IN THE SUPREME COURT OF VICTORIA
AT MELBOURNE
COMMON LAW DIVISION
MAJOR TORTS LIST

Not Restricted

S ECI 2020 00471

NOEL UREN and JOHN ZAKULA — Plaintiffs

v

BALD HILLS WIND FARM PTY LTD — Defendant

JUDGE:	Richards J
WHERE HELD:	Melbourne
DATE OF HEARING:	6–10, 13–17, 20–23 September, 12 October 2021
DATE OF JUDGMENT:	25 March 2022
CASE MAY BE CITED AS:	Uren v Bald Hills Wind Farm Pty Ltd
MEDIUM NEUTRAL CITATION:	[2022] VSC 145

TORTS – Nuisance – Private – Wind farm operated by defendant – Plaintiffs complain noise from wind turbines disturbs sleep – Substantial interference with plaintiffs' enjoyment of land – Interference is intermittent and specifically affects plaintiffs' ability to sleep undisturbed at night – Social and public utility of wind farm – Whether plaintiffs hypersensitive – Nature and established uses in locality – Whether wind farm an established use in locality – Whether defendant took reasonable precautions – Noise found to be substantial and unreasonable interference with plaintiffs' enjoyment of land.

PLANNING – Permit compliance – Relevance of permit compliance to private nuisance claim – Noise conditions in planning permit apply New Zealand Standard 6808:1998 *Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators* – Whether wind farm complied with noise conditions in permit – Proper interpretation of noise conditions and NZ Standard – Role of Minister in relation to permit compliance – Minister responsible authority for noise conditions under *Planning and Environment Act 1987* (Vic) – Not for Minister to determine permit compliance – Defendant did not establish compliance with noise conditions in permit.

INJUNCTION – Whether damages an adequate remedy for continuing nuisance – Damages not an adequate remedy – Injunction restraining defendant from continuing to permit noise

from wind turbines to cause nuisance at night and requiring defendant to take necessary measures to abate nuisance – Injunction stayed for three months.

DAMAGES – Damages for past loss of amenity – Aggravated damages – High-handed conduct of defendant – Exemplary damages not awarded.

APPEARANCES:	Counsel	Solicitors
For the Plaintiffs	Ms G Costello QC with Mr J Fetter	DST Legal
For the Defendant	Mr AM Dinelli with Mr EJ Batrouney	Lander & Rogers

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GLOSSARY

Term	Definition
Bald Hills	Bald Hills Wind Farm Pty Ltd, the operator of the Bald Hills wind farm, and the defendant to the proceeding.
Complaint Procedure	Community Noise Complaint Evaluation and Response Procedure, prepared by Bald Hills and endorsed by the Minister on 12 February 2015.
Council	South Gippsland Shire Council.
dB	Decibel, the unit of measure of sound.
dBA or dB(A)	A-weighted decibels, the unit of measure of sound adjusted to reflect the perception of sound to the human ear.
Environment Protection Regulations	*Environment Protection Regulations 2021* (Vic).
EnviroRisk	EnviroRisk Management Pty Ltd.
EPA	Environment Protection Agency.
EPC Agreement	Engineering Procurement and Construction Agreement between Bald Hills and Senvion.
ETSU-R-97	ETSU-R-97 The Assessment and Rating of Noise from Wind Farm 1996.
Hz	Hertz, the unit of measure for the frequency of a sound in cycles per second.
ICG	Infrastructure Capital Group.
IEC DIS 1400-11	A standard published by the International Electrotechnical Commission for applying the Joint Nordic Method, prescribed by the NZ Standard.
IEC61400-11	The revised version of IEC DIS 1400-11, a standard published by the International Electrotechnical Commission for applying the Joint Nordic Method.
ISO1996-2	A standard published by the International Organization for Standardization for applying the Joint Nordic Method.

Term	Definition
ISO1996-2 2007	A standard published by the International Organization for Standardization for applying the Joint Nordic Method, prescribed by the 2010 NZ Standard.
Joint Nordic Method	An objective method for determining the audibility of tones.
L_{90}	The sound level is exceeded for 90% of the measurement period. For example, $L_{90(10\ min)}$ is the level exceeded for 90% of the measurement time of 10 minutes.
L_{95}	The sound level is exceeded for 95% of the measurement period.
m/s	Metres per second.
MDA	Marshall Day Acoustics.
MDA December 2016 report	Report produced by MDA titled 'Assessment of Wind Farm Operational Noise' dated 12 December 2016.
MDA Uren noise report	Report on MDA's findings in relation to Mr Uren's property dated 2 June 2017.
MDA Zakula noise report	Report on MDA's findings in relation to Mr Zakula's property dated 7 March 2017.
Minister	Minister for Planning.
NCTP	Noise compliance testing plan, prepared by MDA and approved by the Minister on 20 August 2015.
Noise Measurement Services	Noise Measurement Services Pty Ltd.
NZ Standard	New Zealand Standard 6808:1998 – *Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators*.
2010 NZ Standard	New Zealand Standard 6808:2010 – *Acoustics – Wind farm noise*.
Panel	The planning panel appointed in 2003 to consider and evaluate submissions made in relation to an application to the Minister for a planning permit for the use and development of land for a wind energy facility.
Permit	Planning permit TRA/03/002 granted by the Minister on 19 August 2004.

Term	Definition
Planning Act	*Planning and Environment Act 1987* (Vic).
Resonate	Resonate Acoustics.
SAC	Special audible characteristic.
Senvion	Senvion GMBH.
SEPP N-1	State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N–1.
Sonus	Sonus Pty Ltd.
Tribunal	Victorian Civil and Administrative Tribunal.
Uren properties	The properties formerly owned by Noel Uren and his brother, Bruce Uren, located at 1550 Buffalo-Waratah Road, Tarwin Lower and 87 Kings Flat Road, Tarwin Lower.
Vestas	Vestas – Australian Wind Technology Pty Ltd.
Wellbeing Act	*Public Health and Wellbeing Act 2008* (Vic).
wind farm	Bald Hills wind farm, located near Tarwin Lower in South Gippsland, Victoria.
WTG	Wind turbine generator.

HER HONOUR:

OVERVIEW

1 The Bald Hills **wind farm** is located near Tarwin Lower in South Gippsland, Victoria. Since it began operating in 2015, the wind farm has received many complaints from neighbouring residents and landowners about noise from the wind turbines. In this proceeding, two of those neighbours, Noel Uren and John Zakula, seek remedies from the operator of the wind farm, **Bald Hills** Wind Farm Pty Ltd, for common law nuisance.

2 From about 1994, Mr Uren lived in a house at 1550 Buffalo-Waratah Road, Tarwin Lower on land that he owned together with his brother, Bruce Uren. The Uren brothers farmed sheep and cattle on that land, and on another property to the north at 87 Kings Flat Road, Tarwin Lower, together the **Uren properties**. Their partnership dissolved in mid-2015 and the Uren properties were sold. The southern property, on which Mr Uren was living, sold on 18 March 2016. By agreement with the new owner, Mr Uren continued living in the house until December 2018, when he moved into the town of Tarwin Lower.

3 Mr Zakula bought his property at 860 Buffalo-Waratah Road, Tarwin Lower in June 2008. He described the land that he bought as a 'cow paddock', on which he planned to establish an organic farm. Mr Zakula established windbreaks of native vegetation around the property, and planted olive, fruit and nut trees. While there was no house on the property when he bought it, there was a planning permit to build a dwelling. Mr Zakula designed and built an energy efficient house on the property, which was completed during 2011. He moved into the house in late 2011 and has lived there since.

4 From the time the wind farm was first proposed in the early 2000s, it has been the subject of considerable local controversy. In 2003, a Planning **Panel** was appointed to consider and evaluate submissions made in relation to an application to the **Minister** for Planning for a planning permit for the use and development of land for a wind

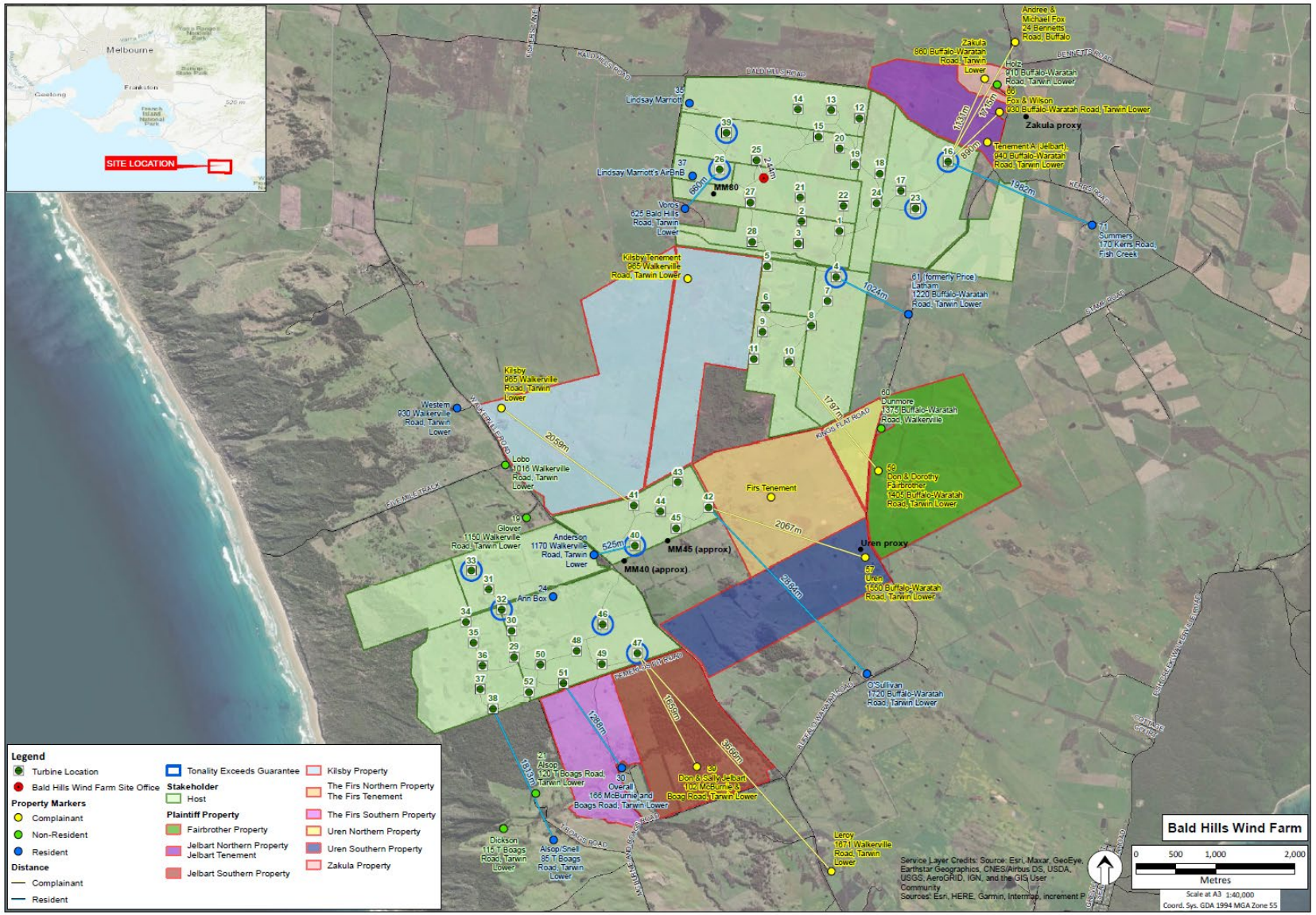
energy facility, and the Environment Effects Statement prepared for the project. The Panel held hearings and conducted site visits in March and April 2004, and reported to the Minister in June 2004. It recommended that a permit be granted, subject to conditions, including conditions in relation to acoustic amenity.

5 The Minister granted planning **permit** TRA/03/002 on 19 August 2004, which allowed the use and development of land 'for a wind energy facility for the generation and transmission of electricity from wind generators, together with associated buildings and works'. The permit allowed the construction of a wind farm of 52 turbines of up to 110 metres each, and included detailed conditions concerning acoustic amenity. The permit prescribed noise conditions, which applied the noise limits and methodology set out in the New Zealand Standard 6808:1998 – *Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators* (**NZ Standard**).

6 Construction of the wind farm commenced in about 2012 and was completed during 2015. The first of the 52 turbines started generating electricity in February 2015, and the wind farm was fully operational by September 2015. It produces up to 380,000 megawatts of electricity each year.

7 **Figure 1** is a map of the wind farm, which comprises three groups of wind turbines — a group of 17 turbines to the south, a central group of six turbines, and a larger northern group of 29 turbines. Mr Uren lived in House 57, to the east of the central group and the north-east of the southern group. Mr Zakula's house is at the north-eastern corner of the map, to the north-east of the northern group of turbines. Certain houses and tenements, and all of the wind turbines, are numbered on the map in Figure 1. Those numbers are used throughout the judgment.

Figure 1: Map of Bald Hills wind farm and surrounding area, tendered by agreement between the parties.



8 During 2015, a number of people who lived near the wind farm complained to its operator about noise from the turbines. The Bald Hills complaint register records 50 complaints received during 2015, all of them about noise, some of them from Mr Uren and Mr Zakula. Bald Hills investigated their complaints made in 2015, and many later complaints. Numerous investigations by Bald Hills' acoustic consultants, Marshall Day Acoustics (**MDA**), concluded that wind farm noise levels at Mr Zakula's and Mr Uren's properties were consistent with the noise conditions in the permit. As a result, Bald Hills took no remedial action in response to any of their complaints.

9 In 2016, Mr Zakula, Mr Uren, and a number of other people complained to the South Gippsland Shire **Council** that a nuisance existed at their properties, caused by noise transmitted by the wind farm. The complainants asked the Council to investigate the nuisance and take action to remedy it, in fulfilment of its statutory responsibility under the *Public Health and* ***Wellbeing Act*** *2008* (Vic). After a lengthy process, the Council resolved on 27 March 2019 that it was satisfied there existed a nuisance of the kind alleged by the complainants, but that the nuisance existed only intermittently. The Council's resolution recorded its opinion that the matter was better settled privately.

10 Bald Hills sought judicial review of the Council's resolution, in a proceeding commenced in this Court on 21 June 2019. Mr Uren, Mr Zakula and the other complainants were later joined as defendants to that proceeding. The proceeding was dismissed in August 2020.[1]

11 In 2017, the ownership and management of the wind farm changed. On 28 February 2017, an investment fund managed by Infrastructure Capital Group (**ICG**) acquired Bald Hills from its former owner, Mitsui & Co Australia Limited. Since March 2017, ICG has been responsible for the management of the wind farm, including overseeing compliance with the permit and managing complaints. James Arthur is a director of both ICG and Bald Hills. The day-to-day operation and maintenance of the wind farm

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1 *Bald Hills Wind Farm Pty Ltd v South Gippsland Shire Council* [2020] VSC 512 (***Bald Hills No 1***).

is contracted to a third party contractor, initially **Senvion** GMBH and, from December 2019, **Vestas** – Australian Wind Technology Pty Ltd.

12 In February 2020, Mr Uren, Mr Zakula and ten of their neighbours commenced this proceeding. The other plaintiffs resolved their claims against Bald Hills before the trial of the proceeding, and were removed as parties. Six of the former plaintiffs — Don and Dorothy Fairbrother, Don and Sally Jelbart, Stuart Kilsby and Alexander McDougall — were called as witnesses by Mr Uren and Mr Zakula.

13 The issues for determination in the proceeding, and my conclusions in relation to each issue, are as follows.

Nuisance

(1) *Has noise from wind turbines on the wind farm operated by Bald Hills caused a substantial interference with the plaintiffs' use and enjoyment of their land?*

Yes. Noise from the turbines on the wind farm has caused a substantial interference with both plaintiffs' enjoyment of their land — specifically, their ability to sleep undisturbed at night, in their own beds in their own homes. The interference has been intermittent and, in Mr Zakula's case, is ongoing. While both Mr Uren and Mr Zakula have been annoyed by the sound of the turbines during the day, it has not substantially interfered with their enjoyment of their properties.

(2) *If yes to question 1, does the burden shift to Bald Hills to establish that the interference was reasonable?*

It is unnecessary to decide this question, because the evidence enables me to make the necessary findings of fact in relation to most issues. Bald Hills accepted that it bore the burden of proof on the one issue on which I may have been left in doubt, which is whether the sound from the turbines received on the plaintiffs' land at all times complied with the noise conditions in the permit.

(3) *What is the nature and extent of the interference?*

The interference does not involve property damage or personal injury. It is an interference with the acoustic amenity of the plaintiffs' properties, in particular their ability to sleep undisturbed in their beds at night. The interference is substantial, albeit intermittent, and in Mr Zakula's case is ongoing.

(4) *Has the sound from the turbines received on the plaintiffs' land at all times complied with the noise conditions in the permit?*

Bald Hills has not established that the sound received at either Mr Uren's house or Mr Zakula's house complied with the noise conditions in the permit at any time. Permit compliance is not determined by the Minister, who is the responsible authority for the permit. While the Minister can initiate enforcement action, it is for the relevant court or tribunal to determine permit compliance.

Bald Hills did not demonstrate compliance with condition 19(a) of the permit, either by the 2021 assessment of noise monitoring data undertaken by its acoustic expert, Christopher Turnbull, or his review of MDA's noise assessments. Mr Turnbull's method for assessing compliance with condition 19(a) was not the method prescribed by the NZ Standard, properly interpreted. MDA initially did not assess compliance at Mr Zakula's house or at Mr Uren's house, but at other nearby locations. The findings of the noise assessment reports MDA produced for Mr Zakula's house in March 2017 and for Mr Zakula's house in June 2017 were plainly flawed.

Neither Mr Turnbull nor MDA demonstrated compliance with condition 19(c), in relation to the night period. Condition 19(c) provides a 'hard measure' for protecting sleep and requires assessment on individual nights.

In addition, neither Mr Turnbull nor MDA properly applied condition 19(b) of the permit in assessing compliance with conditions 19(a) and 19(c).

(5) *If so, what is the relevance of compliance with the noise limits in the permit?*

Demonstrated compliance with the NZ Standard and condition 19 of the permit would not necessarily have established that the noise that from time to time disturbed Mr Uren's and Mr Zakula's sleep was reasonable. Significantly, the NZ Standard sets a limit on the extent to which wind turbine noise may increase continuous underlying noise levels, assessed over a long period. It is not directed to intermittent loud noise from wind turbines, and does not provide a way of assessing whether a wind farm produces unreasonably annoying noise in certain weather conditions, or on a particular night.

(6) *What is the social and public interest value in operating the turbines to generate renewable energy?*

The generation of renewable energy by the wind farm is a socially valuable activity, and it is in the public interest for it to continue. However, there is not a binary choice to be made between the generation of clean energy by the wind farm, and a good night's sleep for its neighbours. It should be possible to achieve both.

