. In relation to the first bullet point (expressing 2 reasons - feasible and reasonable"):-

1. As to Reasonable - Members of Wind Energy Queensland are happy to allow access to monitor noise levels.
2. As to Feasible - It is more feasible to measure indoor noise levels in high speed wind than to measure outdoor noise levels – see paragraphs 9.a to 9.c of this submission.

ii. In relation to the second bullet point:-

1. The Code and Planning Guidelines make a simplistic assumption of 5 dB(A) attenuation which is neither conservative nor valid for the same reasons stated by Les Huson.
2. Attenuation testing of houses near the proposed Coopers Gap Wind Farm indicate attenuation of 1 to 3 dB(A).
3. Such building layouts that may cause 'hot-spots' of enhanced sound levels are not considered in the Code of Planning Guidelines.
4. The second bullet point states "*It is simpler and as safe to predict free-field noise levels outside of the property and then make a conservative assumption on the attenuation properties of the building envelope."* The reverse logic can be more safely applied. "*It is simpler and as safe to measure noise levels inside of the property and then make a conservative assumption on the attenuation properties of the building envelope of 1 dBA."*

iii. In relation to the third bullet point:-

1. The third bullet point states "*Noise limits, and therefore measurements, are in any event required outside the property to protect the external amenity. If internal noise levels can be inferred from these external limits then a requirement for internal measurements would place an unreasonable burden on the operator.*
2. The reverse logic can again be more safely applied – "*If external noise levels can be inferred from these internal*

limits then a requirement for external measurements would place an unreasonable burden on the operator."

3. Further, Wind Energy Queensland considers and submits that the burden on proponents of two sets of measurements would not be unreasonable.

h. However, it is worth pointing out that the in relation to low frequency noise, indoor noise measurements are envisaged (see Section A5.13 first bullet point) highlighting the inconsistencies and again suggesting external noise measurements are motivated by bias in favor of wind farm developers.

i. It should, for the sake of completeness, be recognized that the measurement of noise indoors, brings its own problems in avoiding indoor background noises such as refrigerators, TVs, snoring, clocks ticking, toilet flush etc as well as privacy issues.

j. Privacy is an important issue in relation to indoor measurements but an appropriate pro forma protocol could be developed and included in the Guidelines covering privacy issues and agreed with the residents before indoor measurements begin.

k. Indoor measurements would typically take less time than outdoor measurements. Estimates include:-

i. Indoor measurements for attenuation – one half day;

ii. Indoor measurements for compliance:-

1. Normally 2 days on which the Wind Farm is operating:-

a. one night to see if all indoor extraneous noises have been eliminated and if so, the first night results would suffice; and

b. an extra night if not, after those noises are eliminated.

2. If the wind farm is operating intermittently and continuous monitoring is required, nuisance monitors could be used. Nuisance monitors are able to be switched on by the residents whenever the wind farm noise is annoying. Nuisance monitors can record and transmit the results remotely to the acoustician.

iii. Indoor measurements with windows open, for background noise measurements would take less time than outdoor measurements for such purposes.

l. Residents may wish to vacate the residence while noise measurements are being taken.

m. The Code and Planning Guidelines could provide for the alternative of outdoor measurements and reasonable allowance for attenuation to be available only if the resident does not allow access. Because of the adverse outcomes possible from outdoor measurements, residents would usually allow the necessary access on reasonable conditions as to privacy.

10. <u>Guidelines</u>

a. What standing is to be given to a guideline?

b. It is not a part of the Act, Regulations or SDAP.
c. In the Code there are references to the Planning Guidelines but usually under the heading Editor's Note.
d. The Planning Guidelines cannot override the Code. The Planning Guidelines can only provide assistance in the circumstances provided for in the Planning Guidelines to the extent that they are consistent with the Code.

11. **NHMRC – Para 3.3.3** –
    a. Section 3.3.3 states "*NHMRC concluded that there is no reliable or consistent evidence that wind farms directly cause adverse health effects in humans.*"
        i. The NHMRC does not conclude, "*that there is reliable or consistent evidence that wind farms do not directly cause adverse health effects in humans."*
        ii. The acoustician involved in the NHMRC report had similar conflict of interest and duty to the conflict that Savery & Associates have in relation to the Code and Planning Guidelines and failed to disclose that conflict.
        iii. The NHMRC statement quoted above is irrelevant in circumstances where the Sustainable Planning Act requires the application of the precautionary principle:-
            1. That principle must be applied when there is sufficient evidence to fairly raise the risk.
            2. Many respectable acousticians and other professionals have raised the risk of adverse health impacts.
            3. Many of the papers raising this risk have been peer reviewed.
            4. The risk of adverse health impacts from wind farms is fairly raised.
            5. The precautionary principle should be applied.
            6. The Planning Guidelines acknowledge that NHRMC state that it should be applied.
            7. The Planning Guidelines fail to apply the precautionary principle.
    b. The Guidelines acknowledge the role of the NHMRC when the Guidelines state:-
        i. "*With respect to low-frequency noise, the NHMRC is a national expert body promoting the development and maintenance of public and individual health standards. In early 2014, after a review of scientific literature, the NHMRC concluded that there is no reliable or consistent evidence that wind farms directly cause adverse health effects in humans.*
        ii. *The NHMRC will continue to investigate and monitor health issues and wind farms. As the NHMRC is the key expert body on health effects of wind farms, the Queensland Government will monitor any new findings and incorporate findings from NHMRC reviews, into potential future amendments of the Wind farm state code.*"

c. These statements ignore the July 2010 statement issued by NHMRC which recommended a precautionary approach:-

> "*Concerns regarding the adverse health impacts of wind turbines focus on infrasound, electromagnetic radiation, shadow flicker and blade glint produced by wind turbines, as discussed above. While there is currently no evidence linking these phenomena with adverse health effects, the evidence is limited.*
>
> *Therefore it is recommended that relevant authorities take a precautionary approach and continue to monitor research outcomes."*

d. In Merlin, T, Newton, S, Ellery, B, Milverton, J & Farah, C 2013, Systematic review of the human health effects of wind farms, National Health and Medical Research Council, Canberra, published in 2014 for comment (the "Latest NHMRC Paper"), the paper posed the question "Do wind turbines cause adverse health effects in humans?"

e. The conclusion stated was "*The quality and quantity of evidence available to address the questions posed in this review was limited. The evidence considered does not support the conclusion that wind turbines have direct adverse effects on human health, as the criteria for causation have not been fulfilled. Indirect effects of wind farms on human health through sleep disturbance, reduced sleep quality, quality of life and perhaps annoyance are possible. Bias and confounding could, however, be possible explanations for the reported associations upon which this conclusion is based".*

f. Again the NHMRC acknowledge the evidence is limited and that indirect adverse effects on human health are possible. Accordingly the recommendation of July 2010 still stands and authorities should take a precautionary approach.

g. This is recognized in the Latest NHMRC Paper at page 20:

   i. *The Public Statement recommended that relevant authorities take a precautionary approach and continue to monitor relevant research. It was suggested that compliance with standards relating to wind turbine design, manufacture and site evaluation would minimise any potential impacts of wind turbines on surrounding areas.*

   ii. *In 2011 a Senate Inquiry, 'The Social and Economic Impact of Rural Wind Farms', was conducted. The inquiry received more than 1000 submissions and held public hearings in four cities. It recommended a precautionary approach to noise standards, including conducting epidemiological and laboratory studies of the possible effects of wind farms on human health, as well as continuing the NHMRC review of research. The Australian Government accepted four of the seven recommendations of the inquiry, including supporting the recommendation that the NHMRC should continue the review of current research in the*

field, with regular publication of findings (Australian Government 2012).

iii. In June 2011 the NHMRC held a forum on the issues related to the possible health effects of wind turbines4, leading to five major conclusions:

1. *There is insufficient published, peer-reviewed, high-quality scientific evidence concerning infrasound and its effect on human health.*
2. *Research on infrasound and audible noise needs to include variables such as proximity to turbines, wind levels, topography and structure of residential housing.*
3. *Social and economic factors need to be considered when analysing the impact of wind farms on human health.*
4. *A thorough review should be conducted that evaluates the literature against defined levels of evidence, and highlights limitations in the available literature.*
5. *The review should consider all aspects of noise, including infrasound (less than 20 Hz) and audible noise (greater than 20 Hz)."*

h. The Honorable Jeff Seeney MP in the draft "Call-in Notice for the Mt Emerald Wind Farm" states "The Queensland Government's, *Environmental Protection (Noise) Policy 2008* outlines provisions for protecting the quality of acoustic environments that are conducive to human health and wellbeing by establishing noise level goals for various operations **such as wind farms**. It is noted that the National Health and Medical Research Council (NHMRC), Australia's peak public health body, is currently conducting an independent review to determine whether there is an association between exposure to wind farms and human health effects. **NHMRC recommends that relevant authorities take a precautionary approach to development applications relating to wind farms.**"

i. The Code and the Guidelines do not adopt this approach or the precautionary principle.

j. The World Health Organization recommended level of noise for sleep protection is that the total noise level should not exceed 30 dB(A).

k. This level has been adopted by the Environmental Protection (Noise) Policy 2008.

l. The proposed Code will permit breaches of this noise limit in at least 4 ways:-

i. It assumes a minimum 5 dB(A) attenuation when housing attenuation has been measured at between 1 and 3 dB(A);

ii. It permits the limit to be exceeded by noise generated from the wind farm, if wind farm generated noise exceeds the calculated background noise when that background noise exceeds 25 dB(A) indoors at night because the Code permits

the wind farm generated noise to exceed the background noise by 5 dB(A);

iii. It fails to allow for the effects of any other additional noise source (i.e. in addition to the wind farm generated noise) when all noise sources increase the total noise (even though not linearly). The noise limit in the Code should be less than the total noise limit to allow a buffer for additional noise sources;

iv. It permits the calculation of the effect of masking (by wind generated noise) using wind speeds at the wind farm when wind speeds at the receptor may not be the same as wind speeds at the wind farm and masking (by wind generated noise) at the receptor should only be recognized if the background noise at the receptor is affected by the wind speed at the receptor.

m. The Code and Planning Guidelines do not follow a precautionary approach:-

i. where scientific proof is not available, noise limits should be set applying the precautionary principle to prevent degradation of the environment if there are threats of serious or irreversible environmental damage. (S 5(1)(a)(iii) of the Sustainable Planning Act 2009 ("SPA"));

ii. The Latest NHMRC paper identifies that further research is needed in relation to noise including low frequency noise and infrasound i.e. that scientific proof of the impact of those types of noises on human health is not available but the issue is fairly raised by reputable scientific material.

iii. Thus the threshold requirements for the application of the precautionary principle under SPA are established.

iv. The Code and the Planning Guidelines fail to apply the precautionary principle in that they fail to provide a noise limit for low frequency noise including infrasound;

v. They fail to deal with infrasound at all.

vi. The Planning Guidelines define "Low frequency noise" to be a noise with perceptible and definite content in the **audible** frequency range below 250Hz.

vii. At Section 3.3.3 of the Planning Guidelines, it is stated that *"Low-frequency sound is commonly defined as sound which is inaudible to the human ear (below 16 Hz)."*

viii. It should be noted that the perception of increases in low frequency sound is different from the perception of increases in other audible sound. Other audible sound is perceived to double when there is an increase of 10 dB(A) but low frequency sound is perceived to double when there is an increase of much less probably in the range of 5 dB(A) and with some frequencies even as low as 2 dB(A). As a result a background plus 5 dB(A) is inappropriate as a noise limit

ix. Infrasound is not mentioned in the Planning Guidelines but is usually recognized as sound below 20 Hz.
x. Thus infrasound is covered by the Planning Guidelines only to the extent that it is in the audible range between 16 and 20 Hz.
xi. Like Low Frequency Noise, infrasound when covered is inadequately covered. Otherwise it is not covered at all.
xii. The Code and Planning Guidelines should provide for noise limits for low frequency noise and infrasound applying the precautionary principle.
xiii. Failing to do so is a bias in favor of the wind farm developer/applicant.
xiv. It should be noted that the dB(G) measurement is inappropriate for measuring infrasound because it filters below 10 Hz and misses much of the infrasound.
xv. Les Huson, in his Flyers Creek review referred to above, confirms that there is noise measuring equipment that can measure infrasound and that Wind Farms do generate infrasound.
xvi. It should also be noted that low frequency sound and in particular infrasound, do not attenuate like higher frequencies. In fact low frequency noise can resonate and increase within a building.

12. **Set backs**

a. Low frequency noise is defined in the Planning Guidelines as sound with perceptible and definite content in the audible frequency range below 250Hz.
b. Infrasound is sound below 20 Hz i.e. generally recognized as below normal human audibility.
c. Therefore infrasound is excluded from the term Low Frequency Noise and as a result not considered in the Planning Guidelines.
d. Infrasound attenuates over distance at a much lower rate than the non-infrasonic component of sound.
e. Infrasound is more difficult to measure than audible sound. S Cooper "The measurement of infrasound and low frequency noise for wind farms" in his (revised version) paper delivered to the 5th International Conference on Wind Turbine Noise Denver 28-30 August 2013 summarises the position:-
    i. "*The use of dB(A) for the assessment of large industrial wind turbines does not address low frequency noise (LFN) or infrasound due to the filter characteristics of the A-weighting curve.*
    ii. *In seeking to address infrasound noise (typically identified as between 1Hz and 20Hz) some acousticians for the wind industry have used dB(G) and dB(Z) results. Both of these weighting curves exhibit significant roll offs in the frequency*

domain below 6Hz that renders the use of such descriptors of no real value in addressing infrasound of wind turbine noise.

iii. *In my opinion the correct procedure is to use Linear (unweighted) levels in both constant percentage 1/3 octave bands (to agree with current acoustical data) and narrow band analysis to identify the wind turbine signature.*

iv. *For infrasound noise it would appear consideration of the linear result over the bandwidth of 1Hz – 20Hz is appropriate and*

v. *low frequency noise when considered as a separate exercise should be expressed as a linear level restricted to the bandwidth of 20 – 200Hz.*"

f. The effects of infrasound on amenity and health are not yet fully understood or scientifically explained.