(7) *Is either of the plaintiffs hypersensitive to noise from the turbines?*

No. Neither Mr Zakula nor Mr Uren is hypersensitive to wind farm noise.

(8) *What is the character of and the nature of established uses in the locality of the plaintiffs' land?*

Both properties are in a relatively quiet and remote rural locality. Sounds associated with farming activities are typical of the area during the day, but do not cause intrusive noise at night. Traffic on nearby roads is light and usually creates limited disturbance. The wind farm itself cannot be taken into account as an established use in the locality, because it has not established compliance with the noise conditions in the permit or Div 5, Pt 5.3 of the ***Environment***

Protection Regulations *2021* (Vic).

(9) *What precautions has Bald Hills taken to avoid or minimise the interference?*

Bald Hills has not demonstrated compliance with the noise conditions in the permit at Mr Uren's house or at Mr Zakula's house at any time. While Bald Hills investigated and responded to their numerous complaints, it did not take any remedial action to reduce the noise from wind turbines received at either property.

(10) *Could Bald Hills reasonably have taken any other precautions?*

Bald Hills could reasonably have taken at least two further precautions to reduce the noise levels at the plaintiffs' homes. It could have implemented selective noise optimisation of nearby turbines. It could also have remedied the gearbox tonality issue that was identified by MDA in December 2016.

(11) *Having regard to the answers to questions 3 to 10, has the interference with the plaintiffs' use and enjoyment of their land been unreasonable?*

Yes. Noise from the wind turbines on the wind farm has amounted, intermittently at night, to a substantial and unreasonable interference with the plaintiffs' enjoyment of their land. The wind farm noise has been a common law nuisance at both properties.

(12) *If yes to question 11, will noise from the turbines continue to cause a substantial and unreasonable interference with Mr Zakula's use and enjoyment of his land?*

Yes. The nuisance is ongoing at Mr Zakula's property.

Injunction

(13) *If yes to question 12, should an injunction be granted restraining Bald Hills from continuing the nuisance?*

Yes. An injunction to abate the nuisance is the primary remedy sought by

Mr Zakula, and an injunction will be granted. I do not consider that damages would be an adequate remedy, or that I should exercise my discretion to award damages instead of an injunction for any other reason.

(14) *If so, in what terms?*

I will grant an injunction restraining Bald Hills from continuing to permit noise from wind turbines on the wind farm to cause a nuisance at Mr Zakula's house at night, and requiring it to take necessary measures to abate the nuisance. The injunction will be stayed for three months.

Damages

(15) *Is Mr Uren entitled to damages in respect of the alleged decline in value of his share of the Uren properties?*

No.

(16) *If so, what is the quantum of that loss and damage?*

Does not arise.

(17) *Is Mr Uren entitled to any remedy in respect of nuisance after 18 March 2016?*

Yes. Mr Uren had a leasehold interest in the house on the southern property from March 2016 until December 2018, and he is entitled to damages for nuisance for that period.

(18) *If an injunction is not granted to restrain the defendant from continuing the nuisance, is Mr Zakula entitled to any damages in respect of the alleged diminution in value of his land attributable to the nuisance, or the cost of abating the nuisance?*

I have decided to grant an injunction requiring Bald Hills to abate the nuisance. Had I not done so, Mr Zakula would have been entitled to damages for the reduction in value of his property attributable to the nuisance.

(19) *If so, what is the quantum of that loss and damage?*

The noise nuisance from the wind turbines, if it were to continue, would reduce the value of Mr Zakula's property by $200,000.

(20) *Is either plaintiff entitled to damages for distress, inconvenience and annoyance, and if so in what amount?*

Yes. Both plaintiffs are entitled to damages for past loss of amenity, in the amount of $12,000 per year, or $1,000 per month. Mr Uren is entitled to damages of $46,000, and Mr Zakula is entitled to damages of $84,000.

(21) *Should aggravated damages be awarded to either plaintiff, and if so in what amount?*

Yes. Bald Hills' conduct towards both Mr Uren and Mr Zakula was high-handed and warrants an award of aggravated damages. The manner in which Bald Hills dealt with the plaintiffs' reasonable and legitimate complaints of noise, over many years, at least doubled the impact of the loss of amenity each of them suffered at their homes. There will be an award of aggravated damages of $46,000 to Mr Uren, and $84,000 to Mr Zakula.

(22) *Should exemplary damages be awarded to either plaintiff, and if so in what amount?*

No. I do not consider that Bald Hills engaged in conscious wrongdoing or acted in contumelious disregard of the plaintiffs' right to sleep peacefully in their own homes.

(23) *What is the proper measure of each plaintiff's loss and damage, having regard to the answers to questions 15 to 22 above?*

Mr Uren will be awarded damages in the amount of $92,000, comprising $46,000 for past loss of amenity, and $46,000 for aggravated damages. Mr Zakula will be awarded damages of $168,000, comprising $84,000 for past loss of amenity, and $84,000 for aggravated damages.

14 My reasons for those conclusions follow.

NUISANCE

15 A person commits a private nuisance if that person interferes with another person's use or enjoyment of their land in a way that is both substantial and unreasonable. In *Hargrave v Goldman*,[2] Windeyer J described the basis of liability for nuisance in this way:

> In nuisance liability is founded upon a state of affairs, created, adopted or continued by one person (otherwise than in the reasonable and convenient use by him of his own land) which, to a substantial degree, harms another person (an owner or occupier of land) in his enjoyment of his land.

16 Whether an interference is substantial is a question of fact.[3] A substantial interference may involve property damage, personal injury, or harm to an occupier's use or enjoyment of land; for example, by air pollution, vibration, noise or dust.[4] While it does not extend to a trivial interference, or protect those of 'delicate or fastidious' habits,[5] it does include an interference that disturbs an occupier's sleep.[6]

17 Whether an interference is unreasonable is an objective question, to be answered by 'weighing the respective rights of the parties in the use of their land to make a value judgment as to whether the interference is unreasonable'.[7] The authorities direct attention to a range of considerations that may be relevant to the question of reasonableness. These were summarised by the Court of Appeal of Western Australia in ***Southern Properties*** *(WA) Pty Ltd v Executive Director of the Department of Conservation and Land Management*:[8]

> To constitute a nuisance, the interference must be unreasonable. In making that judgment, regard is had to a variety of factors including: the nature and extent of the harm or interference; the social or public interest value in the defendant's

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2 (1963) 110 CLR 40, 62.
3 ***Riverman*** *Orchards Pty Ltd v Hayden* [2017] VSC 379, [179].
4 ***Marsh v Baxter*** (2015) 49 WAR 1, [244] (McClure P).
5 ***Haddon v Lynch*** [1911] VLR 5, 9.
6 *Haddon v Lynch*, 9; *Munro v Southern Dairies Ltd* [1955] VLR 332, 335.
7 ***Southern Properties*** *(WA) Pty Ltd v Executive Director of the Department of Conservation and Land Management* (2012) 42 WAR 287, [119] (McClure P, Buss JA agreeing at [336]).
8 *Southern Properties*, [118] (McClure P, Buss JA agreeing at [336]).

> activity; the hypersensitivity (if any) of the user or use of the claimant's land; the nature of established uses in the locality (eg residential, industrial, rural); whether all reasonable precautions were taken to minimise any interference; and the type of damage suffered.

18 This formulation has been adopted in a subsequent Court of Appeal decision in Western Australia,[9] and has been applied by single judges of this Court.[10]

Issue 1 – A substantial interference?

19 The first issue for determination is whether noise from wind turbines on the wind farm caused a substantial interference with Mr Zakula's and Mr Uren's use and enjoyment of their land. In their pleading, the plaintiffs also claimed that infrasound from the wind turbines constituted a nuisance. However, their case at trial focused on noise alone. They did not separately address infrasound in their evidence or submissions, and neither does this judgment.

Mr Zakula

20 Mr Zakula first saw the wind turbines turning in around March 2015. He became aware of noise from the turbines in about June or July 2015, when he could hear a roaring sound emanating from them. The noise was louder at night time than during the day. He described the sound as a continual roar, 'like the arrival of a train and the train just — but it never stops arriving'.[11] He also said that the noise levels were cyclic, going up and down, and that there was also a regular whooshing noise. He did not attribute the noise to any particular turbine, but to the combined effect of the turbines and the interaction between them — like listening to an orchestra rather than a soloist.

21 According to Mr Zakula, the noise was loudest in cooler conditions, particularly at night. He described having difficulty getting to sleep, and also being woken during the night and then having trouble getting back to sleep. The wind conditions and noise from the turbines that disturbed his sleep were variable and intermittent.

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9 *Ammon v Colonial Leisure Group Pty Ltd* (2019) 55 WAR 366, [121]. See also *Marsh v Baxter*, [248] (McClure P).

10 *Riverman*, [180]–[181]; ***Butler Market Gardens*** *Pty Ltd v GG & PM Burrell Pty Ltd* [2018] VSC 768, [93]; *Bald Hills No 1*, [69]–[70].

11 Transcript, 9 September 2021, 230:11–13.

Mr Zakula said that the noise from the turbines could continue for several days, was extremely disturbing and made him feel as if he was seasick or carsick. There were occasions when he drove to Walkerville beach and slept in his car to escape from the noise. He estimated that he did this two or three times a month between April and September each year, typically after several consecutive nights of sleep disturbance.

22 Mr Zakula was also bothered by wind turbine noise during the day, particularly on cool, still mornings. He said that the noise subsided slightly as the day warmed up, 'but it's still roaring during the day and you walk around the property and the garden and it's in your face'.[12] The turbine noise was less disturbing to him in windier conditions, because it was drowned out by the sound of the wind and the surrounding trees. Daytime noise levels tended to be lower during the warmer months, and louder in the winter months.

23 By September 2015, Mr Zakula had started keeping records of the turbine noise, including when it disturbed his sleep, and had made the first of many complaints to Bald Hills. The Bald Hills complaint register records that on 14 September 2015, Mr Zakula reported:

> - Why are we turning the turbines when there is no wind?
> - Noise is very bad
> - Sounds like a steam train
> - It is an aerodynamic noise. I can hear the blade passing the tower.
> - the Noise from the turbines is varying all the time.
> - Its worst when wind coming from south west.
> - can hear the sound loudest on western side of bedroom
> - can hear a machine Noise as well
> - Believe the machine Noise is coming from the substation
> - there is a steady drone
> - Noise is worst when wind turbines are operated as fans (ie not generating but taking power from grid and being run like a motor)

24 Mr Zakula made 14 more noise complaints to Bald Hills during 2015, initially by

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12 Transcript, 9 September 2021, 236:24–26.

telephone and then, from November 2015, by letter. By that time he felt that it was pointless to keep making telephone calls and repeating the same things over and over again, and so he started to put his complaints in writing. He made notes when he was disturbed by noise from the turbines, which he then compiled into letters to the wind farm. Initially he did this monthly.

25 In January 2016, Mr Zakula replaced the window in the western wall of his bedroom with a solid bluestone wall. He did this to try to reduce the wind turbine noise in his house. While it did reduce the noise levels to some extent, Mr Zakula could still hear roaring and whooshing sounds from the turbines in his bedroom, and the noise continued to disturb his sleep. He no longer leaves the windows and doors open at night, due to noise from the wind farm.

26 Mr Zakula continued to send complaint letters to Bald Hills during 2016. The Bald Hills complaint register records eight complaints from Mr Zakula in 2016, all of them in similar terms. For example, on 19 October 2016, Mr Zakula wrote to Matthew Croome, the general manager of the wind farm at that time, as follows:

> As previously stated I have significant concerns regarding the disturbing nuisance noise generated by the Bald Hills Wind Farm and the manner in which they are operated.
>
> I formally lodge a nuisance noise complaint at the following times.

September 3rd 2016	0700hrs	All night
September 4th	0600hrs	All night
September 8th	0600hrs	All night
September 9th	0600hrs	All night
September 14th	0700hrs	All night
September 18th	0400hrs	All night
September 19th	0500hrs	All night
September 21st	0700hrs	All night
September 24th	0400hrs	All night
September 30th	0600	All night

> The noise is causing me considerable disturbance and is seriously affecting my sleep as can be seen in the early morning disturbances. This situation is affecting my health causing anxiety and stress, headaches and other issues. The noise is severe and at its worst at night time and is [continuous] throughout the entire night and days and has been ongoing since the startup of the industrial facility. I also have information that these sound levels exceed the background levels including night time levels as specified in the Planning Permit.
>
> I also note there are significantly notable Special Audible Characteristics produced for a significant period of the night (2200 to 0800 hrs) exceeding the night time specifications defined in the Planning Permit and consistent with previous noise nuisance complaints.

27 At the trial, Mr Zakula said that he was still experiencing the same noise levels from the wind farm that he had complained about in 2015 and 2016. The noise was more disturbing during the cooler months, less so in the summer months. It tended to be louder when the wind was coming from the west, particularly the south-west in the cooler seasons, and when the wind speed was in the low to medium range.

28 In cross-examination, Mr Zakula agreed that other stresses in his life, in particular litigation he had been involved in, may also have contributed to his inability to sleep. He agreed that he had become passionately opposed to the wind farm over the last six years. I understood that his opposition had developed because of the wind turbine noise at his property, which he believed did not comply with the permit. Mr Zakula rejected the suggestion that his opposition to the wind farm might have affected his perception of the noise from the turbines or the sleep disturbance he was experiencing.

29 After 2016, Mr Zakula continued to keep records of turbine noise that disturbed him, although his complaint letters became less frequent. I have reviewed those records, as well as his complaints. The records are consistent with Mr Zakula's evidence about noise disturbance from the wind farm from 2015 onwards. Between September 2015 and December 2019, he recorded more than 450 nights on which his sleep was disturbed by wind turbine noise, including 11 nights on which he could not sleep at all.

30 I do not consider that Mr Zakula exaggerated his perception of the wind turbine noise,

or its effects on his sleep. I will deal later in this judgment with the separate question of whether he is hypersensitive to wind turbine noise.[13]

31 Bald Hills relied on the evidence of its acoustic expert, Christopher Turnbull, and his conclusions that wind turbine noise measured at Mr Zakula's property in 2021 did not exceed the acceptable limit under the NZ Standard, 40 dB(A), at any wind speed. It submitted that this was not a substantial level of noise. I will examine the acoustic evidence in detail below, including the methodology for assessing wind turbine noise that is prescribed by the permit and the NZ Standard. At this point it is sufficient to note that Mr Turnbull's conclusions concern average sound levels attributed to wind turbines at Mr Zakula's property, measured over a six week period between February and April 2021. They do not negate Mr Zakula's description of variable and intermittently loud noise from the wind farm, which disturbs his sleep only at some times and in some conditions.

32 I find that noise from the turbines on the wind farm has woken Mr Zakula or kept him awake on hundreds of occasions since June 2015. There were nights when he was unable to sleep at all. There were others when he left home and slept in his car at Walkerville beach to escape the noise. On any view, this amounts to a substantial interference with Mr Zakula's enjoyment of his property at night — specifically, his ability to sleep undisturbed in his own bed in his own house on his own rural property.[14] The interference is intermittent, but ongoing. While Mr Zakula is annoyed by the sound of the turbines during the day, it does not substantially interfere with his enjoyment of his property.

Mr Uren

33 Mr Uren said that after the wind farm began operating in 2015 he could hear noise from the turbines inside his house. The noise varied. He could hear the 'whoosh, whoosh' sound of the blades turning, sometimes there was a 'rolling noise', sometimes there was a 'real roaring going on', like a car over-governing, and at other times there

13 See [245]–[294] below.
14 See [16] above.

was a mechanical noise, like engine brakes on a big truck. Mr Uren noticed these noises from the wind farm more often when the atmosphere was cool, especially in the wintertime, and he said he 'used to cop it' when a northerly or north-westerly wind was blowing.

34 These noises interrupted Mr Uren's sleep. He said he could be woken 'at all hours of the night'. Quite often he moved from his bedroom to the lounge, where he would turn the radio on and sleep on the couch. It was not noisy all the time: sometimes there would be no noise, and at other times he was woken two or three times in a week. The noise gave him headaches, which he just put up with. As well as sleeping in the lounge, Mr Uren sometimes went to a friend's place and camped the night there.

35 Mr Uren could also hear noise from the turbines when he was out working on the farm during the day. The noise was very annoying, but he was able to put up with it.

36 There are a total of 36 complaints from Mr Uren recorded in the Bald Hills complaint register between March 2015 and April 2018, most of them in autumn and winter. His complaints were consistent with his evidence about the noises he heard, the weather conditions in which he heard them, and their effect on his sleep. For example, on 5 May 2015, Mr Uren reported:

> - He was woken from his sleep about 4:40am by [noise] from the turbines which he could hear inside his house
> - He believes the wind was a westerly or north westerly
> - Seems again the noise occurred when wind was at lower levels as he couldn't hear presently
>
> …

A year later, on 5 May 2016, Mr Uren complained:

> - Woken at 5 am this morning
> - Woke with headache
> - Could hear the turbines over the radio
> - Fell asleep with the radio on but could hear it over the radio when I woke

37 Mr Uren also kept handwritten notes of when he was disturbed by wind turbine noise in 2016, 2017 and 2018. I have reviewed these notes, which are consistent with the evidence Mr Uren gave about his experience of the turbine noise, and when it was most disturbing. His notes confirm that the noise interrupted his sleep intermittently, and that this occurred most often in the cooler months.

38 Together, the Bald Hills complaint register and Mr Uren's notes record around 100 occasions on which his sleep was disturbed by wind turbine noise between May 2015 and November 2018. Mr Uren's irritation about repeatedly being woken or kept awake is evident from these records.

39 It was put to Mr Uren that his long standing opposition to the wind farm had affected his perception of the noise he heard from the turbines. He rejected that suggestion. I accept his evidence of his subjective experience of the wind turbine noise. I consider below whether he was overly sensitive to, or unreasonably annoyed by, wind farm noise.[15]

40 I find that wind turbine noise disturbed Mr Uren's sleep, waking him or keeping him awake, or both, on around 100 occasions between May 2015 and December 2018. His sleep was disturbed by turbine noise on six separate nights before the land was sold in March 2016. The remaining disturbances occurred after the sale, while Mr Uren was still living in the house with the agreement of the new owner. I am satisfied that this amounted to a substantial interference with his enjoyment of the property at night.[16] During the day, however, the turbine noise was annoying but bearable.

41 For the reasons discussed at [31] above, Mr Uren's evidence was not controverted by Mr Turnbull's conclusion that wind turbine noise measured at the southern Uren property in 2021 did not exceed 40 dB(A) at any wind speed.

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15 See [245]–[294] below.

16 The nature of Mr Uren's interest in the property after the sale in March 2016 is discussed at [357]–[363] below.

Issue 2 – A shifting burden?

42 As mentioned, this is not the first proceeding in this Court about whether noise from the wind farm is a nuisance. In *Bald Hills Wind Farm Pty Ltd v South Gippsland Shire Council* (***Bald Hills No 1***),[17] I dismissed Bald Hills' challenge to the Council's resolution expressing its satisfaction that 'there exists a nuisance of the kind alleged by the complainants' and noting that 'the nuisance exists only intermittently'. The resolution was the culmination of a number of noise complaints made to the Council under s 62 of the Wellbeing Act, including complaints by Mr Zakula and Mr Uren.

43 It was common ground in *Bald Hills No 1* that a 'nuisance' for the purposes of Pt 6, Div 1 of the Wellbeing Act is a nuisance at common law. It was also not in contention that the case was concerned with complaints of private nuisance — that is, that noise from the wind farm was interfering with the complainants' use and enjoyment of their land in a way that was both substantial and unreasonable. My summary of the elements of the tort of private nuisance was in essentially the same terms as the summary set out at [15] to [18] above.[18] In addition, I said:[19]

> Once a substantial interference has been established, there is a *prima facie* case of nuisance. In a civil claim for nuisance, the evidentiary burden shifts to the person who created the substantial interference to demonstrate that it was reasonable.

44 The shifting burden was one of my reasons for concluding that the 'reasonableness factors' enumerated by McClure P in *Southern Properties* were not mandatory relevant considerations for the Council in making a finding under s 62(3) of the Wellbeing Act. My reasoning was as follows:[20]

> Fourth, the common law position is that a substantial interference with a person's enjoyment of their land is *prima facie* a nuisance, unless the person creating the interference can show it to be reasonable. This may be done by, for example, demonstrating that the person took reasonable precautions to avoid the interference, that the interference is justified by its social utility, or that the interference arises from an activity that is an established use in the locality. Bald Hills' submission did not take into account that it bore the onus

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17 [2020] VSC 512.

18 *Bald Hills No 1*, [66]–[67], [69]–[70].

19 *Bald Hills No 1*, [68], citing ***Kraemers*** *v Attorney General (Tasmania)* [1966] Tas SR 113, 122–5 (Burbury CJ); *Southern Properties*, [119] (McClure P, Buss JA agreeing at [336]); *Butler Market Gardens*, [100].

20 *Bald Hills No 1*, [81].

> of satisfying the Council that its interference with the complainants' enjoyment of their land was reasonable, by drawing the Council's attention to relevant matters. As discussed below, in performing its function under s 62(3), the Council was obliged to have regard to relevant material put forward by Bald Hills. However, it did not also have to work through a mandatory checklist of the *Southern Properties* reasonableness factors before making a finding that a nuisance existed.

45 Bald Hills did not appeal my decision in *Bald Hills No 1*. However, in this proceeding, it submitted that there is no shift in the evidentiary burden of proof of substantial interference. In other words, it submitted that I should not follow that aspect of my reasoning in *Bald Hills No 1*, which was informed by a similar conclusion in *Butler Market Gardens Pty Ltd v GG & PM Burrell Pty Ltd*.[21] Bald Hills argued that the burden only shifts where the plaintiff proves some damage to property, while in cases involving personal discomfort the burden remains with the plaintiff on all issues.[22]

46 This submission raised a number of interesting questions about the common law of nuisance, the coherence of the law of torts, *res judicata* and issue estoppel. In the event, it is not necessary to determine any of these questions.

47 According to the author of *Cross on Evidence*, there are 'four occasions upon which it is vitally important to know which of the two parties to litigation has the burden of proof on a given issue'.[23] These are 'when there is a dispute concerning the right to begin calling evidence …; when there is a submission of no case to answer; when the tribunal of fact is left in doubt; and when an appellate court is considering the correctness of a judgment or summing up related to the burden of proof'.[24]

48 In this case there was no dispute about the course of evidence, and Bald Hills did not make a submission of no case to answer. Both sides adduced abundant evidence directed to the question of reasonableness. Bald Hills pleaded a number of specific

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21 [2018] VSC 768, [100].

22 Referring to *Kraemers*, 119, 122; *St Helen's Smelting Co v Tipping* (1865) 11 HLC 642, 650; 11 ER 1483, 1486 (Lord Westbury LC); *Corbett v Pallas* (1995) 86 LGERA 312, 316–17 (Priestley JA); *Gartner v Kidman* (1962) 108 CLR 12, 48 (Windeyer J, Dixon CJ agreeing at 15); *Owners Corporation SP 46510 v Tan* [2020] NSWSC 1564, [55]–[56].

23 LexisNexis, *Cross on Evidence* (online at 17 March 2022) [7001].

24 Ibid.

matters in its defence — the nature and extent of any harm or interference; the social or public interest value in its generation of renewable energy; the hypersensitivity of the plaintiffs; the nature of established uses in the locality; the reasonable precautions it had taken to minimise any interference; compliance with the permit conditions relating to noise; and the type of damage suffered by the plaintiffs.[25] Unsurprisingly, Bald Hills led evidence in relation to the matters raised in its pleading. With one possible exception, I am in a position to make findings in relation to those matters based on the whole of the evidence.

49 The issue on which I may have been left in doubt is whether the sound from the turbines received on the plaintiffs' land at all times complied with the noise conditions in the permit. Bald Hills accepted without equivocation that it bore the burden of proof on that issue.[26] That being the case, there is no need to consider whether I should revisit what I said in *Bald Hills No 1* about the shifting burden of proof in the tort of nuisance.

Issue 3 – Nature and extent of interference

50 As Bald Hills pointed out, the interference in this case does not involve property damage or personal injury. It is an interference with the acoustic amenity of the plaintiffs' properties. I have already made findings about the nature and extent of the interference, which is substantial, albeit intermittent.[27] In Mr Zakula's case, the interference is ongoing.

51 I will consider Bald Hills' submission that Mr Zakula and Mr Uren's perception of noise from the wind farm was influenced by non-acoustic factors, specifically their long-standing opposition to the wind farm, when I come to the issue of hypersensitivity.[28]

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25 Defence to further amended statement of claim dated 26 August 2021, [28A], [28B].
26 Transcript, 12 October 2021, 1399:21–1400:13, 1409:29–1410:5.
27 See [32] and [40] above.
28 See [245]–[251] below.

Issue 4 – Planning permit compliance

52 Bald Hills contended that the sound from the turbines received on the plaintiffs' land complied with the noise conditions in the permit. This was a central component of its defence to the plaintiffs' claim that noise from the turbines has since 2015 amounted to a nuisance.[29] As mentioned, Bald Hills accepted that it bore the burden of proving that it had complied with the permit conditions that regulate wind turbine noise.

53 The question of permit compliance is a complex one, which must be answered in many parts. I begin with an outline of the noise conditions in the permit, the NZ Standard, and the steps taken by Bald Hills to demonstrate compliance with the permit. It is necessary to consider the role of the Minister in determining permit compliance, an issue that assumed some importance. I then describe the responses by Bald Hills to the plaintiffs' noise complaints, including outlining the methodology used by MDA to investigate their complaints. Next, I refer to the expert acoustic evidence, in particular the evidence of Mr Turnbull that was relied on by Bald Hills. I then reach conclusions as to whether Bald Hills has demonstrated compliance with each of conditions 19(a), 19(b) and 19(c) at the plaintiffs' properties.

Permit conditions

54 Conditions 18 to 25 of the permit relate to noise. They provide:

> 18) Before the development starts, new local background sound level measurements shall be taken at the following properties:
>
> - 930 Buffalo Waratah Road, Tarwin Lower, Lot 1 LP140966, Parish of Tarwin South
> - 1150 Tarwin Lower Waratah Road, Tarwin Lower, Lot 1 TP431975.
>
> 19) The operation of the wind energy facility must comply with the New Zealand Standard 'Acoustics — The Assessment and Measurement of Sound from Wind Turbine Generators' (NZ 6806:1998)[30] (the 'New Zealand Standard'), in relation to any dwelling existing at the date of approval of this document to the satisfaction of the Minister for Planning.

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29 Defence to further amended statement of claim dated 26 August 2021, [28](b)(ii), (d), [28B].

30 There appears to be a typographical error in permit condition 19 – the correct number of the NZ Standard is NZS 6808:1998.

In determining compliance with the New Zealand Standard, the following apply:

(a) The sound level from the wind energy facility, when measured outdoors within 10 metres of a dwelling at any relevant nominated wind speed, should not exceed the background level (L95) by more than 5dBA or a level of 40dBA L95, whichever is the greater.

(b) When sound has a special audible characteristic, the measured sound level of the source shall have a 5 dB penalty applied.

(c) Compliance at night must be separately assessed with regard to night time data. For these purposes the night is as defined in SEPP — N1. For sleep protection purposes, a breach of the standard set out at 19(a), for 10% of the night, amounts to a breach of the condition.

20) Condition 19 does not apply if an agreement has been reached with a specific landowner through which the landowner accepts predicted noise levels and/or appropriate acoustic attenuation measures are installed for the landowner to ensure a reasonable level of acoustic amenity in relation to the indoor habitable areas of any dwelling, and acknowledges that the operation of the wind energy facility may still generate noise in outdoor areas on the land which may from time to time exceed the New Zealand Standard.

21) Before the use commences, details of a noise complaint, evaluation and response process must be submitted to and approved by the Minister for Planning to address any alleged breaches of Condition 19. This evaluation process should include, but not be limited to the following components:

(a) A noise complaint telephone service.

(b) Details of validity requirements for noise complaints (that is: date, time, noise description and weather conditions at the receptor).

(c) Response protocol to valid noise complaints.

(d) A register of complaints, responses and rectifications which may be inspected by the Minister for Planning.

(e) Provision for review of the complaint and evaluation process, including review of the process 6 months after commencement of the operation of the wind energy facility.

22) Where condition 19 is found to have been breached, the Minister for Planning shall notify the wind energy facility operator, with a request that steps be taken to ascertain the relevant meteorological circumstances at the time of breach and to noise optimise the operation of the relevant turbine or turbines in such circumstances. If there is a further breach in similar circumstances, the Minister for Planning shall

notify the wind energy facility operator, with a request to noise selectively shut down the operation of the relevant turbine or turbines in those circumstances. In circumstances where optimisation or selective shutdown routines have been requested but not reasonably implemented, or have been implemented but have not prevented further instances of recorded breach, the relevant turbine or turbines will be required to be decommissioned and removed.

23) An independent post-construction noise monitoring program must be commissioned by the Minister for Planning within 2 months from the commissioning of the first generator and continue for 12 months after the commissioning of the last generator to the satisfaction of the Minister for Planning. The program must be carried out in accordance with the New Zealand standard as varied by condition 19 (a), (b) and (c) above. The permit holder must pay the reasonable costs of the monitoring program.

24) An independent report summarising the results of the monitoring program, and the data collected, and indicating compliance or non compliance with the New Zealand Standard, must be forwarded to the Minister for Planning within 45 days of the end of each the monitoring period. The results must be written in plain English and formatted for reading by lay people.

25) The Minister for Planning must make a copy of the report and any data available as soon as practicable during office hours for any person to inspect free of charge.

55 Conditions 28 and 29 set out the process for determining the dwellings at which condition 19 applies. They provide:

28) Prior to the preparation of the development plan, a plan shall be prepared to the satisfaction of the Minister for Planning showing all farm tenements neighbouring the development site (including those separated from the site by a road), and the location of existing houses on each separate tenement, as at 24 June 2004 (the 'tenement plan'). In the event that there are any tenements over 40 ha in area without an existing house, a potential house site for the tenement should be identified after consultation with the tenement owner. The Minister for Planning may indicate satisfaction with an otherwise reasonable plan that does not address the issues raised by all consultees.

29) Where a dwelling site is shown on an approved tenement plan, it shall be considered as an existing dwelling for the purposes of all other relevant conditions in this permit.

56 These permit conditions accord with the recommendations of the Panel that considered the permit application and the environment effects statement for the wind farm in 2004. The Panel's report was titled 'Bald Hills Wind Farm Project: EES, EES

Supplement and Called-in Permits' (**Panel Report**). Chapter 13 of the Panel Report concerned acoustic amenity — that is, 'the enjoyment of the place in which one lives or works, without undue or unreasonable exposure to unwanted sound that is a by-product of adjacent land uses'.[31]

57 The Panel noted that there was a high level of concern from the public about the acoustic impact of the proposed wind farm, including in relation to the adequacy of the NZ Standard. The South Gippsland Planning Scheme incorporated the Policy and Planning Guidelines for the Development of Wind Energy Facilities in Victoria dated May 2003, which required the adoption of the NZ Standard as the standard for acoustic amenity. The Panel accepted that compliance with the NZ Standard was a criterion to be met, but expressed some reservations about the 'considerable room for manoeuvre' in interpreting the standard and difficulties in enforcing it. The Panel adopted an additional criterion of protecting residents in a dwelling from undue sleep disturbance due to wind farm noise.[32]

58 The Panel explained its concerns about night time noise levels:[33]

> Compliance with NZS 6808 using long periods of averaged data that does not differentiate between day and night hours has the potential to expose sensitive receptors to significant levels of adverse noise impact. However, the standard explicitly contemplates the use of a defined night time or other exceedence period to ensure that emissions and effects are properly evaluated for the purposes of setting performance requirements.
>
> It is possible that stable air conditions at night may result is significant increases in predicted noise emissions, as found in the work of Fritz van den Berg at Wind Park Rhede, located in Europe on the Germany – Netherlands border. This effect can manifest in an area significantly larger than predicted in normal acoustic modelling being subject to significant tonal variations, experienced as cyclic beats. However, little work has been done to demonstrate whether the van den Berg effect is specific to Rhede or is found in other locations with more or less severity. Whilst the adverse impact of such an effect on sensitive receptors could be significant, it has not been demonstrated as being likely to be experienced on and around the project site.
>
> The 5dbA penalty provisions of NZS 6808 could apply if a van den Berg phenomenon of annoying tonal variations and cyclic beats was found to occur

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31 *Bald Hills Wind Farm Project: EES, EES Supplement and Called-in Permits* (**Panel Report**, 24 June 2004) 192.
32 Ibid, 194.
33 Ibid, 209–10.

on the subject site.

The proponent has established that it is technically feasible and considers that it is appropriate to noise optimise (ie reduce power yield) or even switch off individual or groups of turbines under particular wind or other climatic conditions, as a means of controlling adverse acoustic impacts in breach of a relevant approval condition or standard.

The absence of an independent entity charged with acoustic condition compliance monitoring adds considerably to difficulties in assessing operational performance in the face of noise complaints. Municipalities are not likely to possess the budgets or the expertise necessary to monitor or enforce wind farm acoustic conditions. The Department of Sustainability and Environment Planning and Building and/or Regional Services Divisions do not directly possess the expertise necessary to monitor or enforce wind farm acoustic conditions. The EPA possesses the theoretical expertise to carry out this task but lacks a formal role under the planning scheme or SEPP.

59 The recommendations of the Panel in relation to acoustic amenity were:[34]

Before the commencement of construction, new local backgrounds should be taken at the Fox and Burfield properties.

Where the relevant acoustic performance standard for a dwelling cannot be met on a proponent stakeholder property, the property owner should enter into an agreement under section 173 of the Act, providing that the dwelling may only be occupied by a person who is a shareholder in or entitled to receipt of turbine rents from the project, and the family of such a person.

A night compliance period should be defined for the purposes of NZS 6808. Of preference, this should be the night as defined in SEPP – N1. Within the defined night period, the wind energy facility should not exceed the standard more than 10% of the time. This approach should protect the interests of occupants in undisturbed sleep.

In accordance with NZ 6808, a 5dbA penalty should apply to noise experienced at sensitive receptors that contains annoying tonal variations and cyclic beats.

For the purpose of meeting any limit pursuant to NZS 6808, including a 5dBA penalty limit, the proponent is entitled to seek to demonstrate to the satisfaction of the responsible authority that time or climate responsive acoustic optimisation and/or temporary turbine shutdown regimes can be implemented, before enforcement is commenced seeking the permanent removal of a turbine or turbines.

In this case, the Minister for Planning should retain the ongoing responsibility for monitoring and enforcing acoustic conditions. The proponent should underwrite the actual cost of a monitoring programme to the satisfaction of the Minister.

In the medium term, consideration should be given to the establishment of a

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34 Ibid, 210.

role for the EPA in monitoring and enforcing acoustic conditions.

In the medium term, consideration should be given to the use of a SEPP or other relevant Victorian standard to define the specific application of NZS 6808 and or the forthcoming Australian Standard to wind energy facilities within Victoria.

NZ Standard

60 The NZ Standard provided a method for predicting and measuring sound from wind turbine generators, referred to as 'WTGs', and the assessment of the received sound. It also provided 'guidance on the limits of acceptability for sound received at residential and noise sensitive locations emitted from both windfarms and single WTGs'.[35] The introductory paragraphs of the NZ Standard explained that wind turbine specific guidelines were needed because other acoustic standards were unsuitable for measuring sound from wind turbines in the presence of wind.

61 Section 4 of the NZ Standard dealt with preliminary planning and pre-installation issues. Clause 4.4 provided a guide to acceptable limits, in the following terms:

> **4.4.1** *Background*
>
> In order to determine acceptability of predicted WTG L_R or windfarm sound levels it is necessary to compare these predicted levels with background sound levels measured in accordance with 4.5. The measured background sound levels are used to quantify the existing sound climate which can be quite low as WTG sites are often located in areas with a rural character. In order to provide a satisfactory level of protection against the potential adverse effects of WTG sounds, this Standard recommends an upper limit of acceptable WTG sound levels outdoors at the residential locations of 40 dBA L_{95} (refer to 4.4.2). This has been based on an internationally accepted indoor sound level of 30 to 35 dBA L_{eq} commonly used as a design level to protect against sleep disturbance (refer Berglund & Lindvall). See 4.4.2, Notes (1) and (2) for the relationship between L_{eq} and L_{95}. A reduction from outdoors to indoors of typically 10 dB with open windows has been assumed.
>
> **4.4.2** *Acceptable limit*
>
> As a guide to the limits of acceptability, the sound level from the WTG (or windfarm) should not exceed, at any residential site, and at any of the nominated windspeeds, the background sound level (L_{95}) by more than 5 dBA, or a level of 40 dBA L_{95}, whichever is the greater.

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35 New Zealand Standard 6808:1998 – *Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators*, 3 – Foreword (**NZ Standard**).

NOTE –

(1) The level predicted (L_R) is based on the Leq source level of the turbines under consideration and hence the predicted level is also an L_{eq} level. This predicted level needs to be assessed against a recommended acceptable level and possibly a measured background level, both determined using an L_{95} descriptor.