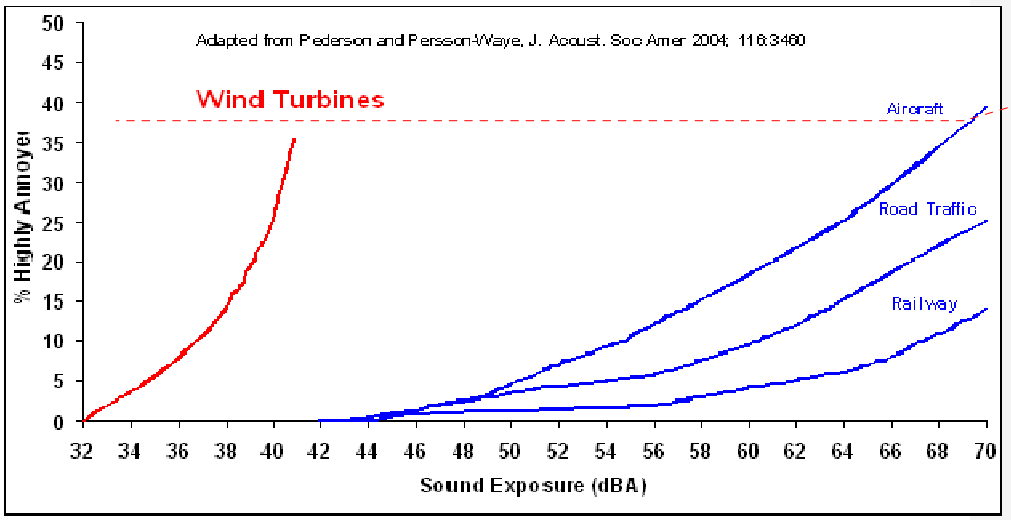
g. Various experts have proposed theories to explain adverse physiological impacts of infrasound from wind farms including:-

i. Dr Paul Schomer "A proposed theory to explain some adverse physiological effects of the infrasonic emissions at some wind farm sites May 7, 2013";

ii. Dr Nina Pierpont "Wind Turbine Syndrome";

iii. Dr A Salt "Wind Turbines can be hazardous to human health".

h. Dr A Salt in his article, "550m set backs are insane" (see http://oto2.wustl.edu/cochlea/wt6.html) states "If you look at the relationship between annoyance and different noise sources you can see that wind turbine noise is clearly "different" from other types of noise . Comparing with aircraft, automobile or rail traffic wind turbine noise at about 30 dB lower levels (40 dBA rather than 68 dB A or higher) annoys 30 % of people. There are attempts to justify the increased annoyance by other (e.g. visual) factors but the possibility remains that the noise itself could be more annoying, due to the **infrasound that is present in the noise but which is excluded from the A-weighted measurement."**



Comment [O1]:

e

l of complaints concerning the effects of noise from wind farms is well documented.

j. The effects caused by wind turbine noise have been known since 1985 when the report "Acoustic Noise Associated with the Mod 1 Wind Turbine: Its source, Impact and Control" was produced by Neil Kelley and Others for the US Department of Energy – Link to Report: Kelley et al 1985. This Report provides scientific evidence that wind turbine noise can cause complaints and impact on the health and well being of neighbouring residents.

k. There is a high risk of adverse impacts on human health from the noise generated by wind turbines.

l. The Precautionary Principle (referred to in paragraph 11.m.i above, requires that care be taken to ensure that the potential adverse impacts do not occur.

m. It is not sufficient for the Proponent of a wind farm to state that there is no scientific evidence that noise from wind farms affects health.

n. The Proponent of a wind farm bears the responsibility to demonstrate that at the relevant sensitive receptors, there will be no unacceptable adverse impacts on health and amenity.

o. If the Proponent is unable to so demonstrate this, then the design and location of the wind farm must avoid the risk by being set back sufficient distance from all sensitive receptors that the noise (including infrasound) will abate before reaching the sensitive receptor.

p. Proposed setbacks:-

   i. the Dwelling Set Back be a minimum of 2 Km.

   ii. the Boundary Set Back be 4 times the overall height of the wind turbine.

q. Definition

i. Dwelling Set back is the distance between a building or small parcel of land capable of use as a dwelling and the nearest electricity generating wind turbine.
ii. Boundary Set Back is the distance between a boundary line of land owned by a neighbour to the Wind Farm and the nearest electricity generating wind turbine.

r. Existing Rules in Other Locations
   i. Victoria
      1. The Victorian Government apply a Dwelling Set Back of 2 Km.
   ii. The NSW Government have included 2 km setbacks in their Draft Wind Farm Guidelines.Moorabool Shire Council in Victoria has adopted a policy requiring a Dwelling Set Back of 2 Kms.
   iii. Upper Lachlan Shire Council in New South Wales has adopted a policy requiring a Dwelling Set Back of 2 Kms.
   iv. The New Zealand Environment Court decision, Mighty River Wind Power Ltd V Porirua City Council, dated 8.10.2012, required 700 metre setbacks from boundaries of neighbouring properties to wind turbines.
   v. British Horse Society:-
      1. The British Horse Society have guidelines requiring a Boundary set back of 4 times the overall height of the wind turbines.
   vi. Town of Union in the United States of America has adopted an Ordinance requiring a Boundary Set Back of 5 time the rotor diameter.

s. Qld Health advised Tablelands Regional Council not to allow wind turbines at the proposed Mt Emerald Wind Farm closer than 2 km from the nearest residence.

t. South Burnett Regional Council unanimously supported a Resolution requiring 2 km setbacks for wind farms in January 2012.

u. QCWA Branches voted 267 for and 4 against a resolution requiring 2 km setbacks for wind turbines at their State conference in Toowoomba on the 26th October, 2012.

v. Dr Bob Thorne's recommendation
   i. Dr Bob Thorne is the principal of Noise Measurement Services Pty Ltd, Brisbane His professional background is the measurement of low background sound levels and the assessment on noise as it affects people. Wind Farms with their unique characteristics of sound and noise are of particular interest. He holds a PhD in Health Science from Massey University in New Zealand, specialist qualifications in acoustics with the New Zealand Diploma in Science (environmental noise, 1985), post graduate diploma in acoustics from the Institute of

Acoustics (UK) 1985, Diploma in Health Engineering 1981 (Royal Society for the Promotion of Health New Zealand).

ii. Dr Bob Thorne has published the "Wind Farm Noise Assessment Technical Guide September 2010".

iii. In that guide he states - "it is concluded that no large-scale wind turbine should be installed within 2000 meters of any dwelling or noise sensitive place unless with the approval of the land owner.

iv. It is concluded that no large-scale wind turbine should be operated within 3500 meter of any dwelling or noise sensitive place unless the operator of the proposed wind farm energy facility, at its own expense, mitigates any noise within the dwelling or noise sensitive place identified as being from that proposed wind farm energy facility, to a level determined subject to the final approval of the occupier of that dwelling or noise sensitive place."