(2) Overseas studies on windfarm sound (refer ETSU-R-97), have shown that L_{95} is typically 1.5 dB – 2.5 dB lower than L_{eq} measured over the same period. Similarly L_{eq} is typically 1.5 dB – 2.5 dB lower than L_{10}, assuming a normal distribution of sound levels. Hence L_{95} is typically 5 dB lower than L_{10}. For this reason, a 5 dB only margin should be applied above the L_{95} results, rather than the "background plus 10" approach which, subject to specified reservations, is taken in NZS 6802.

4.4.3 *Special audible characteristics*

These limits of acceptability are specified without any adjustment applied for special audible characteristics. Predicted or measured L_R levels from WTGs with known special audible characteristics shall be adjusted by adding +5 to the level. This adjustment is a penalty to account for the adverse subjective response likely to be aroused by sounds containing such characteristics (see section 5.3 for compliance assessment for sounds containing special audible characteristics).

4.4.4 *Territorial Authority compliance level*

Nothing in this Standard prevents the Territorial Local Authority from specifying an alternative compliance level (at residences or noise sensitive areas) on a site-by-site basis, taking into account individual circumstances and characteristics (e.g. distance to WTG(s), other sound sources, amenity values, etc.).

62 Clause 4.5 set out the method for carrying out background sound level measurements:

4.5.1

This Standard recommends that background sound level measurements be carried out where predicted sound levels of 35 dBA or higher are calculated for the relevant locations. It is recommended that measurement positions be selected to include locations at or within the nearest affected residential property boundary, (the notional boundary – if a rural property), and near the location of representative positions for any other residential locations within the vicinity of a WTG or windfarm.

4.5.2

The locations selected for sound level measurements shall be more than 5 metres from any significant vertical reflecting surface, or other structures or objects (such as trees, power lines, etc.) so that "natural" wind sound generated at or near the microphone is excluded as far as possible from the measurements. The microphone shall be protected from extraneous wind sound by using a manufacturer's purpose designed wind shield. Instrumentation shall be in accordance with section 4 of NZS 6801. In addition,

cables, supporting tripods and any other equipment associated with the measurement system shall be so secured as to avoid extraneous wind sound generated in close proximity to the microphone.

NOTE – If a particular residential location is, for example, surrounded by trees, some of the tree induced background sound may be considered as part of the general overall background sound at that location. For locations influenced by such factors as traffic noise, the background sound level measurements should include times in the early morning when traffic noise drops to a minimum.

4.5.3

Background L_{95} levels shall be measured in accordance with NZS 6801 at positions indicated in 4.5.1. Concurrent measurement of windspeed and direction shall be taken within the windfarm site at a known height above ground level.

NOTE – As background sound level measurements vary as a function of windspeed and direction, it is necessary to undertake measurements of windspeed and direction concurrently with background sound level measurements.

4.5.4

For the measurement of background levels, the same location should be used for the measurement of windspeed and direction before and after installation. Care must be taken to ensure the measurement of windspeed and direction is not significantly affected by the WTG(s). Measurement time intervals should be synchronized to allow for meaningful correlation of wind data with measured background sound levels. Monitored data should cover the range of windspeeds and wind directions generally expected at the windfarm site.

4.5.5

Background sound level measurements shall be correlated with the windspeeds measured at the windfarm or WTG site. A regression curve shall be used to describe the average background sound level versus the windfarm windspeed relationship. It may be necessary to separately correlate background sound levels with windspeed for different wind directions and/or time of day.

4.5.6

Background sound level measurements (L_{95}) shall be conducted in accordance with NZS 6801 excluding any reference to 'Zero Met' conditions (see 5.3.3 of NZS 6801), and measurement positions less than 5 metres from reflecting surfaces (see 5.2.2 of NZS 6801). Data should be obtained for the windspeed range of 5 m/s – 8m/s, i.e. slightly above the typical cut-in windspeed of currently commercially available WTGs.

NOTE – It is suggested that 10 minute L_{95} background sound measurements be taken at the relevant residential and/or other noise sensitive locations over the required range of windspeeds and wind directions as measured within the windfarm area. Most importantly, this should cover the lower range of windspeeds within which it is anticipated that the wind turbine sound would be most noticeable. It is expected that, at least, 10 to 14 days of continuous monitoring will be required to give a suitable range

of data. Typically, this will result in excess of 1440 data points which should be plotted against the appropriate corresponding windspeed data. The windspeed should be monitored on the windfarm site and measured preferably at the WTG hub height. Windspeed should also be monitored over a 10 minute time period and be average values. Having a number of data pairs (windspeed and sound level), the regression curve can be fitted to the data to obtain the function relating the windspeed and the existing background sound level.

63 Section 5 provided a method for post-installation sound compliance testing:

5.1 Section overview

5.1.1

This section outlines a precise method for the post installation compliance testing of sound from WTGs in the far field, i.e. at distances where the cyclic variations in sound due to blade rotation are no longer discernible. The procedure is based upon the method outlined in 4.5 with the exception that the WTGs will now be operational. Acceptable limits are outlined in 4.4.2.

5.1.2

Once the WTG (or windfarm) is installed and operational, it may be necessary to monitor the sound level in the surrounding area. If so, measurements shall be taken of the sound level, and in addition, consideration needs to be given as to whether there are any special audible characteristics of the sound which may justify analysis and possible application of a penalty which must be taken into account when determining acceptability (see 4.4.3).

5.2 Compliance level testing

(NOTE – The procedure outlined below should be followed whether or not background sound levels have been measured.)

5.2.1

Sound from WTGs shall, where practical, be measured at the same locations where the background sound levels were determined. The method of measurement shall be consistent with the measurement of background sound levels as described in 4.5 with the exception that the WTG (or complete windfarm) will now be operational.

5.2.2

Compliance level testing shall take place at the same positions and across a similar range of wind conditions for which background sound level data has been previously collected.

5.2.3

As with the background sound level measurements, the compliance level testing shall take place at known windspeeds in the range 0 m/s to rated windspeed (typically 13 m/s – 15 m/s) measured at an anemometer height consistent with the background level measurements. As a check on sound

levels generated at higher windspeeds, it is necessary to obtain measurements at windspeeds in excess of 15 m/s. For dual-speed WTGs, this shall be above the cut-in speed for the higher generating capacity.

NOTE – WTG sound measurements should be taken over a representative range of windspeeds and directions, each measurement being typically 10 minutes in time duration, as described above for background sound level determination. If typically 1440 data points were collected over the required windspeed range, it would be possible to repeat the regression analysis.

An assessment of any special audible characteristics should be undertaken.

5.3 Special audible characteristics

5.3.1

Sound from a WTG that has special audible characteristics (clearly audible tones, impulses, or modulation of sound levels) is likely to arouse adverse community response at lower levels than sound without such characteristics. At present, there is no simple objective procedure available to quantify special audible characteristics, and subjective assessment is therefore necessary, supported by objective evidence (e.g. frequency analysis) where appropriate.

5.3.2

When sound has a special audible characteristic, the measured sound level of the source shall have a 5 dB penalty applied. This is because the subjective reaction to a sound containing a special audible characteristic is generally found to be similar to a sound 5 dB louder, but without the special audible characteristic. A maximum penalty of 5 dB shall be applied by adjustment of the measured sound level by arithmetic addition of +5 dB.

NOTE – The objective method for determining whether a sound exhibits a tonal character shall be that used in IEC DIS 1400-11 for assessing wind turbine tonal character close to the turbine, i.e. The Joint Nordic Method. The method takes a number of narrow band spectra over a period of 2 minutes and compares the sound level of the tonal frequency to the 'masking sound level' in that of a critical band positioned around the tonal frequency. As the method takes the five highest tonal values within the 2 minute monitored period, it automatically considers those cases where the sound level of the tonal frequency is fluctuating.

5.4 Compliance assessment

To determine conformance with the limits set out in 4.4.2, a comparison shall be made between the best fit regression line of the background sound levels and the regression curve of the operational windfarm corrected for any special audible characteristics. If the background levels were not measured prior to installation (4.5.1), it may be necessary to obtain background sound level measurements for limited periods at critical windspeeds to satisfy 4.4.2 (e.g. if wind turbine or windfarm sound levels exceed 40 dBA L_{95}). This may be for a limited range of windspeeds and directions, with the WTG(s) non-operational.

5.5 Further monitoring

When sound levels from WTGs have been established as complying with the

> criteria for acceptability set down in 4.4.2 of this Standard, nothing in this Standard shall prevent further monitoring at any later date as a further check on compliance. All such follow-up testing shall be carried out in accordance with the procedures set down in this Standard. Such testing may, for example, be conducted at a later date when investigating noise complaints, as provided for under procedures set down in relevant legislation.

64 Appendix A to the NZ Standard was a worked example showing how the recommended method should be used to predict sound levels from two proposed wind turbines, measure background sound levels at a nearby residence, and test compliance after the wind turbines had been installed. The following notes appeared at the end of the worked example, under the heading 'Compliance testing':

> Once the two WTGs have been installed, a further sound survey will need to be completed (if required) in order to check compliance. If no complaints arise and the sound levels are subjectively considered acceptable, it may not be necessary to undertake measurements. If, however, measurements are required, the analysis shown in A1 of this Appendix should be repeated with the turbines operational.
>
> If operational measurements are undertaken, the results of the 'operational' sound measurements should be compared to the background measurements (non-operational) defined by equation A1, to determine compliance. Since the "operational" measurements will be combined windfarm and background levels, it may be necessary to adjust these measurements to determine the "windfarm only" levels.
>
> The compliance test should include consideration and an assessment (if necessary) of any special audible characteristics.

65 The NZ Standard was superseded in 2010 by the New Zealand Standard 6808: 2010 – *Acoustics – Wind farm noise* (**2010 NZ Standard**). However, the NZ Standard continues to provide the noise standard for wind energy facilities that received planning permission on or before 31 December 2010,[36] including the wind farm.

Bald Hills' compliance program

66 Bald Hills took a number of steps to comply with the noise conditions in the permit.

67 It prepared a Community Noise Complaint Evaluation and Response Procedure, as required by condition 21 of the permit, which was endorsed by the Minister on 12 February 2015. The **Complaint Procedure** set out the ways in which a complaint

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36 *Environment Protection Regulations 2021* (Vic), reg 131B.

could be made, how complaints would be recorded, and the procedure for responding to a complaint regarding noise from the operation of the wind farm.

68 It also prepared a tenement plan, as required by condition 28 of the permit. A modified tenement plan was approved by the Minister on 20 August 2015. The plan identified the dwellings to which the noise standards in condition 19 applied, including Mr Uren's home on the southern Uren property. Mr Zakula's home was not shown on the approved tenement plan, not having been built when the permit was granted.

69 MDA conducted background noise monitoring at 14 locations between November 2014 and February 2015. These locations did not include Mr Uren's home, although it was one of the dwellings identified on the tenement plan. The closest background monitoring location was House 59, the Fairbrothers' home, some distance to the north of Mr Uren's house. Background noise monitoring was also conducted at House 66, the Fox-Wilson residence, just south of Mr Zakula's house.

70 In accordance with condition 23 of the permit, MDA prepared a noise compliance testing plan (**NCTP**), which was approved by the Minister on 20 August 2015.

71 MDA conducted post-construction noise monitoring at 13 locations at various times between April 2015 and November 2016. This included continuous monitoring at House 66, next to Mr Zakula's property, and at House 60, the Dunmore residence, to the north of Mr Uren's house, between April 2015 and September 2016. Although MDA had placed noise monitoring equipment near Mr Uren's house in October 2015 and near Mr Zakula's house in December 2015, data recorded by that equipment was not used by MDA in its assessment of permit compliance.

72 On 12 December 2016, MDA produced a report titled 'Assessment of Wind Farm Operational Noise' (**MDA December 2016 report**). The report stated that Bald Hills commissioned the assessment, although condition 23 of the permit contemplated the Minister commissioning an independent post-construction noise monitoring

program. MDA concluded that the noise levels assessed over the 24 hour period were below the permitted noise limits at all properties, and that noise levels assessed over the night period were below the permitted noise limits at all non-stakeholder properties.[37] Noise levels were found to exceed the night time limit at some wind speeds at four locations — House 28, House 61, Tenement A and Tenement B. Tenement A is just to the south of Mr Zakula's house and House 66. House 61 is further south along Buffalo-Waratah Road, about halfway between Mr Zakula's house and Mr Uren's house.

73 MDA recommended implementing an intermediate strategy to reduce noise, involving the use of noise optimisation modes for some turbines. It also recommended a longer term strategy:[38]

> The longer term strategy will be to address tonality related compliance requirements through the mitigation of tonal emissions rather than continued reliance upon noise optimisation modes to achieve A-weighted reductions which offset penalties related to Special Audible Characteristics.
>
> [Bald Hills Wind Farm (BHWF)] remains in ongoing discussions with the turbine suppliers, Senvion, for the purpose of identifying an engineering option which will address tonality where necessary for specific turbines. These discussions will be informed by the results of separate noise testing work which is being conducted at the site by acoustic consultants acting on behalf of Senvion to quantify the noise emission characteristics of the turbines.
>
> Subject to the identification of a feasible engineering option to mitigate tonality, ongoing works at the site are expected to involve:
>
> - Sound power level testing of a sample turbine fitted with the proposed mitigation measures to verify the effectiveness of the measure in close proximity to the turbine
> - Identification of the turbine(s) which require the mitigation measures to be applied for the purpose of achieving compliance at relevant receivers, noting that the turbine(s) may not necessarily coincide with the turbine(s) selected to operate in a noise optimised mode as part of the intermediate strategy
> - Preparation of a statement to notify the Minister for Planning of the

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37 Like the noise conditions in the permit, the MDA December 2016 report distinguished between stakeholder properties, on which wind turbines were located, and non-stakeholder properties that did not host turbines.

38 Exhibit D41 – MDA, *Assessment of Wind Farm Operational Noise* (Report, 12 December 2016) [7.2] (**MDA December 2016 report**).

intention to vary the operating configuration of the relevant turbine(s), through implementation of the proposed mitigation measures, and details of repeat testing to be undertaken to verify the effectiveness of the mitigation measures at the relevant receptor locations

- Further on-site testing and follow-up reporting to the Minister for Planning to confirm ongoing compliance with the planning permit requirements.

74 Between January and February 2017, MDA conducted further post-construction noise monitoring at the four locations where it had found noise levels to exceed the permitted night time limits. MDA prepared a further report titled 'Assessment of Wind Farm Operational Noise', dated 19 May 2017, in which it concluded that implementation of the interim strategy (called the 'preliminary curtailment strategy') had reduced the noise levels to below the night time noise limits at three of the four locations. Taking into account tonality, there was still a small excess above the night time limit for a limited wind speed range at Tenement B. MDA recommended a 'revised preliminary curtailment' to achieve compliance at Tenement B. The report reiterated the need for a longer term strategy to address tonality related compliance requirements through the mitigation of tonal emissions rather than relying on noise optimisation modes to reduce noise.

75 Bald Hills implemented the revised preliminary curtailment strategy from 23 May 2017, under which seven identified turbines operate in noise optimisation mode. Mr Arthur, a director of Bald Hills, explained that the strategy involves reducing the power output of those seven turbines at specific wind speeds and wind directions, which reduces the sound power levels at the turbine from 104 decibels to 98.5 decibels. The turbines that operate in this mode are turbines 40, 46 and 47 in the central and southern groups, and turbines 4, 7, 8 and 16 in the northern group. Turbine 16 is the turbine closest to Mr Zakula's house; turbines 40, 46 and 47 are to the west of Mr Uren's former home.

76 MDA undertook further noise monitoring at Tenement B in June 2017, which was inconclusive, and again in February 2018 at Tenement B and an intermediate location. In a report dated 15 August 2018, MDA expressed its conclusion that the

measurements taken at the intermediate location demonstrated compliance with the applicable night time limits at Tenement B.

77 **EnviroRisk** Management Pty Ltd, an auditor appointed under s 53V of the *Environmental Protection Act 1970* (Vic), undertook peer reviews of MDA's reports dated 19 May 2017 and 5 June 2018 (updated 18 July 2018). In reports dated 13 June 2017 and 15 August 2018 respectively, EnviroRisk expressed general agreement with MDA's overall conclusions that the wind farm complied with the noise conditions in the permit. EnviroRisk identified some qualifications in its first report, including in relation to the application of the 5 dB tonal penalty to individual measurement samples rather than the regression curve. Bald Hills responded to these qualifications in a letter to the Manager Wind Farms at the Department of Environment, Land, Water and Planning dated 17 July 2017.

78 On 21 February 2019, Mr Arthur wrote to the Minister in relation to the wind farm's compliance with the noise conditions in the permit. The letter read:

> The Wind Farm's post construction noise monitoring program was completed in August 2018 by Marshall Day Acoustics Pty Ltd (***MDA***). This monitoring was conducted in accordance with the NZS 6808:1998 Acoustics Standard, the Wind Farm's endorsed Noise Compliance Testing Plan, and the Attended Measurements Testing Plan submitted to the Minister.
>
> In a report dated 15 August 2018 and provided to the Minister, MDA confirmed that the results of its monitoring and analysis demonstrated compliance with the Wind Farm's planning permit noise requirements. At the request of the Department of Environment, Land, Water and Planning, the work performed by MDA was independently peer reviewed by EnviroRisk. EnviroRisk determined that MDA's approach to noise assessment was appropriate, and concurred with the overall conclusions specified within their reports.
>
> Accordingly, we ask for written confirmation that the Minister is satisfied that the Wind Farm is complying with its planning permit with respect to noise emissions.

79 The Minister replied in a letter dated 23 March 2019, which said:

> Thank you for your letter of 21 February 2019 requesting confirmation that the Bald Hills Wind Farm is complying with its planning permit with respect to noise emissions.

Condition 19 of the Permit provides an ongoing requirement that:

> The operation of the wind energy facility must comply with the New Zealand Standard....in relation to any dwelling existing at the date of approval of this document to the satisfaction of the Minister for Planning…..

Based on the information you provided to me on 21 August 2018, and on the basis that the wind farm continues to operate in accordance with the specified noise curtailment strategy, I am satisfied that compliance with the requirements of condition 19 of the planning permit is presently being demonstrated.

For completeness, I note that the planning permit provides for an ongoing noise complaint, evaluation and response process (condition 21) and a process for dealing with any breaches of the ongoing requirement in condition 19 (condition 22).

80 In his evidence at trial, Mr Arthur confirmed that there has been no change to Bald Hills' curtailment strategy since May 2017. Bald Hills has not implemented the longer term strategy to reduce tonal emissions recommended by MDA in its December 2016 and May 2017 reports.

Role of the Minister

81 Bald Hills submitted that the Minister is the 'final arbiter' of compliance with condition 19 of the permit, and the Minister's letter of 23 March 2019 conclusively determines the issue of permit compliance. It submitted that the Court could not go behind the Minister's expression of satisfaction that the wind farm had demonstrated compliance with condition 19 of the permit.

82 The plaintiffs put two main submissions against that proposition:

(a) First, they argued that the 'satisfaction of the Minister' in condition 19 is directed to the dwellings at which the NZ Standard must be met, not compliance with the NZ Standard at those dwellings.

(b) Second, they pointed out that the *Planning and Environment Act 1987* (Vic) (**Planning Act**) provides for the enforcement of permit conditions in the Victorian Civil and Administrative **Tribunal** and the courts. They argued that it would be contrary to the scheme of the Planning Act for condition 19 to

designate the Minister as the final arbiter of compliance.

83 It is convenient to consider the second of those submissions first.

Enforcement under the Planning Act

84 The allocation of responsibility between the Minister and the Council for the administration and enforcement of the permit for the wind farm is not at all clear. In the course of Bald Hills' opening, I asked the parties to identify which of the Council or the Minister is the responsible authority in relation to the noise conditions specified in the permit.[39] Bald Hills submitted that the permit assigns responsibility for managing noise compliance to the Minister, but that this did not have the effect of displacing the Council's powers to administer and enforce the permit.[40] Unfortunately, this submission was not supported by reference to the Planning Act or the South Gippsland Planning Scheme at relevant times.

85 Ordinarily, an application for a planning permit is made to and determined by the 'responsible authority' for the administration and enforcement of the relevant planning scheme.[41] The responsible authority is generally the municipal council for the land to which the planning scheme applies, unless some other person is specified in the planning scheme as the responsible authority. The duties of a responsible authority are set out in s 14 of the Planning Act:

> The duties of a responsible authority are—
>
> (a) to efficiently administer and enforce the planning scheme; and
>
> (aa) to enforce any enforcement order or interim enforcement order relating to land covered by a planning scheme for which it is the responsible authority; and
>
> (b) to implement the objectives of the planning scheme; and
>
> (c) to comply with this Act and the planning scheme; and
>
> (d) to provide information and reports as required by the Minister.

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39 Transcript, 7 September 2021, 130:13–24.
40 Transcript, 7 September 2021, 162:11–163:3.
41 *Planning and Environment Act 1987* (Vic), s 13, Pt 4, Div 1.

Hence, the Council is the responsible authority for the South Gippsland Planning Scheme, unless otherwise specified.

86 Over time, the South Gippsland Planning Scheme has said various things about who is the responsible authority in respect of wind energy facilities.[42] At the time that the application for the permit for the wind farm was under consideration, it appears that cl 52.32 of the South Gippsland Planning Scheme provided that the Minister was the responsible authority for proposals for the use and development of land for a wind energy facility over 30 megawatts in capacity, a trigger that applied in this case.[43] Now, cl 72.01-1 of the South Gippsland Planning Scheme provides:

> The Minister for Planning is the responsible authority for matters under Divisions 1, 1A, 2 and 3 of Part 4 of the Act, and matters required by a permit or the scheme to be endorsed, approved or done to the satisfaction of the responsible authority, in relation to the use and development of land for a:
>
> - Energy generation facility with an installed capacity of 1 megawatt or greater.
>
> …
>
> with the exception of the following:
>
> …
>
> - in relation to permits for the use and development of land for a wind energy facility issued prior to 2 April 2015 under Division 1 of Part 4 of the Act, the Council is the responsible authority for matters under Divisions 1, 1A, 2 and 3 of Part 4 of the Act, and for matters required by the permit or the scheme to be endorsed, approved or done to the satisfaction of the responsible authority.
>
> - in relation to permits for the use and development of land for a wind energy facility issued prior to 2 April 2015 under Division 6 of Part 4 of the Act, the Council is the responsible authority for matters required by the permit or the scheme to be endorsed, approved or done to the satisfaction of the responsible authority, subject to the operation of section 97H of the Act.
>
> …

87 Under Pt 4, Div 6 of the Planning Act, the Minister has power to 'call in' a permit

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42 Exhibit D125 - Expert report of Robert Milner dated May 2021, 61–5 (**Milner report**).

43 Panel Report, 23. See also Milner report, 62.

application in the circumstances set out in s 97B(1) of the Planning Act. It is not clear on the face of the permit whether it was issued under Div 1 or Div 6 of Pt 4 of the Planning Act. However, the Panel for the wind farm project was appointed by the Minister under s 97E of the Planning Act,[44] which indicates that the Minister exercised the call in power in relation to the permit application.

88 Where the Minister grants a permit under s 97F of the Planning Act, s 97H provides who is to be the responsible authority in respect of the permit:

> **Effect of issue of permit**
>
> Once a permit is issued under section 97F, the responsible authority specified in the planning scheme becomes the responsible authority for the administration and enforcement of this Act and the relevant planning scheme in respect of the permit (whether or not the permit is amended) except that the Minister remains the responsible authority in respect of—
>
> (a) any matters which the permit specifies to be done by, approved by or done to the satisfaction of the Minister; and
>
> * * * * *
>
> (c) any extension of time under section 69 in relation to the permit; and
>
> (d) the correction of the permit under section 71(1); and
>
> * * * * *
>
> (f) the amendment of the permit under section 97J.

89 Doing the best I can, it seems most likely that the permit was issued by the Minister under s 97F, and so the Minister remains the responsible authority in respect of those matters that the permit specifies must be done to the satisfaction of the Minister. Several of these matters are specified in the noise conditions in the permit, including condition 19.

90 However, the Minister's role is limited to that of responsible authority under the Planning Act in respect of those matters. That is, he is responsible for administering and enforcing those aspects of the permit. Where the Minister is not satisfied of the

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44 Panel Report, 3.

matter specified in the permit for which he is the responsible authority, various enforcement actions are available under Pt 6 of the Planning Act. These include applying for an enforcement order under s 114, issuing an infringement notice under s 130, or commencing a prosecution for an offence against s 126 of the Planning Act. Part 6 of the Planning Act contemplates these enforcement actions being taken by an authorised officer of the responsible authority, among others.

91 While the Minister, through an authorised officer, can initiate these enforcement actions, it is not for the Minister to determine them. Under Pt 6, Div 1 of the Planning Act, it is a matter for the Tribunal whether an enforcement order should be made, against whom, and on what terms. Criminal liability for an offence against s 126 is determined by the court that hears the charge — usually the Magistrates' Court.[45]

92 It is within this statutory framework that the noise conditions of the permit must be construed.

Construction of condition 19

93 Returning to the first of the plaintiffs' submissions about the role of the Minister, the first sentence of condition 19 of the permit reads:

> The operation of the wind energy facility must comply with the New Zealand Standard 'Acoustics – The Assessment and Measurement of Sound from Wind Turbine Generators' (NZ 6806:1998) (the 'New Zealand Standard'), in relation to any dwelling existing at the date of approval of this document to the satisfaction of the Minister for Planning.

94 Bald Hills' position is that this means that the Minister must be satisfied that the wind farm is operating in compliance with the NZ Standard. The plaintiffs submitted that the Minister's satisfaction was required only in relation to the existence of a dwelling at the date the permit was issued.

95 The meaning of a planning permit is to be ascertained primarily from the words used

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[45] A prosecution for an offence is commenced under the *Criminal Procedure Act 2009* (Vic), by a police officer or a 'public official acting in the performance of his or her duty' signing and filing a charge-sheet with the Magistrates' Court: see *Criminal Procedure Act 2009* (Vic), ss 5, 14.

in the permit.[46] However, I accept that the syntax and punctuation of condition 19 give rise to ambiguity, and that I may refer to extrinsic material, in particular the Panel Report, in order to resolve that ambiguity.[47] As mentioned, the statutory framework provides important context in which the words used in the permit are to be understood.

96 Looking first at the words of the other noise conditions in the permit,[48] I note the following:

(a) The Minister is to approve the noise complaint, evaluation and response process required by condition 21. Condition 21(d) provides that the register of complaints may be inspected by the Minister.

(b) Condition 22 sets out a series of steps that may be taken by the Minister 'where condition 19 is found to have been breached'. This condition is unhelpfully expressed in the passive voice, which obscures who it is who must find a breach of condition 19 before the Minister can take remedial action. However, there are only two persons mentioned in the condition — the Minister and the operator of the wind farm.

(c) Condition 23 provides that the Minister — not the wind farm operator, or the Council — must commission an independent post-construction noise monitoring program, which must 'continue for 12 months after the commissioning of the last generator to the satisfaction of the Minister'.

(d) Condition 28 requires the preparation of a tenement plan 'to the satisfaction of the Minister', showing the location of existing houses as at 24 June 2004. A dwelling site shown on the approved tenement plan is considered to be an

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46 ***Vestey*** *v Warrnambool City Council* (2008) 160 LGERA 204, [30]–[31], quoting *Winn v Director-General of National Parks and Wildlife* (2001) 130 LGERA 508, [4] (Spigelman CJ); *Gant v Greater Geelong City Council* (2003) 15 VPR 230, 232–3.

47 *Vestey*, [40]–[48], and the authorities cited.

48 Set out at [54] and [55] above.

'existing dwelling' for the purposes of all other relevant conditions in the permit.[49]

97 I do not accept the construction of condition 19 put forward by the plaintiffs: that the Minister's satisfaction relates only to whether a dwelling existed at the date the permit was issued. Condition 28 separately provides for the preparation of a tenement plan to the satisfaction of the Minister, and condition 29 defines an 'existing dwelling'. The phrase at the end of the first sentence of condition 19 does more than merely repeat, in an awkward way, what is spelled out clearly in conditions 28 and 29.

98 Reading the noise conditions together, it is plain that the Minister has responsibility under the permit for monitoring and enforcing the conditions. The first step in time, under condition 28, is to approve a tenement plan that identifies 'existing dwellings' for the purposes of the permit. Further steps are for the Minister to approve a noise complaint process and to commission a post-construction noise monitoring program. If the Minister is not satisfied that the operation of the wind farm complies with the NZ Standard, as required by condition 19, the Minister can take the remedial actions provided in condition 22. In addition, the Minister as responsible authority could take enforcement action under Pt 6 of the Planning Act through an authorised officer.

99 This is what the Panel recommended in its report — that the Minister 'should retain the ongoing responsibility for monitoring and enforcing acoustic conditions'.[50] The phrase 'to the satisfaction of the Minister' is a form of words that appears in s 97H(a) of the Planning Act, and indicates that the Minister is to be the responsible authority for monitoring and enforcing compliance with condition 19.

100 However, the phrase does not have the effect contended for by Bald Hills, that it is the Minister and only the Minister who can determine whether the wind farm is operating in compliance with condition 19. That interpretation would be repugnant to the enforcement framework provided in the Planning Act. It is for the Tribunal, not the

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49 Condition 29 of the permit.
50 Panel Report, 309.

Minister, to determine whether to make an enforcement order in accordance with s 119 of the Planning Act. It is for a court, not the Minister, to determine whether the operator of the wind farm is guilty of an offence against s 126 of the Planning Act.

101 It follows that the Minister's letter of 23 March 2019 is no more than an expression of his opinion, in his capacity as the responsible authority, that the wind farm was at that time demonstrating compliance with condition 19 of the permit. Because he considered the wind farm to be compliant at that time, there was no occasion for the Minister to consider taking the steps set out in condition 22 or any enforcement action under Pt 6 of the Planning Act. Contrary to the submission of Bald Hills, the letter does not communicate any decision of the Minister, and has no legal effect. Nor was it a declaration of future compliance with the noise conditions in the permit.

102 The question of whether the sound from the wind farm received on the plaintiffs' land complied with the noise conditions in the permit at relevant times is to be determined on the evidence in this proceeding. It is not determined by the Minister's letter of 23 March 2019.

Responses to the plaintiffs' noise complaints

103 As noted, both Mr Zakula and Mr Uren made a large number of noise complaints to Bald Hills, commencing in 2015. The Complaint Procedure provides for the evaluation of complaints, as follows:

> - BHWF will conduct an initial assessment of the complaint based on the information provided to assess the complaint and determine the next steps.
> - If the complaint is found to be invalid (ie turbines not operating at the time subject of the complaint}, BHWF will contact the Originator in writing, within 10 business days after receipt of the complaint, to advise that the complaint has been rejected and the grounds.
> - In the event that BHWF determines that further investigation is required, including investigation by a specialized technical consultant, BHWF will, within 10 business days after receipt of the complaint, contact the Originator in writing to provide an estimation of the time required to complete the investigation.
> - In the case that further investigation is undertaken BHWF will provide fortnightly written updates regarding the likely timing for completion of the investigation.

- Upon completion of the investigation BHWF will provide written advice regarding the outcome of the investigation and any corrective measures which may be required.

104 Bald Hills engaged MDA to investigate the complaints made by Mr Zakula and Mr Uren. This resulted in many memos written by MDA between September 2015 and May 2019, as follows:

(a) memos dated 4 September 2015 and 4 March 2016 about complaints made by Mr Uren in the period 1 March to 31 May 2015;

(b) memos dated 16 February 2016 and 4 March 2016 about complaints made by Mr Uren in the period 1 June to 14 July 2015;

(c) a memo dated 8 April 2016 about complaints made by Mr Uren in the period 15 July to 3 October 2015;

(d) a memo dated 2 May 2016 about complaints made by Mr Zakula in the period 15 July to 3 October 2015;

(e) a memo dated 18 May 2016 about complaints made by Mr Zakula in the period 3 October to 31 December 2015;

(f) a memo dated 22 July 2016 about complaints made by Mr Uren in the period 3 October 2015 to 30 June 2016;

(g) a memo dated 8 August 2016 about complaints made by Mr Zakula in the period 31 December 2015 to 11 April 2016;

(h) a memo dated 16 September 2016 about complaints made by Mr Uren in the period 30 June to 18 July 2016;

(i) two memos dated 7 March 2017, the first about complaints made by Mr Zakula in the period 11 April to 29 June 2016, the second concerning complaints in the period 29 June to 30 September 2016;

(j) a further memo dated 7 March 2017 about complaints made by Mr Uren in the period 18 July to 15 November 2016;

(k) a memo dated 13 September 2017 about complaints made by Mr Uren in the period 15 November 2016 to 1 July 2017;

(l) a memo dated 15 May 2019 about complaints made by Mr Zakula in the period October 2016 to May 2017; and

(m) a memo dated 15 May 2019 about complaints made by Mr Uren in the period 1 July to 24 July 2018.

105 In all of these investigations MDA concluded that, although the wind farm was audible, the wind farm noise levels during the investigated period were consistent with the requirements of condition 19 of the permit and the NZ Standard.

106 Initially, MDA did not monitor the sound levels at either Mr Zakula's property or Mr Uren's property. MDA's investigations of the complaints that Mr Zakula and Mr Uren made during 2015 were instead based on measurements taken at nearby properties — House 66, to the south of Mr Zakula's property, and House 60, some distance north from Mr Uren's house. MDA recommended installing equipment to take recordings at the plaintiffs' properties, and this was done in late 2015. Noise monitoring equipment was in place near Mr Uren's house from 21 October 2015 and near Mr Zakula's house from 2 December 2015.

107 In addition to the complaint investigations listed above, MDA undertook assessments of wind farm operational noise at Mr Zakula's property for the period 2 December 2015 to 30 September 2016, and at Mr Uren's property for the period 21 October 2015 to 30 September 2016. MDA reported its findings in relation to Mr Zakula's property in a report dated 7 March 2017 (**MDA Zakula noise report**), and its findings at Mr Uren's property in a report dated 2 June 2017 (**MDA Uren noise report**). In both cases, MDA concluded that its assessment of noise levels demonstrated compliance with condition 19 of the permit.

108 Remarkably, MDA concluded that post-construction noise levels at both properties over a 24 hour period were lower than the pre-operational background noise levels used for comparison. These findings are illustrated in **Figure 2**, in relation to Mr Zakula's property and **Figure 3**, for Mr Uren's house:

Figure 2: Graph showing noise level vs wind speed measured over a 24 hour period at Mr Zakula's property, from the MDA Zakula noise report, page 21.