w. NSW General Purpose Standing Committee No. 5 Rural wind farms Inquiry

i. Recommendation 7 from the Inquiry Report published on 16 December 2009 stated:-

ii. "That the Minister for Planning include a minimum setback distance of two kilometres between wind turbines and residences on neighbouring properties in the NSW Planning and Assessment Guidelines for Wind Farms. The guidelines should also identify that the minimum setback of two kilometres can be waived with the consent of the affected neighbouring property owner."

x. House of Lords Bill

i. Section 2 of Wind Turbines (Minimum Distances from Residential Premises) Bill before the House of Lords in the United Kingdom prescribes the Requirements for minimum distance in the following terms:-

1. The "minimum distance requirement" means the necessary minimum distance between the wind turbine generator and residential premises as set out in subsection (4).
2. "Residential premises" means any premises the main purpose of which is to provide residential accommodation, including farmhouses. "Noise sensitive place" includes a dwelling, marae, retreat, hotel, motel, child care centre, educational institution, hospital or private workplace. References to adverse affects on dwellings and noise sensitive places refer to adverse

affects on the occupiers, residents or tenants of those dwellings or noise sensitive places.

3. If a number of wind turbine generators are being built as part of the same project the minimum distance requirement applies to each wind turbine generator individually.
4. If the height of the wind turbine generator is—
    a. greater than 25m, but does not exceed 50m, the minimum distance requirement is 1000m;
    b. greater than 50m, but does not exceed 100m, the minimum distance requirement is 1500m;
    c. greater than 100m, but does not exceed 150m, the minimum distance requirement is 2000m
    d. greater than 150m, the minimum distance requirement is 3000m.
5. The height of the wind turbine generator is measured from the ground to the end of the blade tip at its highest point.
6. There is no minimum distance requirement if the height of the wind turbine generator does not exceed 25m.

ii. The Bill was first read in the House of Lords on 26 July 2010. The 2nd reading in the House of Lords is to be on a date to be announced.

y. The SA Liberal Party have stated in the media they will legislate 2 km setbacks when elected.

13. **Predictions**

a. Acoustic Engineer

i. Section A5.4 Noise level predictions states "***Noise levels should be predicted by an acoustic engineer defined for the purposes of these guidelines as an engineer who is eligible for membership of both the Australian Acoustical Society and the Institution of Engineers Australia.***"

ii. The website of the Australian Acoustical Society (AAS) states "Admission to the Society is open to all people interested in acoustics and companies and other organisations who may wish to support the Society. Members come from a wide range of occupations working in all fields of acoustics, such as bioacoustics, electro-acoustics, auditorium acoustics, physical acoustics, musical acoustics, speech communication, ultrasonics, noise control, vibration, etc."

iii. Membership of the AAS, therefore, does not indicate sufficient expertise in acoustics to predict noise levels to be generated by wind turbines at a proposed wind farm site.

iv. Not all engineers who are members of the Institution of Engineers Australia (IEA) are interested in acoustics.

v. Membership of the IEA, therefore, does not indicate sufficient expertise in acoustics to predict noise levels to be generated by wind turbines at a proposed wind farm site.
vi. The Panning Guidelines are again inadequate to protect Queenslanders.

b. The Planning Guidelines:-
   i. permit the use of predictions to assess whether the wind farm will meet the criteria of these guidelines. Why not require actual measurements?
   ii. Do not make it clear that the background noise and wind speeds need to be measured at the same place namely at all receivers.

c. What is meant by "predicted" in the Planning Guidelines?:-
   i. Section A5.4 "*Noise levels should be predicted by an acoustic engineer defined for the purposes of these guidelines as an engineer who is eligible for membership of both the Australian Acoustical Society and the Institution of Engineers Australia.*"
   ii. *"At the time of development application, the contractual arrangements for a particular WTG model may not have been finalised between the developer and WTG supplier. If the WTG model to be installed differs from that indicated at the time of development application, the developer should assess and discuss the effect on the propagation model with the EPA.*"
   iii. *"The sound power level can be thought of as the noise signature for the WTG model proposed for the wind farm.*"

d. WTGs do not all generate the same noise.
e. In order to predict the noise levels, the engineer referred to needs to know what WTGs are to be built in the Wind Farm.
f. The documentation to be provided with the application should include:-
   i. "*Relevant information could include:*
   • *make and model of WTGs to be used, including hub height, cut-in wind speed and speed of the rated power.*" (See Section A5.12 of the Planning Guidelines)
g. The approval, if given, will be based upon the nominated WTGs.
h. The Planning Guidelines envisaged that the actual WTGs used in a Wind Farm will be different from the WTGs nominated for the application.
i. If this occurs, the change is a material change as the noise predictions on which the approval was granted, could be quite different from the noise predictions for the replacement WTGs.
j. Such a change is material and should be properly provided for.
k. A provision to the effect "*the developer should assess and discuss the effect on the propagation model with the EPA*" is totally inadequate.
l. The EPA has no jurisdiction in relation to the approval.

m. The Planning Guidelines should state that the Conditions of Approval should contain conditions to the effect that:-
    i. The approval should specify the WTGs on which the approval was granted;
    ii. The approval is limited to the WTGs so nominated;
    iii. If, the WTGs to be built are different from those nominated in the Approval, the Approval is not applicable and must be amended before the construction of the Wind Farm commences;
    iv. To obtain an amendment of the approval to allow for the changed WTGs, the applicant must submit a new noise impact report nominating the newly proposed make and model of WTG and with all predictions based upon the new WTGs, for assessment by the Assessment manager SARA;
    v. SARA may amend or refuse to amend the approval to change the WTGs to the new make and model.

14. Enforcement

a. Who will be responsible for enforcement?

b. There is no acceptable out come in imposing a condition of approval that cannot be enforced.

c. There is nothing in the Code or Planning Guidelines that requires the Wind Farm operator to make available the noise and wind data that is required to determine compliance.

d. Without the wind data, it is impossible to determine compliance.

e. The guideline explains a process of matching the wind data with the noise data but there is no requirement in the Code or Planning Guidelines requiring the Wind Farm operator to make available the wind data by itself.

f. Without that data, an independent acoustician has no means of determining compliance.