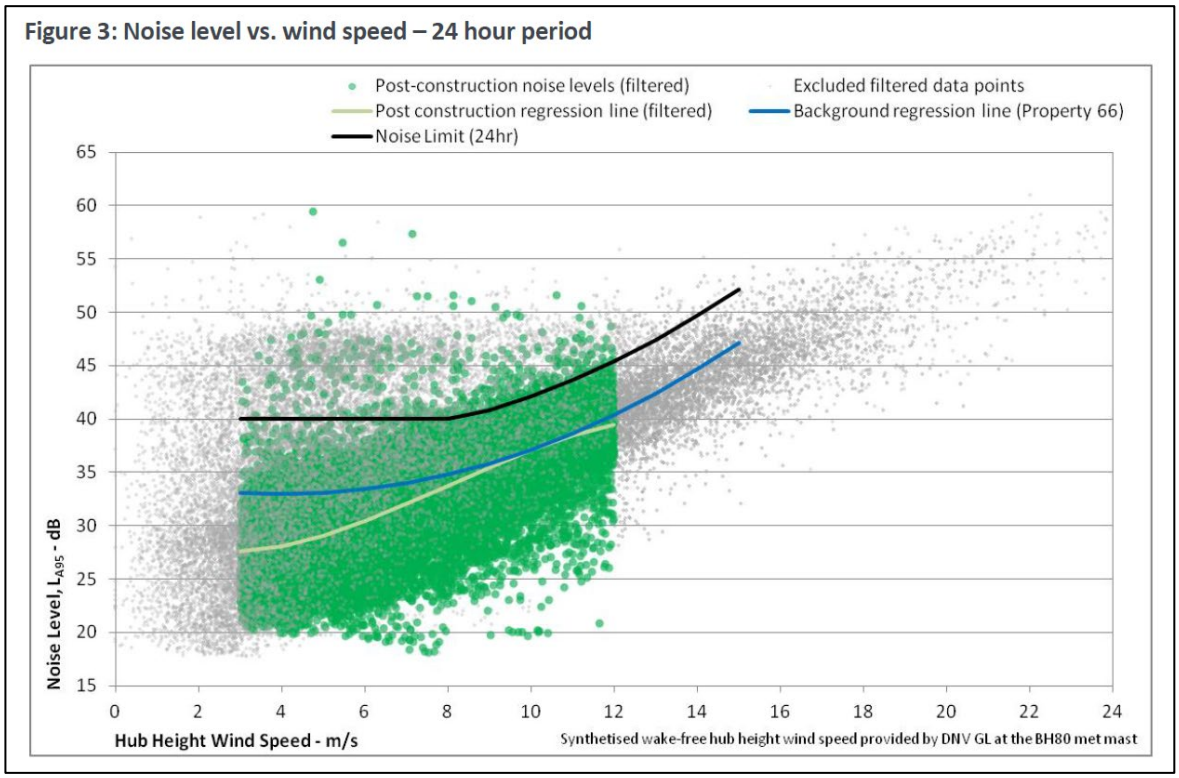
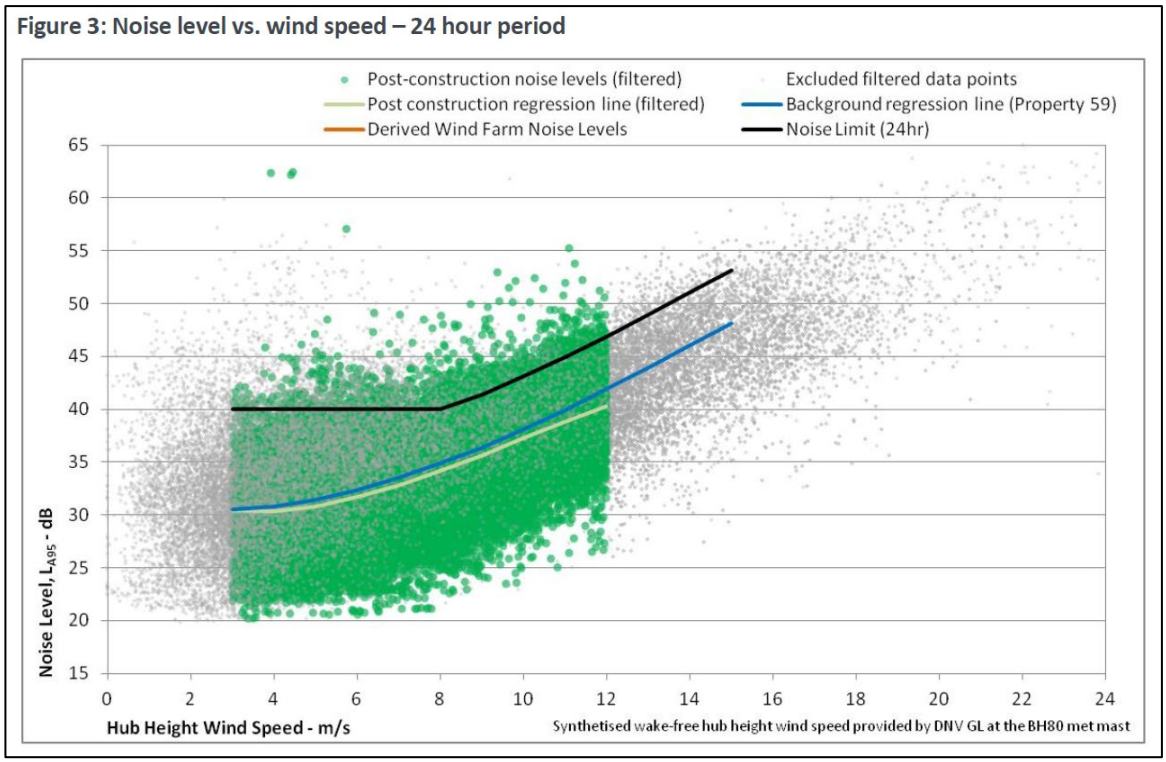


Figure 3: Graph showing noise level vs wind speed measured over a 24 hour period at Mr Uren's property, from the MDA Uren noise report, page 21.



109 The derived wind farm noise levels — that is, the difference between the measured post-construction noise levels and the background noise levels — are not shown on either graph. That is presumably because the post-construction noise levels were lower than the background noise levels in both cases.[51]

110 For the night time period, MDA concluded that post-construction noise levels were lower than pre-operational background levels at Mr Zakula's property at wind speeds below 8 m/s, and at Mr Uren's property at wind speeds below 11 m/s. These findings are illustrated in **Figure 4** and **Figure 5** respectively.

51 MDA Zakula noise report, 21; MDA Uren noise report, 21.

Figure 4: Graph showing noise level vs wind speed measured over the night time period at Mr Zakula's property, from the MDA Zakula noise report, page 21.

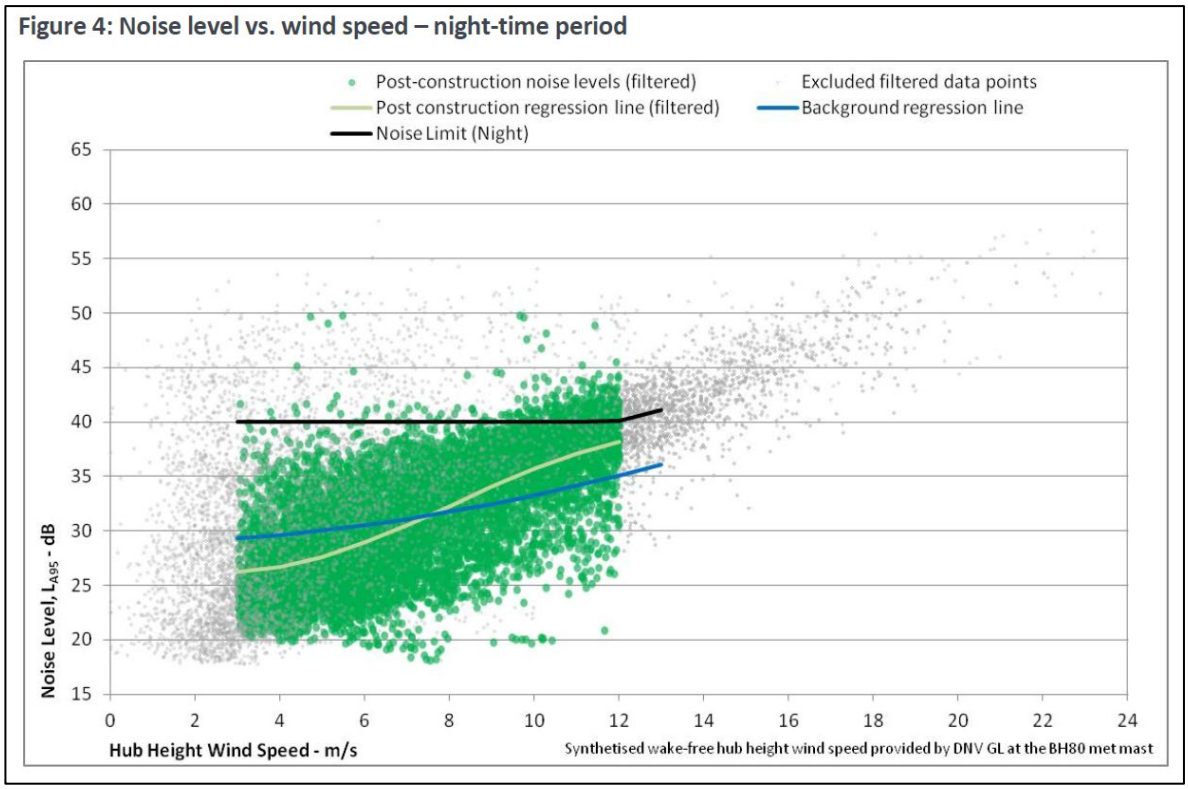
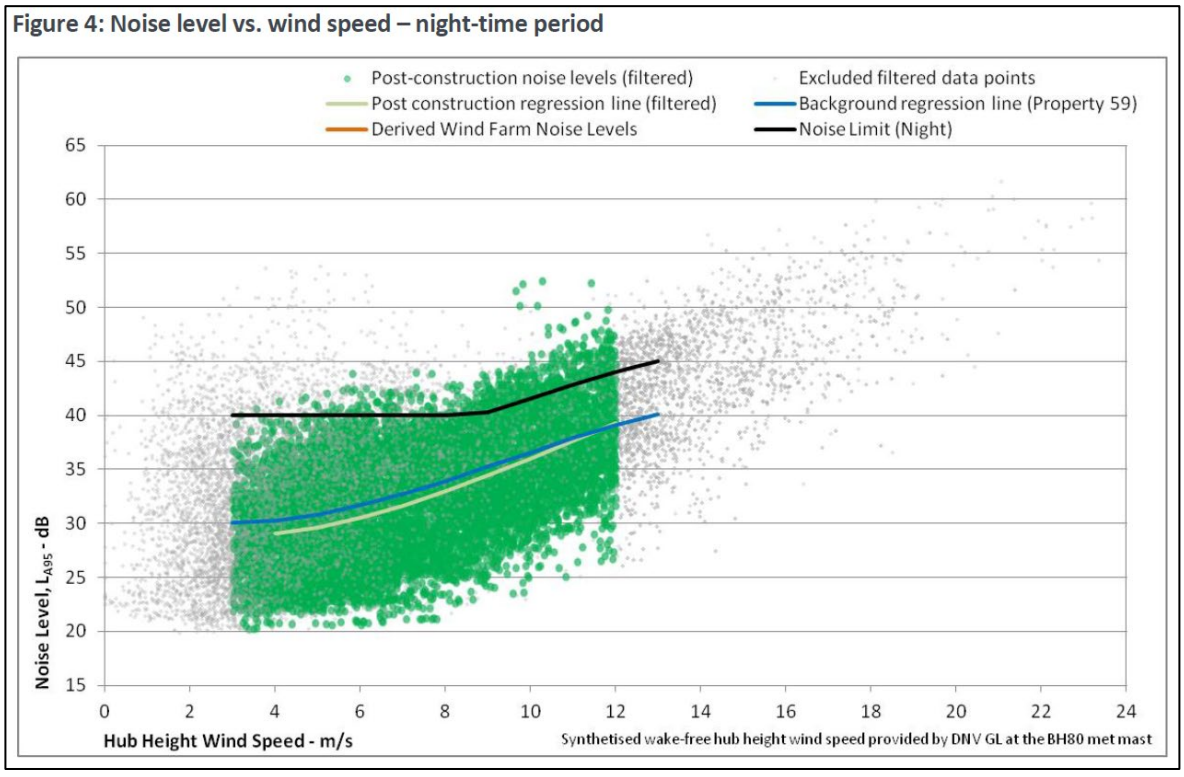


Figure 5: Graph showing noise level vs wind speed measured over the night time period at Mr Uren's property, from the MDA Uren noise report, page 21.



111 The plaintiffs disputed the methodology used by MDA in all of its assessments of noise from the wind farm. The correct methodology for assessing wind farm noise was the subject of expert evidence, and is considered below. At this stage it is useful to explain MDA's methodology, which was set out in some detail in its assessment reports. What follows is extracted from the MDA December 2016 report, which contained this overview of MDA's methodology:

> The compliance monitoring comprised a combination of:
>
> - Unattended noise measurements at multiple receiver locations in the vicinity of the wind farm to enable data to be captured across a wide range of wind speeds, wind directions and atmospheric conditions
>
> - Attended observations by qualified engineering staff to document the types of sources influencing the noise environment at each monitoring location and conduct a preliminary assessment of the wind farm's sound character.
>
> The unattended monitoring involves measuring noise levels in continuous 10 minute intervals while simultaneously measuring wind speeds in 10 minute intervals at the wind farm site. The noise level and wind speed datasets are then paired and a series of screening processes are applied to remove data points that are most likely to have been contaminated by extraneous influences on the noise measurements (e.g. rainfall or sources of noise in close proximity to the microphone).
>
> The screened data is then plotted on a chart illustrating noise levels versus site wind speed. One chart is created for data measured during all time periods and a separate chart is created for data measured during the night-time only. A line of best fit is applied to the data (using regression analysis) to characterise the trend of the relationship between measured noise levels and wind speeds. The line of best fit is then adjusted using background noise data measured prior to the wind farm commencing operation to provide a preliminary estimate of the upper noise level that may be attributable to the operation of the wind farm.
>
> The analysis of the unattended measurement data also incorporates the findings of the attended observations and, where applicable, the findings of any objective analysis of potential [special audible characteristics (SACs)].
>
> The adjusted best fit trend line of the data is then compared with the noise limits to conduct a preliminary assessment of whether the wind farm complies with the noise limits. If the preliminary estimated wind farm noise, accounting for any penalties associated with identified SACs, is below the applicable noise limits, then no further analysis is required to evaluate the wind farm's compliance.
>
> However, an inherent limitation of unattended monitoring is that the precise cause of the measured noise levels cannot be determined from the results. The

> analysis includes a limited account of the influence of background noise, based on screening of clearly contaminated periods and adjustments using background noise data measured prior to commencement of operation of the wind farm. However, background noise levels in practice are highly variable and can differ significantly from the levels measured during other periods. As the noise limits for the wind farm equate to levels that are comparable to the range of background noise level, the variability of background noise levels represents a significant source of uncertainty assessment.

112 Particular aspects of MDA's methodology that were criticised by the plaintiffs were:

(a) the background sound level measurements used to assess compliance at the plaintiffs' properties;

(b) the reliability of the wind speed data used by MDA;

(c) the filtering or screening of noise monitoring data before analysis;

(d) the approach to identifying special audible characteristics and applying the 5 dB penalty under condition 19(b); and

(e) the method used to assess night time compliance under condition 19(c).

MDA's approach to each of these matters is outlined in turn in the following paragraphs.

113 As mentioned, MDA conducted background noise monitoring between November 2014 and February 2015. During this time the wind farm was under construction. Background sound level measurements were not taken at either Mr Zakula's house or Mr Uren's house. MDA used background sound level measurements taken at House 66 to assess operational wind farm noise at Mr Zakula's house, and measurements taken at House 59 to assess compliance at Mr Uren's house.

114 MDA used wind speed data provided to it by DNV-GL, which was commissioned by Bald Hills 'to derive a time series of wake-free wind speed and direction data at the BH80 meteorological mast' at the wind farm. DNV-GL had 'de-waked' wind speed data recorded after March 2015, to take account of wake effects as the turbines began operating across the site. In a letter accompanying the wind speed dataset, DNV-GL

noted:[52]

> The uncertainty associated with the resulting wind speed time series is high, as a result of the above-mentioned assumptions and the uncertainty associated with the de-waking process. The elevated uncertainty has been exacerbated in the current analysis as a result of failure of both of the top-mounted sensors on the BH80 mast. It is recommended that the BH80 mast is refurbished as soon as possible to ensure valid data is collected from the mast.

115 MDA screened or filtered the operational sound level data it recorded as described in the MDA December 2016 report:

> Section 4.1 discusses the inherent limitation of unattended measurements and the influence of variable background sounds levels. This means that the noise levels measured at each property will include the contribution of both:
>
> - Operational wind farm noise, and
> - Residual noise, meaning the noise from all other sound sources around the measurement location.
>
> The measured or 'total' noise level will be equal to or greater than the operational wind farm noise level in all cases. In some instances, particularly at increased wind speeds, total measured noise levels may be dominated by residual noise and, as a result, the contribution of the turbines will be significantly less than the total measured noise level.
>
> Conversely, the noise criteria for this project which are specified in the planning permit relate to the level of noise from the wind farm only, without contribution from any residual noise.
>
> The analysis of measurement data includes a number of filtering procedures which are generally intended to improve the representation of wind farm noise in the total noise levels by excluding periods which are likely to be affected by extraneous noise sources which are commonly present during environmental noise measurements. The filtering procedures include consideration of rainfall, high local wind speeds at the microphone, distinctive occurrences of extraneous noise such as insect activity and the speed and direction of wind at the wind farm.
>
> The filtering methods detailed in Table 9 are applied before applying a regression analysis to the correlated noise level and site wind speed data.

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52 MDA December 2016 report, Appendix G – Site reference wind speed data – derivation.

Table 9: Data filtering	
Issue	**Comment**
Rainfall	Where it is considered likely that rainfall has occurred at the monitoring locations, associated noise and wind speed data points have been removed from the analysis
Turbine operational performance	Any periods that are considered to be affected by turbine shut down have been excluded from the regression analysis, as per the procedure described in Section 4.5.3
Extraneous noise	Extraneous noise can in some circumstances significantly affect noise measurements. Measured one-third octave band levels have been used to identify data when extraneous noise, such as insects, may have significantly influenced the measurement period using the method detailed in Appendix H. Periods identified as being potentially influenced by extraneous noise are excluded from the regression analysis. It should be noted that this filtering procedure has been adopted for the purpose of automated and preliminary filtering of large measurement datasets. The procedure is therefore adopted as a cautious process to remove periods affected by distinctive sources of extraneous noise. There will be many instances where extraneous noise sources significantly affect or dominate the measured noise levels, but will not be automatically identified and removed by this filtering process. Accordingly, the filtered dataset will still include periods in which the total measured noise levels are attributable to the combined influence of the ambient noise environment and operation of the wind farm.

MDA also excluded measurements recorded at wind speeds above 12 m/s, due to 'the increased effect of background noise at higher wind speeds as a result of wind disturbed vegetation', and measurements taken when fewer than 50 of the 52 wind turbines were in operation.

116 This approach significantly reduced the operational noise data that was analysed by MDA, including in the MDA Zakula noise report and the MDA Uren noise report:

(a) MDA collected 63,310 data points at Mr Zakula's property between December 2015 and September 2016, 15,811 of these at night time. Only 20,664 data points were used for analysis over the 24 hour assessment period, and only 8,764 for the night time period.

(b) At Mr Uren's property, MDA collected 74,276 data points between October 2015 and September 2016, 17,847 of these at night. Only 26,164 data points were used for analysis over the 24 hour assessment period, and only 9,547 for the night time period.

The grey shaded dots in Figures 2, 3, 4 and 5 above represent data that was screened and not analysed.

117 In order to determine whether special audible characteristics were present, an MDA assessor conducted listening tests over the course of the noise monitoring period — three at Mr Zakula's property and five at Mr Uren's. This involved listening to 10 minute audio samples collected at the observation positions, to identify the potential presence of tonality, amplitude modulation, low frequency noise and impulsiveness. If these subjective assessments indicated that special audible characteristics may be present, an objective assessment was carried out to determine if the characteristic was present and whether the 5 dB penalty was applicable. The objective assessment procedures were defined in the NCTP, as follows:

(a) Tonality — ETSU-R-97 *The Assessment and Rating of Noise from Wind Farms* (**ETSU-R-97**);

(b) Amplitude modulation — New Zealand Standard 6808:2010 *Acoustics – Wind farm noise*; and

(c) Impulsiveness — Australian Standard 1055-1:1997 *Acoustics – Description and measurement of environmental noise - Part 1: General Procedures*.

118 The subjective assessments of audio samples taken at Mr Zakula's property on 2 December 2015, 17 February 2016 and 25 August 2016 identified tonality in each sample. Five listening studies were done at Mr Uren's property, on 8 September 2015, 2 December 2015, 17 February 2016, 3 June 2016 and 25 August 2016. Low level tonality was identified in the first and last of these studies.

119 All of the audio records collected during the monitoring period at both properties were then objectively analysed for tonality, using an automated software routine to apply the ETSU-R-97 narrow band assessment procedure. Analysis results with a tone frequency greater than 500 Hz were excluded, on the basis that the frequency was too high to be attributable to the sound of the wind farm. The results of the objective assessment confirmed the presence of tonality in the total measured sound levels for some individual 10 minute periods. All of these were assumed to relate to the operation of the wind farm, although some may have been from other sources.