15. Environmental Management Plan (EMP)

a. – P 14 – enforcement power to turn off the turbines if compliance is not established:-

b. Section 3.3.4 of the Planning Guidelines states that minimum achievements of the EMP should include:-
    i. "*define the procedures for monitoring and reporting, if required, to ensure processes implemented are effective and to provide a mechanism for demonstrating compliance.*"
        1. Monitoring and reporting must be required to demonstrate compliance. The words, "if required", should be deleted.
    ii. "*establish stakeholder consultation and complaint management procedures*".
        1. Complaint Management Procedures should be set out in the Planning Guidelines.

iii. "*For decommissioning, the EMP should specifically contain commitments by the proponent to rehabilitate the wind farm site, regarding how:*

1. *the wind farm infrastructure is removed from the site;*
2. *the site is suitable for other uses compatible with the locality as stated in the planning scheme;*
3. *the visual amenity and the sustainable ecological functioning of the site is maintained and where possible improved."*

a. Wind Farms are generally sold by the more experienced developer to superannuation companies who will be ultimately responsible for decommissioning.

b. They have no experience and would not be aware that decommissioning cost of a wind farm is approximately $400,000 per turbine. See Weston and Sampson report dated December 2011 "Wind Energy Facility Mitigation Alternatives Analysis prepared for the town of Falmouth, Massachusetts which, after analysing the equipment, manpower and process of decommissioning at P 16 of the report, concludes:-

"The cost for the cranes, rigging, tools and labor is on the order of $350,000 per turbine, plus project management and coordination. The cost for removal of the second wind turbine would be perhaps $50,000 less, as the large crane would still need to be dismantled and re-built for the second location. Additional cost for preparation of the crane pad and storage area would result in a total cost of approximately $838,000."

c. This requires more thought than a simple description in the EMP that the wind farm will be decommissioned.

d. Adequate security must be provided at approval stage and before construction for the cost of decommissioning and topping up of the security from time to time when circumstances including present and future inflation justify it.

e. .The Code and Planning Guidelines fail to require security to be taken.

c. set out the audit process for the implementation of the EMP and develop a procedure for managing non-conformances and providing for continual improvement in environmental performance.

d. for the purposes of assessing the effect of masking:-

i. by noise created by wind;

ii. of noise generated by the wind farm;
iii. at a particular location from which complaints are made about noise generated by the wind farm during operation,

the EMP should clearly provide that:-

1. the EMP requires monitoring of the wind speed at the relevant receiver locations; and
2. that definition of that term (relevant receiver location) should be expanded to include any and all receptors from which complaints are lodged about noise generated by operation of the wind farm.

e. The EMP should be required to include a requirement for the retention of all data particularly the noise recording file.

16. **Relevant receiver locations– A5.1**:

a. There are 3 terms:-

i. State Planning Policy and Wind Farm code use the term "Sensitive Land Uses :-

1. sensitive land uses is defined in the State Planning Policy to mean *a "use that is a: child care centre, community care centre, community residence, dual occupancy, dwelling house, educational establishment, health care services, hospital, hostel, multiple dwelling, relocatable home park, residential care facility, retirement facility, short-term accommodation, tourist park."*

ii. The Planning Guidelines use "Relevant receiver locations":-

1. and "relevant receivers" are premises:-
   a. where someone resides or has development approval to build a residential dwelling;
   b. where the predicted noise level exceeds the base noise level for the area [35dB(A)] for wind speeds up to the speed of the rated power;
   c. that are representative of the worst-case situation when considering the range of premises, e.g. a house located among a group of nearby houses within a residential zone.
2. what if actual noise levels at a receiver are different from predicted noise levels. The receiver may not be a relevant receiver location and not assessed for compliance.

iii. The Noise Policy uses "Sensitive Receptors" which means an area or place where noise is measured i.e. those listed in Schedule 1 of the Noise Policy which includes "dwellings (for indoors)".

iv. NB, the Guidelines use a term different from the Code. This is a nonsense as it leaves too much room for argument as to what are relevant receiver locations (determined on a representative basis) when the Code applies to all Sensitive

Land Uses i.e. including all dwelling houses. The assessment manager is entitled to rely upon the applicant's reports to determine what is representative. There is no independent assessment what is representative.

v. In relation to compliance testing only "Relevant Receivers" identified in the development assessment stage need be tested clause A5.11.

b. Only the Noise Policy distinguishes between indoors and outdoors.

c. Relevant receiver locations are significantly less locations than the Sensitive receptors under the Noise Policy.

d. "Relevant receiver locations" (RRLs):-

i. References to RRLS should be changed to Sensitive land uses being the term used in the Code so all such uses are considered.

ii. RRLs is a new term introduced by the Planning Guidelines and is different from the term "Sensitive Land Uses" used in the Code which change of term is unjustifiable in Planning Guidelines explaining the application of the Code.

iii. RRLs is used to identify the locations for noise measurements for assessment for both approval and compliance.

iv. The identification of RRLs is based upon predictions.

v. The predictions may be incorrect.

vi. The Planning Guidelines purport to exclude noise measurements for assessment of compliance at other receivers that are not initially identified by prediction as sensitive receiver locations. *A5.11 Excessive Noise*

The operation of the wind farm should comply with the criteria at all ***relevant receivers****. The extent of relevant receivers is* ***confined to those identified during the development assessment stage*** *(including proposed developments near the wind farm which have approved development applications).*

vii. Complaints may come from Receivers that are not RRLs and are therefore excluded from compliance assessment.

viii. This is completely unacceptable and in conflict with the Code which requires compliance at all sensitive land uses.

ix. Relevant receiver locations include only sensitive land uses that are receivers that are representative and not all dwellings. How will the worst case scenario established? Applying whose interests for the purpose of comparison (See paragraph 5 "Worst Case").

e. There does not appear to be a requirement to actually measure noise at all sensitive receptors (i.e. the term used in the Noise Policy) unless it will be in the EMP.

f. For the purposes of the application for approval of a wind farm, predictions of the noise to be generated by the proposed wind farm, at the relevant receiver locations, are used according to the

Guidelines even though the Code applies the 35 dB(A) to all dwelling houses.

g. The use of the term Relevant Receiver Locations is another bias in favour of the Wind Farm developer and is not justified.
h. Under the heading "Data Collection in Section A5.2 of the Planning Guidelines, it is stated, "*If wind data from the single wind speed monitor are not representative for all of the noise monitoring locations, the wind speed should be measured separately at each of the locations.*"
i. Wind speed should be measured at each receiver location. It cannot be known if the single wind speed monitor is representative for all locations unless the wind speed at the location is known.
j. The statement is circuitous. Noise monitoring locations are limited by the Planning Guidelines to RRLs.

17. **Community Consultation**
    a. The Code and Planning Guidelines should provide rules for community consultation.
    b. Appendix C: ("Guidelines for wind farm community consultative committees") to the draft NSW Planning Guidelines for Wind Farms is a reasonable example of such Rules and their adoption would avoid many of the problems being currently experienced by communities in Queensland involved in such consultation.
    c. The proponent should be required to report a list of the actual neighbours they have consulted and whether each of those neighbours supports or opposes the wind farm proposal.

18. **Application of the Code**
    a. The Code is intended to provide a complete code for consideration of development applications to use land for the purposes of a wind farm in Queensland.
    b. Approval to use land for a wind farm in Queensland can be obtained through 3 processes:-
        i. IDAS
        ii. Ministerial Designation
        iii. Coordinator General
    c. The Code and Planning Guidelines apply only to the IDAS process.
    d. It is submitted that the Code and Planning Guidelines should apply to all 3 processes and bind the decision maker in all three processes.
        i. For the sake of consistency;
        ii. For integrity and to avoid forum shopping by applicants who cannot meet the Code and Planning Guidelines;
        iii. For Probity.

19. **Need and viability**
    a. The Code should require a proponent to justify the proposed wind farm by demonstrating the cost (including economic and all other costs) to the community and the benefit to the community of the proposed wind farm.
    b. Wind farms pollute the environment through many factors including:-

i. Audible and inaudible noise;
ii. Their size and visibility from great distances;
iii. Flicker;
iv. Impact on animal life
v. Etc.

c. Wind farms pollute the environment generally.
d. The impact of a wind farm is on a wide area of the environment around the site of the proposed wind farm and not just at the location of the land on which the wind farm is proposed to be constructed. For example, typically a wind farm is constructed on hills or mountains and can be heard and seen from distances many kilometres from the land on which the wind farm is constructed.
e. Wind farms are not a use of land as of right and approval is required to use land for the purpose of a wind farm.
f. As a general principle, pollution of the environment should not be permitted through an approval to use land for the purpose of a wind farm unless that pollution is justified.
g. Wind Farms have been encouraged by the Federal Government because wind farms have been seen as a source of electricity power produced without carbon emissions emanating from coal fired power stations.
h. Not all wind farms benefit the community to the same extent or at all.
i. Each wind farm proponent should be required by the wind farm code to demonstrate through scientific evidence that the pollution of the environment by the proposed wind farm is justified by the benefits (both public and private) to be gained from the particular wind farm.
j. A particular wind farm cannot be justified by the general arguments of carbon emission savings.
k. Typically wind as a source of energy is not sufficiently reliable. There are myriad stories of boats becoming becalmed for extended periods due to insufficient wind. Hence wind gave way to steam and other fuels as a source of mobilisation of shipping.
l. While batteries can store electricity power, the technology is not sufficiently advanced to be viable for large scale power generation.
m. Electricity generated by a wind farm must be used when it is generated.
n. Electricity can be transmitted over long distances through electricity transmission lines but electricity dissipates over distance.
o. The justification should include:-
    i. The extent and continuity of the wind resource at the proposed location;
    ii. The rated capacity of the proposed wind farm to generate electricity;
    iii. The demonstrable capacity of the proposed wind farm to generate electricity over a year taking into account the extent and continuity of the wind resource at the proposed location and the distance the electricity must travel to market;
    iv. The demonstrable capacity and reliability of the proposed wind farm to generate electricity at the times of each day during a

year when base load electricity generation capacity is required by the community;

v. The carbon emissions which theoretically could be saved by replacing the demonstrated electricity generation capacity of the proposed wind farm;

vi. Which power generation carbon emissions can actually be saved by the reliable electricity generation of the proposed wind farm generally and particularly having regard to the reliable capacity of the proposed wind farm to generate .electricity during base load times;

vii. The financial subsidies the community will be required to pay for the proposed wind farm.

p. AGL published a map of Australia, sourced from CSIRO and illustrating the general background winds in Australia – copy attached.**

q. Most of Queensland has background winds of less than 4 m/s indicating that most of Queensland is unsuitable for a wind farm..

20. **Hardship**

a. Wind Farms impact on the environment broadly.

b. The impact of a wind farm is on a wide area of the environment around the site of the proposed wind farm and not just at the location of the land on which the wind farm is proposed to be constructed. For example, typically a wind farm is constructed on hills or mountains and can be heard and seen from distances many kilometres from the land on which the wind farm is constructed.

c. The Proponent and operator of a wind farm should bear the cost of hardship to members of the community caused by the wind farm. Individuals should not be left to bear this themselves.

d. Under S 222 of the Sustainable Planning Act, the owner of land designated by a Minister, may ask the designator to buy the land if the owner of an interest in designated land (the designated interest) is suffering hardship because of the designation.

e. This right to request that the designator buy land is not extended beyond the designated land or neighbouring land owned by an owner of designated land.

f. Because of the wide impact of wind farms and the number of examples where neighbours have been forced by the adverse impacts of wind farms to abandon their land, this right to request that the designator buy land in case of hardship suffered due to the development approval for the wind farm, should be extended by the wind farm code to a condition binding the Proponent of a wind farm to purchase the land of any owner impacted by the wind farm, at fair market value (disregarding the impact of the wind farm) in accordance with established principles.

g. This condition should apply to an approval obtained through any of the 3 processes for obtaining such approvals.

21. **Audible Sound**

a. The audible noise criteria must comply with The Environmental Protection (Noise) Policy 2008 (Queensland)(the “Noise Policy”).

b. The criteria for acoustic quality objectives stated in Schedule 1 of the Noise Policy do not apply as a limit to the noise that can be generated

by any one source (e.g. a wind farm) as heard at an individual noise point (e.g. a sensitive receptor such as a dwelling). The Explanatory Notes to the Noise Policy state (only the italics parts are the quote - I have added the material in between [ ]):-

i. "Specifically, the acoustic quality objectives [i.e. the noise criteria in Schedule 1 including the 30dB(A) Laeq indoors at night for dwellings] must be considered in assessment processes and help inform the decision, including any conditions that may be placed on approvals for environmentally relevant activities [NB Wind Farms are not ERAs but use of the word "including" indicates that this applies to all the noise sources and more than just ERAs]. The acoustic quality objectives are not individual point source emission standards but are total levels of noise in the surrounding environment."

c. This means that the numerical noise criteria stated in Schedule 1 should not be the noise criteria for an individual source (like a wind farm) but that the noise at a receptor should not be increased by a new source (the wind farm) above the criteria/objective in Schedule 1. The criteria in Schedule 1 should be taken into account in this way when setting the criteria for the new noise source.
d. Therefore, it is correct to say that:-
   i. the Noise Policy does not directly set noise criteria for wind farms; and
   ii. Queensland does not presently have noise criteria solely for wind farms.
e. However, these statements are mere semantics and should not guide the setting of noise criteria for audible noise.
f. The Noise Policy does require that the noise generated by any source (including wind farms) must not cause the noise at the receptor to increase above the criteria in Schedule 1 of the Noise Policy.
g. The acoustician involved in drafting the Wind Farm Code should confirm that noises from multiple sources increase the total noise level above the loudest noise by only a small amount.
h. Therefore, setting an absolute numerical noise limit for the noise that a wind farm may generate is a further compromise of this criteria (in Schedule 1 of the Noise Policy) which could permit the wind farm noise to breach the main objective of preventing sleep disturbance and protecting health.
i. Can this compromise of the criteria be avoided by setting the noise limit at a figure less than the objective in Schedule 1 of the Noise Policy by a reasonable allowance for the cumulative effect of multiple noise sources?
j. If so what is that reasonable allowance?
k. If the points above are confirmed, noise criteria conditions should be drafted not in terms of a numerical noise limit for the noise which the wind farm can generate but in terms of prohibiting the wind farm from generating a noise which is or is equal to the loudest source at a receptor if the total noise at the receptor is then equal to or above the criteria objective in Schedule 1 of the Noise Policy at any point in time.

l. This makes background noise relevant to the application of the criteria in the Noise Policy but in a way different from the usual way of dealing with background creep (i.e. for example, setting a numerical limit of the greater of 30 dBA or background noise plus 5 dBA). It is only relevant to determine if the noise from the wind farm is or is equal to the loudest source of all noise at the receptor. Historical background noise is irrelevant.