120 MDA applied the 5 dB penalty to each of these 10 minute periods, and then reanalysed the data to assess compliance over both the 24 hour period and the night period. This increased the post-construction noise level regression line for Mr Zakula's property by about 1 dB, with an increase of only 0.2 dB for Mr Uren's property. In both cases the application of the penalty did not affect compliance with the noise limits prescribed by condition 19 of the permit.

121 It will be recalled that condition 19(c) requires a separate assessment of compliance at night with regard to night time data — that is, data collected between 10:00pm and 7:00am. Condition 19(c) stipulates that a breach of the standard set in condition 19(a) for 10% of the night amounts to a breach of the condition. Unfortunately, the NCTP said nothing about how compliance with this condition was to be assessed, and nor did MDA explain its approach to night time compliance in any of its reports. It appears that MDA simply analysed the night time data separately, and concluded that there was compliance at all wind speeds during the night.[53] MDA did not apply a more stringent standard at night, which was required 'for sleep protection purposes'.

122 For completeness, I note that no-one from MDA was called by Bald Hills to prove the opinions provided in its various reports and memos, or explain its methodology. The reports and memos produced by MDA were admitted for non-opinion purposes, with

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53 This was Mr Turnbull's understanding of MDA's approach to assessing compliance with condition 19(c): see Transcript, 23 September 2021, 1306:3–28.

a direction that they could not be used to prove the opinions expressed in them. It has been necessary to set out MDA's methodology and conclusions in order to understand Bald Hills' response to the plaintiffs' complaints, and because they were the subject of evidence from the three acoustic expert witnesses.

Expert acoustic evidence

123 I heard expert acoustic evidence from three witnesses with different areas of expertise.

124 Bald Hills called Christopher Turnbull, an acoustic engineer, who is the principal of the acoustical consulting practice **Sonus** Pty Ltd. Mr Turnbull completed a Bachelor of Mechanical Engineering with Honours in 1990 and a Master of Engineering Science in 1994. Both degrees are from the University of Adelaide and in both Mr Turnbull specialised in the field of acoustics. Before forming Sonus in 2002, Mr Turnbull worked for four years as an acoustical engineer with the Maritime Operations Division of the Defence Science and Technology Organisation, and for seven years as an associate and state manager at Bassett Acoustics. He is a member of the Australian Acoustical Society. He has experience in many aspects of environmental noise, including background noise monitoring, predictions, compliance monitoring and peer reviews for more than 75 wind farms located across Australia.

125 Mr Turnbull prepared a report dated 16 June 2021 and a supplementary report dated 9 August 2021. He also prepared an amendment to his report on 12 September 2021, and a further report on an alternative interpretation of permit condition 19(c).

126 The plaintiffs called Dr Robert Thorne, a health scientist, who is the principal of **Noise Measurement Services** Pty Ltd and the Acoustar Work, Health and Safety Training Centre. Dr Thorne completed a Diploma in Science in New Zealand in 1985, specialising in noise management. He also obtained a Diploma in Acoustics and Noise Control from the United Kingdom Institute of Acoustics in 1985. In 2007, he was awarded a Doctor of Philosophy in Health Science from Massey University in New Zealand. His doctoral research involved assessing intrusive noise and low amplitude sound, including two years spent studying the effects of wind farms on people in

Manawatu, New Zealand. He has worked in environmental health roles in local government and the public service in New Zealand and in the public service in Queensland. Dr Thorne is a fellow of the Royal Society of Public Health in the United Kingdom, a member of the Institute of Acoustics in the United Kingdom, and a member of the Acoustical Society of America. He established Noise Measurement Services in 1999, to undertake acoustical work including environmental noise surveys, social surveys and analysis, health impact assessments and noise impact prediction modelling. In the past 10 years he has prepared noise and perception assessments of 26 wind farms, in Australia, New Zealand and Canada.

127 Dr Thorne prepared reports dated 25 June 2019 and 26 March 2021.

128 The plaintiffs also called Leslie Huson, a physicist, who is the principal of the acoustical consulting firm L Huson & Associates Pty Ltd. Mr Huson has a Bachelor of Science with Honours in Applied Physics, completed in 1975, and a Master of Science in Sound and Vibration Studies, completed in 1977 at the Institute of Sound and Vibration Research at the University of Southampton in the United Kingdom. He is a Chartered Physicist, a member of the Institute of Physics and a member of the Institute of Acoustics in the United Kingdom. He is also a member of the Australian Acoustical Society and the Environment Institute of Australia and New Zealand.

129 Mr Huson prepared a report dated 22 March 2021, and a supplementary report dated 12 September 2021.

130 Unfortunately, the three experts were not asked to address common questions in their reports, and each took a different approach to the issues for determination in this case. However, they conferred on 3 September 2021, and produced a joint expert report that set out their respective positions on 40 issues that they had identified. On the issues where they disagreed, they each gave brief reasons for that disagreement.

131 The first issue identified in the joint report was the central question of whether Bald Hills had complied with the permit requirements for noise. Mr Turnbull was of the

opinion that it had, while Dr Thorne and Mr Huson considered it had not. Their brief reasons for those opinions were:

> Turnbull
>
> My noise measurements demonstrate that the noise from the BHWF achieves the Permit Conditions at all Plaintiff properties. Marshall Day has demonstrated compliance at several additional locations. It is not clear to me if noise from the BHWF is compliant at Tenement B.
>
> Huson
>
> Reports submitted to the Minister have not considered Permit condition 19c, as required in the Permit, nor have they adhered to the endorsed NCTP.
>
> Thorne
>
> To comply with the permit the BHWF must show that its activity has successfully achieved all the conditions of the permit, which in the case of noise is NZ 6808:1998 with variations particular to the permit set out in condition 19. I understand BHWF claims that "… *at all times, the sound so emitted was … in compliance with the noise conditions in the planning permit TRA/03/002*". There is no evidence that I have been provide with from MDA or Mr Turnbull to support this claim of "at all times". My own evidence (2019 and 2021 reports) and MDA reports establishes that BHWF is not always in compliance. BHWF has not established compliance with 19(b) and 19(c) at all times.

132 The three acoustic experts gave their evidence concurrently at the end of the trial. Before they did so, I identified a list of issues for consideration, which was agreed to by the parties. Within the broad issue of whether sound from the turbines received on the plaintiffs' land at all times complied with the noise conditions in the permit, the following more specific issues were identified for the acoustic experts:

1. Permit condition 19(a)

1.1 What is the correct methodology for assessing compliance with permit condition 19(a) at the Zakula property and the Uren southern property (House 57)?

1.2 Can compliance at the Zakula property be assessed using:

(a) background sound level measurements taken at the Fox property (House 66);

(b) operational sound level measurements taken at the Fox property (House 66), the Jelbart northern property (Tenement A), or some other nearby site?

1.3 Can compliance at the Uren southern property be assessed using:

(a) background sound level measurements taken at the Fairbrother property (House 59);

(b) operational sound level measurements taken at the Dunmore property (House 60)?

1.4 When should background sound level measurements be taken? Are these measurements valid if taken while the wind farm was being constructed?

1.5 Can compliance at the Zakula property and the Uren southern property be assessed using hub height wind data from:

(a) BHWF meteorological mast 80;

(b) Bureau of Meteorology weather stations at Yanakie and Pound Creek;

(c) individual BHWF wind turbines?

1.6 What is the relative reliability of these sources of wind data?

1.7 Please explain what is involved in 'de-waking' wind data?

1.8 What wind data was used by:

(a) MDA;

(b) Dr Thorne;

(c) Mr Turnbull,

to assess compliance with permit condition 19(a)?

1.9 Should sound level measurements be filtered before analysis? If so, what filtering is appropriate?

1.10 What filtering was applied by

(a) MDA;

(b) Dr Thorne;

(c) Mr Turnbull,

to the background sound level measurements used to assess compliance with condition 19(a) at the Zakula property and the Uren southern property?

1.11 What filtering was applied by

(a) MDA;

(b) Dr Thorne;

(c) Mr Turnbull,

to the operational sound level measurements used to assess compliance with condition 19(a) at the Zakula property and the Uren southern property?

1.12 Has BHWF complied with permit condition 19(a) at all times:

(a) at the Zakula property;

(b) until March 2016/December 2018, at the Uren southern property?

2. Permit condition 19(b)

2.1 What is the correct methodology for applying permit condition 19(b)?

2.2 How are special audible characteristics (clearly audible tones, impulses, or modulation of sound levels) to be identified?

2.3 Is a 'whoosh, whoosh, whoosh' sound from wind turbines a special audible characteristic?

2.4 At locations where sound from wind turbines has a special audible characteristic, is the 5 dB penalty to be applied to the regression curve, or to individual 10 minute recorded levels?

2.5 What methodology for applying condition 19(b) was used by:

(a) MDA;

(b) Dr Thorne;

(c) Mr Turnbull?

3. Permit condition 19(c)

3.1 What is the correct methodology for assessing compliance with permit condition 19(c)?

3.2 What methodology for assessing compliance with permit condition 19(c) was used by:

(a) MDA;

(b) Dr Thorne;

(c) Mr Turnbull?

3.3 Has BHWF complied with permit condition 19(c) at all times:

(a) at the Zakula property;

(b) until March 2016/December 2018, at the Uren southern property?

133 Mr Turnbull, Dr Thorne and Mr Huson addressed these issues in turn during their concurrent evidence, over three days of the trial. They were also cross-examined, in Mr Turnbull's case at some length. They gave their evidence conscientiously, with good humour, and commendable patience. I am grateful to each of them for the assistance they provided me in achieving an understanding of the acoustic issues presented by this case.

134 Of the three acoustic experts, only Mr Turnbull expressed an opinion that the wind farm complied with the noise conditions in the permit at Mr Zakula's property and at Mr Uren's former property. Bald Hills relied on his opinion to demonstrate its compliance with the permit. While Dr Thorne conducted noise monitoring at both properties, ultimately the plaintiffs did not rely on his analysis of the data he recorded to establish non-compliance. Their submission was that Bald Hills had not proved compliance, in part because Mr Turnbull's findings could not be accepted. Mr Huson did not undertake any noise monitoring.

135 I turn therefore to the evidence of Mr Turnbull.

Expert evidence – Christopher Turnbull

136 In his principal report, Mr Turnbull provided a clear explanation of his approach to measuring wind turbine noise to assess compliance with condition 19 and the NZ Standard. By way of introduction, he said:

> 31. Both Condition 19 and the NZ Standard require the noise from the Wind Farm to be measured. At typical setback distances from a wind farm, any measured noise levels are a combination of noise from the wind farm as well as noise from other sources, such as wind in trees, birds, insects, frogs etc. Therefore, careful consideration must be given to determine the component of noise which is from the Wind Farm.
>
> 32. The relevant NZ Standard is more than 20 years old and although it expresses the objectives of the assessments, it does not provide all of the specific procedures required to achieve the objectives. For example the NZ Standard includes;
>
> > *Since the 'operational' measurements will be combined windfarm and background noise levels, it may be necessary to adjust these measurements to determine the "windfarm only" levels.*

but does not provide the procedures to adjust the measurements. It also includes:

> *At present, there is no simple objective procedure available to quantify special audible characteristics, and subjective assessment is therefore necessary, supported by objective evidence (e.g. frequency analysis) where appropriate.*

33. Further, the modification to the NZ Standard required by Permit Condition 19(c) (**19c**) is not based on any Standard or Guideline.

34. In these circumstances, a level of interpretation is required, particularly given the extent of wind farm noise monitoring experience in the years since the NZ Standard was drafted. I have described the interpretation which I believe is required below.

137 Mr Turnbull clarified in his evidence at trial that he was unaware that the NZ Standard had been interpreted by any court or tribunal. He said that his interpretation was based on his own reading of it, as well as his experience with other standards and acoustic methodologies.[54]

138 His report continued with an explanation of the methods available to separate wind farm noise from other noise:

35. The core method of determining noise levels in the NZ Standard is a "regression analysis" of the wind speed and noise data. Noise data are measured in 10 minute intervals (using the L_{95} descriptor) and the wind speed at or near hub height is measured concurrently on the wind farm site. Each 10 minute period represents a single point on the graph of wind speed and noise level. …

36. When noise logging is conducted over an extended period of time, a large number of data points can be plotted. The NZ Standard suggests that 10 to 14 days of data, resulting in excess of 1440 points, are required.

37. The NZ Standard requires that this regression analysis be conducted prior to construction to determine the background noise levels (and resultant criteria) and during operation, to determine compliance with the criteria.

38. A concentration of data points along in a pattern will be shown where there is a relationship between noise level and wind speed. This could be shown for the noise from wind in trees or from the noise of a wind turbine. …

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54 Transcript, 23 September 2021, 1269:21–1270:22.

…

40. Conversely, a regression analysis with scattered points, without any significant correlation, indicates that the major noise sources are not dependent on the measured wind speed. Examples of noise sources which are not dependent on wind speed at the wind farm site include insects, frogs, local activity and distant surf.

41. The measurement of noise during the operation of a wind farm inherently includes the contribution of noise from the wind farm as well as the contribution of noise from other sources, such as wind in trees, birds, insects, frogs and other sources.

42. Condition 19 specifically requires "the sound level from the wind energy facility" to be assessed. Therefore, it is necessary for the noise from other sources to be filtered, so that the contribution of noise from the Wind Farm (or wind energy facility) alone is determined. Further, the NZ Standard includes the following text but does not provide a specific method to "adjust" the noise measurements.

> *Since the 'operational' measurements will be combined windfarm and background noise levels, it may be necessary to adjust these measurements to determine the "windfarm only" levels.*

43. There is some level of filtering inherent in the NZ Standard. This takes the form of the L_{95} descriptor. As the L_{95} is the sound level which is exceeded for 95 per cent of the 10 minute measurement period, it can be used to determine the continuous underlying noise by excluding intermittent noise such as vehicle movements and gusts of wind in trees.

44. In most cases, the L_{95} descriptor alone is not sufficient to exclude all other noise sources. For example, where insects produce continuous noise and when there is continuous noise from wind in trees, the noise is often the result of these noise sources rather than the wind farm. Without further filtering of the noise of other sources, the contribution of noise from the wind farm cannot be determined. There are several methods, which are often used to exclude other noise sources, which I will explain below.

139 Mr Turnbull identified four methods for excluding other noise sources:

(a) subtracting background noise;

(b) one-third octave band analysis to reduce insect and bird noise;

(c) use of a proxy noise monitoring location; and

(d) use of an intermediate noise monitoring location.

140 The first of these methods was used by MDA, but not by Mr Turnbull, to assess noise from the wind farm. Mr Turnbull explained:

> 45. Where the background noise has been measured prior to the operation of a wind farm, there is the potential for the pre-operation measured noise levels to be logarithmically subtracted from the post-construction measured noise levels. Given the variation in background noise levels, this cannot be done on an individual 10 minute data point basis but rather must be done based on the line of best fit, which is similar to an average. An increase in the average noise at a particular wind speed can be due to a range of reasons including the contribution of the wind farm or the growth of local trees. Therefore, a conservative method of assessment is to assume that the total increase is entirely due to the wind farm.
>
> 46. Caution must be exercised when using this method for a number of reasons.
>
> - There is a natural variation in background noise and in some cases this variation is sufficient to indicate an exceedance of the criteria when the wind farm is not creating the noise. There are a number of potential causes for the variation but the most common are; trees growing taller and creating more noise from wind in leaves and an increase in the noise from insects, birds or frogs.
>
> - Any filtering conducted to exclude extraneous noise must be performed in the same way on both data sets. If filtering is conducted pre-operation but not conducted post-construction, the difference is wrongly attributed to the wind farm. In a similar way, if filtering is not performed on the pre-construction data set but is performed on the post construction data set, any subtraction of the pre-construction data set would result in an underestimate of the contribution of noise from the wind farm.

141 The second method, one-third octave band analysis, is a means of removing data points dominated by insect, frog or bird noises. Mr Turnbull said that MDA had used this technique in the analysis of both background noise and post-construction compliance monitoring, and so he had used it when analysing the noise monitoring data he had collected. This filtering method was not disclosed in any of MDA's reports. Mr Turnbull said he had obtained the raw data of MDA's pre-operational noise level measurements, and analysed it for locations 19, 61 and 66 to replicate MDA's graphs. From this exercise, he concluded that MDA had used this technique in analysing both its pre-operational and its operational data.

142 The third method for reducing noise from extraneous sources, such as wind in trees, is to measure the noise at a location further from the noise source, but at an equivalent distance from the wind farm. Mr Turnbull explained that an appropriate proxy location will be on the same noise contour on a noise model, in a position that is not as influenced by extraneous noise sources.

143 The fourth method involves placement of an additional noise logger at an intermediate point between the wind farm and the point at which wind farm noise is to be measured. The intermediate location should be on a noise contour with higher predicted wind farm noise levels. If the noise at the measurement location is higher than the noise at the intermediate location, the noise at the measurement point is considered not to be the result of wind farm noise, and the 10 minute data point can be discarded. Mr Turnbull noted that when this method is used the background noise cannot be subtracted from the measured level.

144 Mr Turnbull used the second, third, and fourth methods to measure noise from the wind farm at the plaintiffs' properties. The proxy and intermediate locations used by Mr Turnbull are plotted on the noise model shown at **Figure 6**. He used the Firs Tenement as the intermediate location for Mr Uren's house. The noise model was prepared by Mr Turnbull using noise modelling software, for a wind speed of 12 m/s, with inputs including a four metre receiver height, a temperature of 10 degrees Celsius, and 70% relative humidity.

Figure 6: Map showing noise monitoring locations and expected noise contours, from Mr Turnbull's report dated 16 June 2021, page 63.