m. The conditions of approval should address a number of issues relevant to the above, including:-

i. Determining all relevant sensitive receptors (whether existing or potential) for the wind farm;

ii. The methodology for determining the noise level (at a sensitive receptor at a particular point in time), of the noise created by the wind farm;

iii. The methodology for determining the total noise level at a sensitive receptor;

iv. Requiring the wind farm to be shut down for reasonable periods if reasonably required to make such determination;

v. Enabling the governmental authority responsible for enforcement of the conditions of approval of the wind farm to physically shut down the wind farm if it considers it is reasonably required to make such determination without fear of liability for such action;

vi. The methodology for independent continuous monitoring at all sensitive receptors and the wind farm to determine compliance or otherwise;

vii. Retention of records of monitoring;

viii. Public access to the monitoring and the records of monitoring;

ix. Responsibility for cost of the above monitoring and determinations;

x. Security for that cost.

xi. Detailed and transparent process for recording:-

1. Complaints;
2. Dealing with complaints;
3. Resolving complaints;

22. **Inaudible Sound/Infrasound/Low Frequency Sound**

a. The wind farm code should set noise limits for low frequency and infrasound.

b. The findings from research commissioned by the US Department of Energy in 1981 and published in 1985, into unexpected complaints from residents living near a wind turbine, should be reflected in the Wind Farm Codes. Research institutes such as NASA were involved in conducting the research which found the symptoms of annoyance were caused directly by the infrasound and low frequency noise emissions from the turbines which penetrated inside, and resonated within, the building where the residents reported the “annoyance” symptoms. **The researchers determined the acoustic exposure levels outside the buildings which they judged were necessary to**

protect the residents, on the basis of the field data they had collected (from p 225):

i. "the joint radiation levels (expressed in terms of acoustic intensity and measured external to a structure) in the 8, 16, 31.5 and 63 Hz standard (ISO) octaves **should not exceed band intensity threshold limits of 60, 50, 40 and 40 dB (re 1 pWm –2) more than 20% of the time**.

c. The Report can be found in the following link:- Kelley et al 1985.
d. Neil Kelley has commented in the Australian media in 2013 that the research findings are applicable to current wind turbines.
e. This field research published in 1985 was subsequently followed by laboratory research published in 1987, which investigated the impact of different sources of noise, reproduced in a specially constructed building to assess infrasound and low frequency noise with respect to building resonance and annoyance.
f. Other research by William Willshire (NASA 1985) found that infrasound from wind turbine emissions was measured 10km from the wind turbine. The bibliography within this document details much of the research performed over this period of time.

23. **Remediation**
    a. A wind farm turbine has a limited viable life - usually in the order of 25 years.
    b. Wind turbines break down.
    c. Wind turbines are at risk of catching on fire.
    d. Unless there is remediation, the adverse impacts on the environment can continue after the turbine ceases to operate and after the cessation of any benefits to the community.
    e. The land owner and the community should not bear the cost of remediation.
    f. The cost of dismantling a turbine is in the vicinity of $400,000 per turbine as the removal and remediation cost.
    g. In January 2011, Weston and Sampson for the town of Falmouth Massachusetts estimated that it would cost US $838,000 to dismantle 2 turbines (http://www.falmouthmass.us/selectmen/falmouth%20turbine%20mitigation%20study.pdf).
    h. Remediation of the land to original state requires:-
        i. Hiring, transport and assembling of large scale cranes;
        ii. Preparing crane pads and allowing to settle;
        iii. Hiring of labour
        iv. Preparation of storage area;
        v. Dismantling of the tower and turbine;
        vi. Cutting up for scrap metal
        vii. Remove the foundation built for the tower;
        viii. Removal of electricity collection cables
        ix. Remove any roads providing access to the tower
        x. Remove gates
        xi. Restoration of contours, topsoil, re-vegetation and seeding etc

xii. Comply with all health, safety and environmental law applicable at the time of decommissioning;
xiii. Etc

i. Any scrap metal value should be used as a hedge against such unknowns and returned to the owner as a rebate following completion of decommissioning.
j. Often the Proponent of a wind farm does not operate the wind farm at all or for the life of the wind farm.
k. The owner and operator of a wind farm may be a company with no other assets than the wind farm. On ceasing to operate for any reason, those assets may be of little value.
l. The wind farm code should provide for the imposition of conditions of approval requiring:-
    i. remediation of the land to original condition when a turbine permanently ceases to be operable for any reason;
    ii. adequate security for such remediation;
    iii. topping up of the security from time to time when circumstances including present and future inflation justify it.

24. **Compliance and Enforcement**

a. The Wind Farm Code should be robust and practical in the areas of compliance and enforcement.
b. Typically, wind farms involve large capital cost and persons responsible for enforcement are reluctant to shut down the operation of a wind farm. The potential damages claim from shutting down a wind farm or just one turbine and the costs of defending such a claim, are frightening for normal persons engaged in enforcement.
c. Much of the evidence required to demonstrate non-compliance is peculiarly under the exclusive control of the wind farm operator.
d. There are many difficulties involved in gathering this evidence:-
    i. Difficulties in identifying the source of an offending noise at a sensitive receptor including a dwelling and attributing that noise to the wind farm;
    ii. Difficulties in measuring the noise level (whether audible or inaudible) of the offending noise ex post facto;
    iii. Methodologies in measuring noise – particularly as noise measurements are expressed in terms which involve averaging over time;
    iv. Difficulties with equipment;
    v. Difficulties in cross referencing noise and wind speed at the turbine with noise and wind speed at the sensitive receptor;
    vi. The cost of monitoring and enforcement;
    vii. Access to monitoring records;
    viii. Etc etc.
e. There are value judgements to be made in terms of which breaches justify shutting down a turbine or a wind farm. Should any breach justify this or only repeated breaches and if the latter how many? Should a minor breach or only a major breach.
f. The Wind Farm Code will be a toothless tiger unless it adequately deals with compliance and enforcement.

g. The Federal Clean Energy Regulator cannot be relied upon to suspend registration of a wind farm for failure to meet conditions of a development approval because the Clean Energy Regulator assumes that while a wind farm is operating it is compliant and relies upon the authority issuing the development approval to ensure compliance and enforcement.
h. Typically Local Authorities in Queensland do not have the expertise to monitor and assess compliance nor carry out enforcement. The Wind Farm Code should identify an appropriate independent Government Agency to be responsible for compliance and enforcement of development approval conditions for wind farms.
i. Wind Farms attract large financial subsidies from the community through the RET scheme. As a result wind farms should bear:-
    i. a greater than normal onus to maintain compliance with the conditions of approval;
    ii. the full cost of establishing compliance;
    iii. the cost of independent experts assessing compliance on a regular basis and where appropriate enforcement.
j. The Wind Farm Code should require the Proponent to provide adequate unconditional security for all future costs including the costs of:-
    i. Monitoring compliance;
    ii. Enforcement;
    iii. Remediation.
k. Reasonable security should be provided:-
    i. before construction commences;
    ii. whenever the security requires topping up to be adequate for the purposes;
l. Failure to provide security when requested should result in the operation of the wind farm being stopped immediately.

25. **Other Conditions**
a. The Proponent of a Wind Farm must comply with all applicable standards relating to:-
    i. turbine design and manufacturing;
    ii. site evaluation; and
    iii. final siting of wind turbines.
b. The Proponent and operator of a Wind Farm must not construct or operate a turbine or other infrastructure in the Wind Farm at a location or in a manner other than that disclosed in the development application or initial assessment report.
c. Such conditions on the construction, operation and dismantling of the Wind Farm as will ensure that the environmental harm will not occur or that the risk is acceptable.
d. The Proponent and operator of the Wind Farm must not:-
    i. Cause any detriment to health of any residents within 10 Kms of the Wind Farm;
    ii. Reduce land values of land held within 10 Kms of the Wind Farm by more than $50,000 per land holder;
    iii. Reduce productivity of land within 10 Kms of the Wind Farm;
    iv. Interfere with TV reception;

v. Cause fire that escapes from any electricity generation plant;
vi. Kill any living animal.

e. The Proponent and the owner and operator of the Wind Farm must adopt and implement best practice guidelines such as those identifying potential receptors of turbine noise, following established setbacks and managing infrasound.
f. The components of the Wind Farm that are not in good working order and condition must be repaired and if not repaired within 6 months of breakdown, the relevant components be dismantled.
g. The Wind Farm must be fully dismantled and the land returned to its natural state within 1 year of expiration of the expected life of the Wind Farm.
h. If:-
    i. environmental harm occurs; or
    ii. if the Wind Farm does generate Noise that exceeds the Noise Criteria identified in the development approval; or
    iii. Shadow Flicker occurs; or
    iv. Tonality occurs;
    v. Any condition of the approval whether through IDAS, Ministerial designation or otherwise, is breached;

At the Wind Farm or any such event is likely to occur, the operation of the wind farm can be stopped (e.g. by turning off a switch) immediately by a body independent of the operator based upon minimal objective or anecdotal (not necessarily scientific) evidence without risk of liability being incurred by the independent body or its officers unless that body acts under this condition arbitrarily or capriciously i.e. without any reason for doing so.

    vi. the approval:-
        1. continues during the first 10 years after approval only so long as the Proponent is the owner and operator of the Project; and
        2. ceases to have effect if the Proponent ceases to be the owner or operator of the Project within 10 years of the approval to use the land for the wind farm.

i. That natural wind be the only source of power involved in generating electricity on the wind farm land.
j. That the Wind Farm must not generate noise that will cause or contribute to the noise measured at any sensitive receptor namely a dwelling house greater than the objective set in the Environmental Protection (Noise) Policy 2008 or any lower objective set in any legislation or policy amending or replacing that Policy.
k. The Proponent and the owner and the operator of the Wind Farm must not rely upon or enforce any provision of a lease (or other document giving right to use of the land for a wind farm or part thereof) of wind farm land to the Proponent whereby the Landowner acknowledges and/or agrees or to the effect that it is adequately compensated (as part of the rent or otherwise) for any noise or inconvenience caused as a result of the permitted use of the site or the land and that it will not seek any further compensation from the Proponent of the wind farm, in relation to such matters.

l. The proponent and the owner and the operator of the Wind Farm must not enforce or attempt to enforce against a Landlord:-
    i. a lease or other right to use wind farm land in favour of the proponent for the Wind Farm signed before the Landowner was fully informed of the actual and potential impacts of the Wind Farm.
    ii. A confidentiality clause binding a landowner of wind farm land not to make disclosure or take any other action in relation to:-
        1. Breaches of a condition of the land use approval;
        2. Environmental harm caused or contributed to by the Wind Farm;

m. The proponent and the owner and the operator of the Wind Farm must not install:-
    i. a turbine or other generation plant in a location on the wind farm land to which the landowner objects.
    ii. an electricity generating wind turbine within:-
        1. 2 Kms of:-
            a. a building; or
            b. a parcel of land of 1000 sq m or less;
                i. capable of use as or for a dwelling.
                ii. 4 times the overall height of the wind turbine (640 m) of a boundary line of land neighboring wind farm land.

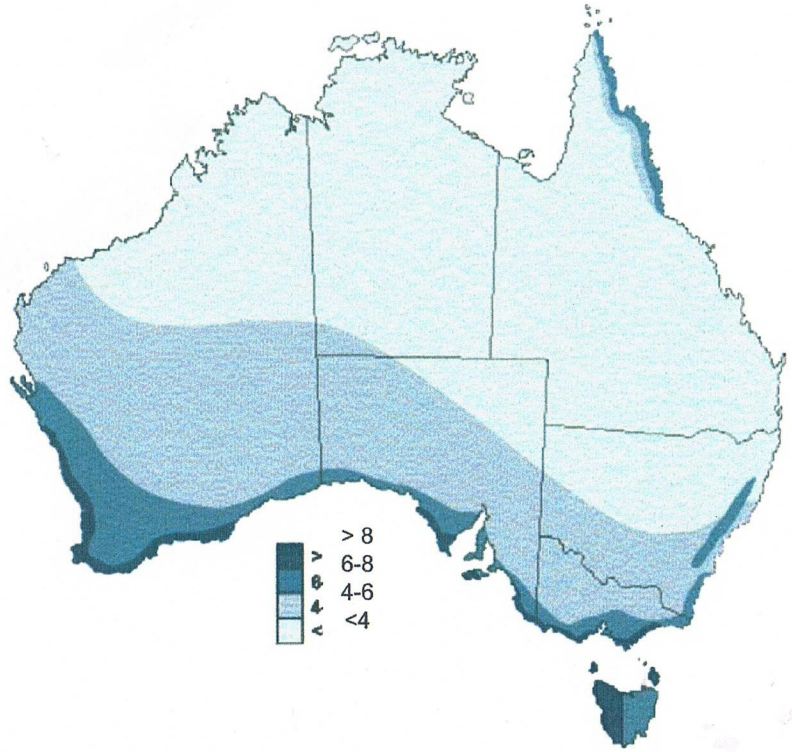
n. The proponent and the owner and the operator of the Wind Farm must report to the Authority issuing the development approval or his nominee and to all neighboring affected landowners :-
    i. Any breach of these conditions;
    ii. Any non-compliance with the conditions attaching to the development approval 6 monthly;
    iii. any update report on compliance with all, or any part, of the conditions of this approval as required by the Approval Agency. Any such update must meet the requirements of the Approval agency and be submitted within such period as the Approval Agency may require.

o. Pre-construction, Construction and Operation the proponent and the owner and the operator of the Wind Farm must meet the requirements of the Approval Agency in respect of the implementation of any measures necessary to ensure compliance with the conditions of this development approval, and general consistency with the development application and/or Initial Assessment Report and any other documents listed in this development approval. The Approval Agency may direct that such a measure be implemented in response to the information contained within any report, plan, correspondence or other document submitted in accordance with the conditions of this approval, within such time as the Approval Agency may require.

Australia: World-class wind resource

Average wind speeds (metres per second)

- Wind resource is best in Tasmania and areas in Western Australia, South Australia and Victoria
- Queensland and the Northern Territory have limited large scale wind potential
- The best development sites are already being taken in Tasmania, South Australia and Western Australia



Source: CSIRO