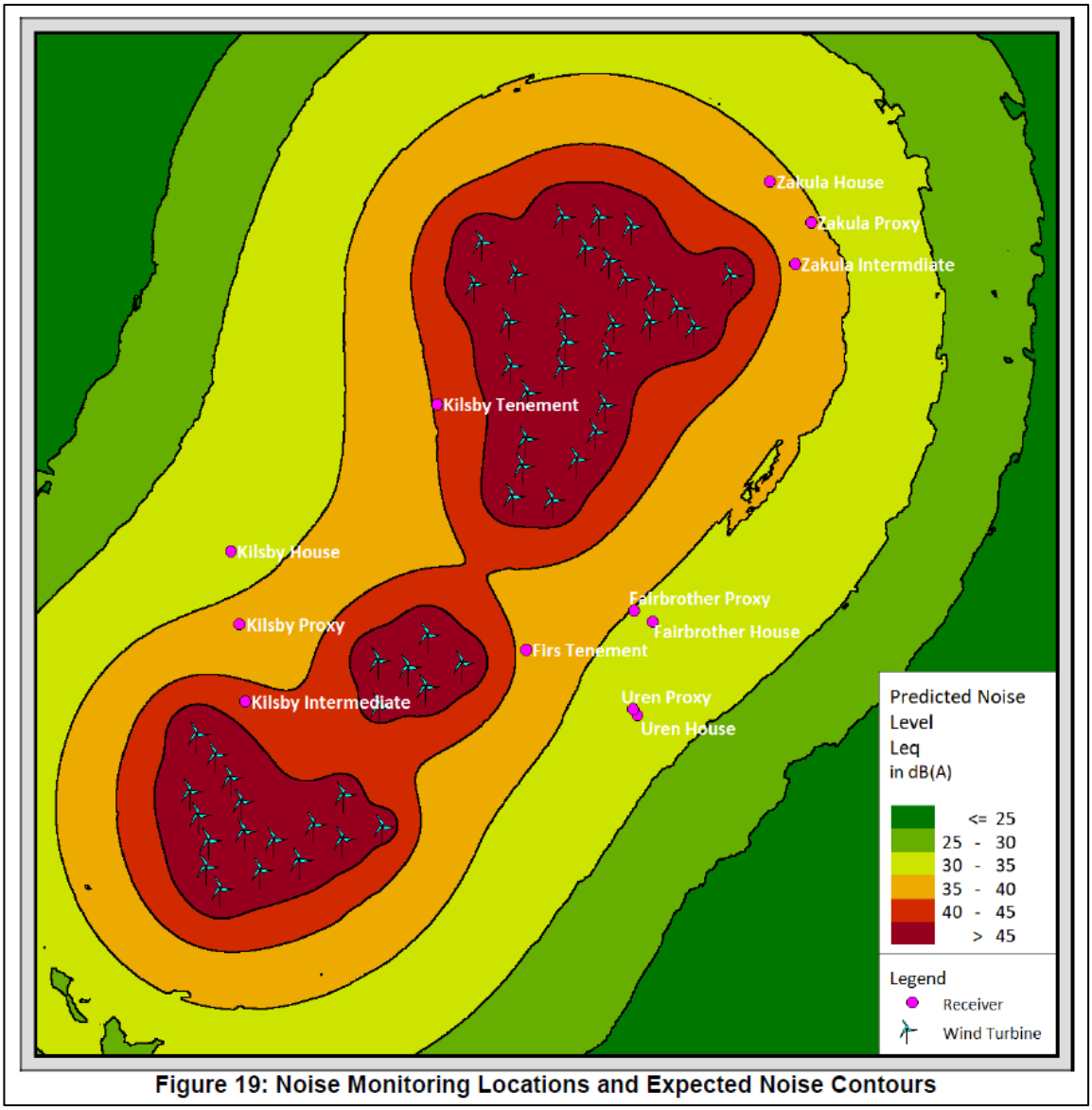

Figure 19: Noise Monitoring Locations and Expected Noise Contours

145 In relation to condition 19(b), Mr Turnbull explained that special audible characteristics or SACs are clearly audible tones, impulses or modulation. A 5 dB penalty is to be added to any individual data point when a SAC is present — the penalty is not added to the regression line. When the NZ Standard was developed in 1998 there was no simple objective method of quantifying SACs. A subjective assessment is therefore necessary, supported by objective evidence where required. The Joint Nordic Method is to be used as the objective method for determining tonality.

146 The NZ Standard identifies IEC DIS 1400-11 as the relevant standard for applying the

Joint Nordic Method. That was a draft standard in 1998, which has since been replaced by the standard IEC61400-11. The standards IEC61400-11, ISO1996-2 and ETSU-R-97 all provide a similar methodology for determining the audibility of tones. Mr Turnbull used ISO1996-2 2007, which is referenced in the 2010 NZ Standard. It applies a penalty ranging from 0 dB(A) to 6 dB(A) depending on the audibility of the tone.

147 During his noise monitoring in 2020 and 2021, Mr Turnbull listened for special audible characteristics close to turbines, and at the plaintiffs' properties on several occasions when he was installing equipment. He did not observe impulsive sound, and the level of amplitude modulation was typical of other wind farms. On some occasions, he observed tonality in the low frequency range. Using digital recordings, he identified audible tones in the near field close to turbines 10 and 40. He therefore analysed 2 minutes of digital audio in every 10 minute sample at each plaintiff's house to detect tones between 20 Hz and 425 Hz. Whenever he detected an audible tone warranting a penalty of greater than 0 dB(a), he added a penalty of 5 dB(a) to the measured noise level before the correlation assessment.

148 Mr Turnbull said that there was no specific methodology for assessing compliance with condition 19(c). To his knowledge, it had not been derived from any standard or guideline, and he was only aware of one other wind farm where it had been applied. He had been instructed by Bald Hills' solicitors to use the following methodology:

> **Step 1**: Analyse the aggregated night data for the monitoring period(s) in accordance with the regression method outlined in the NZ Standard NZS 6808:1998. The 'night' is the 'SEPP defined' night period of 10pm to 7am, across the monitoring period.
>
> **Step 2**: For any wind speeds (measured to the nearest 0.1m/s) that indicate an exceedance of the project specific criteria determined by the regression analysis in Step 1, determine whether those wind speeds occur more than 10% of the total measurement time. To the extent practicable, this is to occur consistent with the NZ Standard NZS 6808:1998.

149 He considered this to be a reasonable interpretation of condition 19(c), in part because it did not require adjustment to the procedure of the NZ Standard other than

excluding day time data.

150 The final aspect of Mr Turnbull's methodology to note is his use of near field noise measurements, which he considered a useful way of identifying the wind farm when mixed with other noise sources. He gave two examples. First, if a tone does not exist near turbines, then it will not be audible at a nearby dwelling. Second, if the sound level plateaus at a particular wind speed near the turbine, then an increase in the sound level at a dwelling above that wind speed cannot be due to the wind farm.

151 He had recorded noise levels close to turbine 10 over two days in June 2020. He found that the noise levels reached a plateau at between 8 m/s and 9 m/s, and did not increase further as the wind speed increased. This supported the exclusion of noise data above 12 m/s.

Review of MDA assessments

152 Mr Turnbull reviewed numerous MDA assessments of compliance, including the MDA December 2016 report, the MDA Zakula noise report and the MDA Uren noise report. He reviewed the adequacy of the monitoring locations, the equipment used, the analysis conducted, the wind speed data used, the assessments of special audible characteristics, the approach to condition 19(c), the curtailment regime, and the attended noise measurements at Tenement B. He concluded that MDA had demonstrated compliance at all existing residences not associated with the wind farm, although compliance had not been demonstrated at Tenement B or the Firs Tenement. He believed that MDA had demonstrated compliance with condition 19 of the permit at Mr Zakula's house and Mr Uren's house.

153 In relation to MDA's approach to condition 19(c), Mr Turnbull said:

> 124. MDA has conducted separate assessments for the night period and analysed the data in accordance with the NZ Standard. With the exception of Tenement B, every non-associated monitored location ultimately achieved the criteria at every wind speed. Although MDA has not specifically described the method, the "Compliance at wind speeds representing 90% of data points" as described in Section 6.5.3 can be applied to the results.

> 125. For locations where the night time monitoring achieved the criteria at all wind speeds, it can be concluded that the noise exceeded the criteria at wind speeds which occur for less than 10% of the night period (actually 0%) and therefore compliance with 19c is achieved.

154 In his oral evidence, Mr Turnbull clarified that he understood that all that MDA had done was to do a separate assessment for the night period. It did not appear that MDA had used the methodology that he had been instructed to apply.

Noise monitoring

155 Mr Turnbull conducted noise monitoring at locations including Mr Zakula's house and Mr Uren's former house between 19 June and 4 August 2020 and between 21 February and 6 April 2021. It turned out that a number of turbines were not in use during the 2020 monitoring period, and Mr Turnbull considered that any conclusions drawn from that data did not represent the typical operation of the wind farm. The wind farm's operation during the 2021 monitoring period was typical.

156 His primary assessment of the 2021 noise monitoring was based on data recorded at the proxy locations, which he considered appropriate to minimise the influence of noise from other source such as wind in tall trees. He filtered the data recorded at these locations by removing 10 minute periods where:

(a) data might have been adversely affected by rain or wind on the microphone, where it had rained during the 10 minute period, or the wind speed exceeded 5 m/s for more than 90% of the 10 minute period;

(b) the noise level measured at the intermediate location was lower than the noise level measured at the proxy location;

(c) the data may have been adversely affected by extraneous noise sources such as insects, birds or frogs, using the one-third octave band method described above;[55]

(d) wind speeds were below 3 m/s, the cut-in speed of the turbines, or above

[55] See [141] above.

12 m/s; and

(e) equipment was being placed or removed, or batteries changed.

157 He applied a 5 dB(a) penalty where tonality was detected, using the method set out at [147] above. He then correlated the filtered and adjusted data set with de-waked wind data from MM80, as calculated by DNV-GL.[56] He determined the resultant regression curve to represent noise from the wind farm.

158 After filtering, Mr Turnbull had 2,365 data points from the Zakula proxy location, 835 of these recorded during the night period. These are shown on the correlation graphs at **Figure 7** and **Figure 8** below. The red curve is the compliance line, and the black curve is the regression line for the data. Once again, the grey dots represent data points that were excluded from the analysis.

Figure 7: Graph showing 24 hour correlation at Zakula proxy location, from Mr Turnbull's report dated 16 June 2021, page 70.

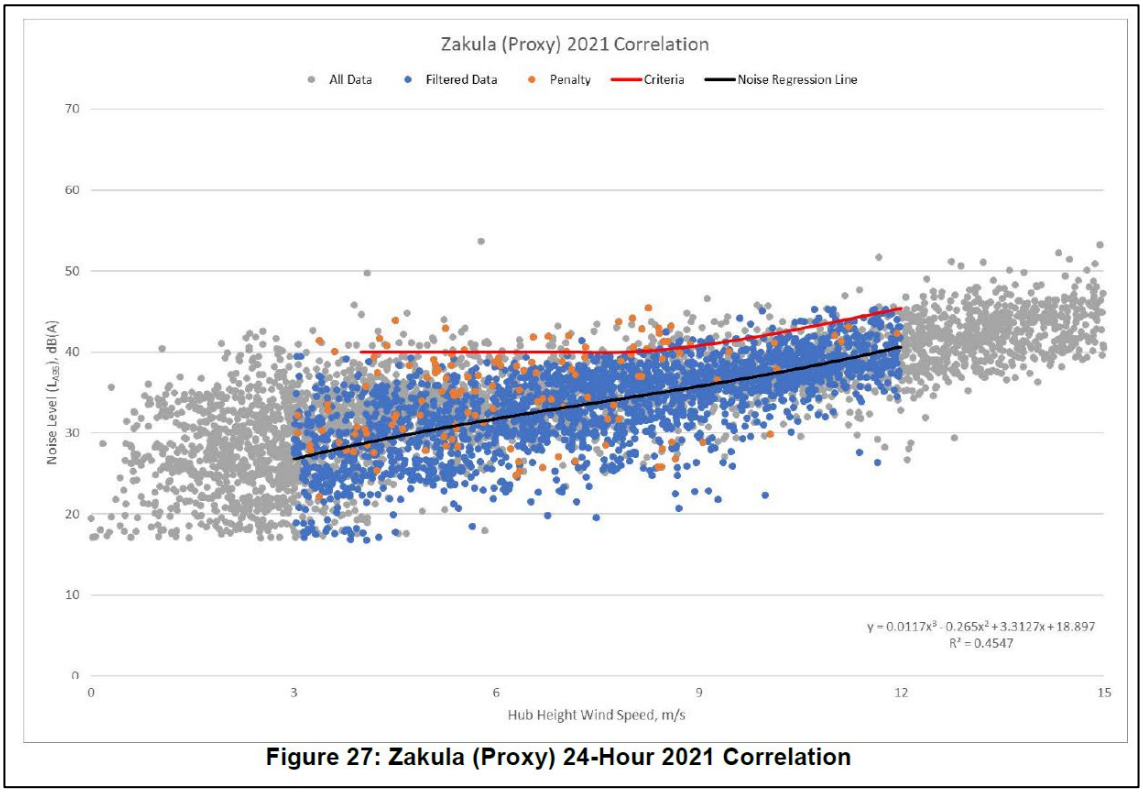

Figure 27: Zakula (Proxy) 24-Hour 2021 Correlation

56 See [114] above.

Figure 8: Graph showing night time correlation at Zakula proxy location, from Mr Turnbull's report dated 16 June 2021, page 74.

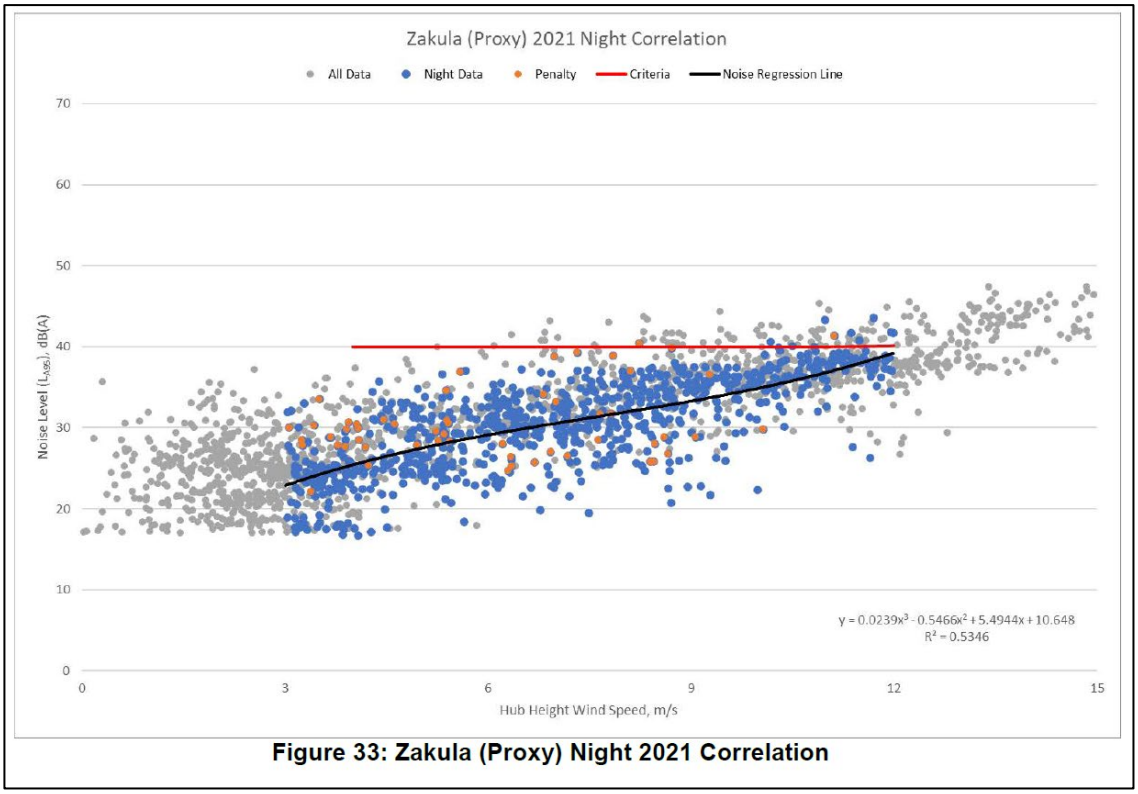

Figure 33: Zakula (Proxy) Night 2021 Correlation

159 Mr Turnbull used 1,218 data points from the Uren proxy location, of which 332 were recorded at night. These are shown on the correlation graphs at **Figure 9** and **Figure 10** below.

Figure 9: Graph showing 24 hour correlation at Uren proxy location, from Mr Turnbull's report dated 16 June 2021, page 70.

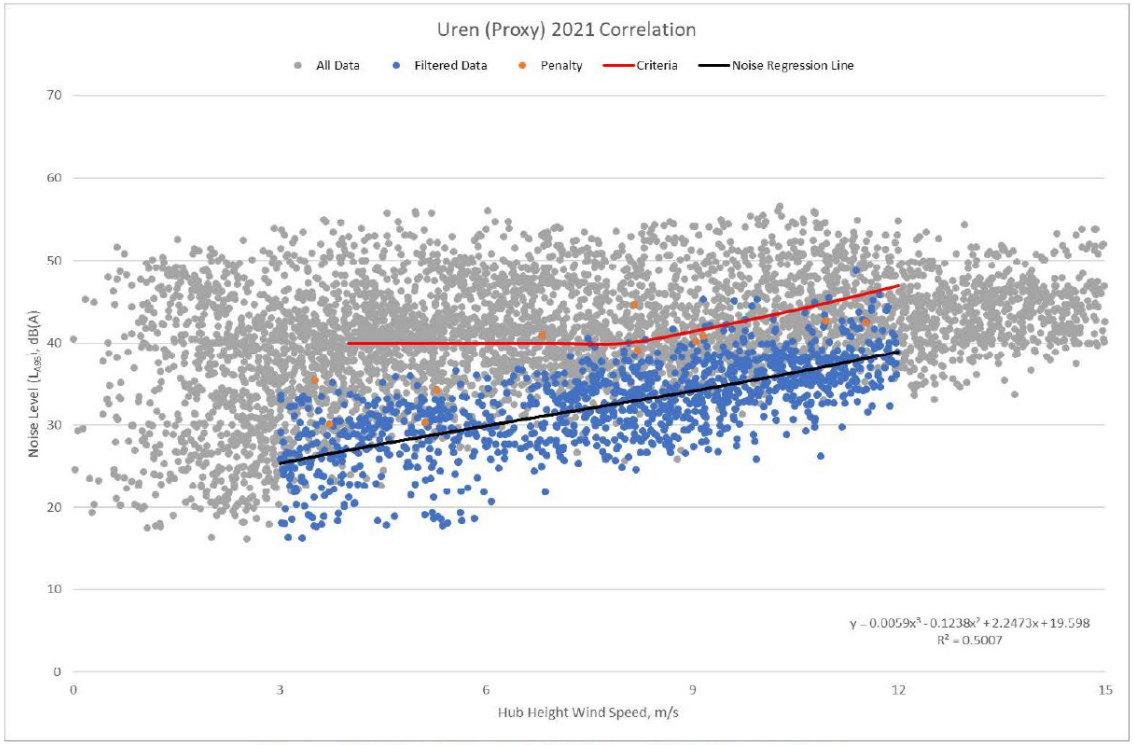

Figure 26: Uren (Proxy) 24-Hour 2021 Correlation

Figure 10: Graph showing night time correlation at Uren proxy location, from Mr Turnbull's report dated 16 June 2021, page 73.

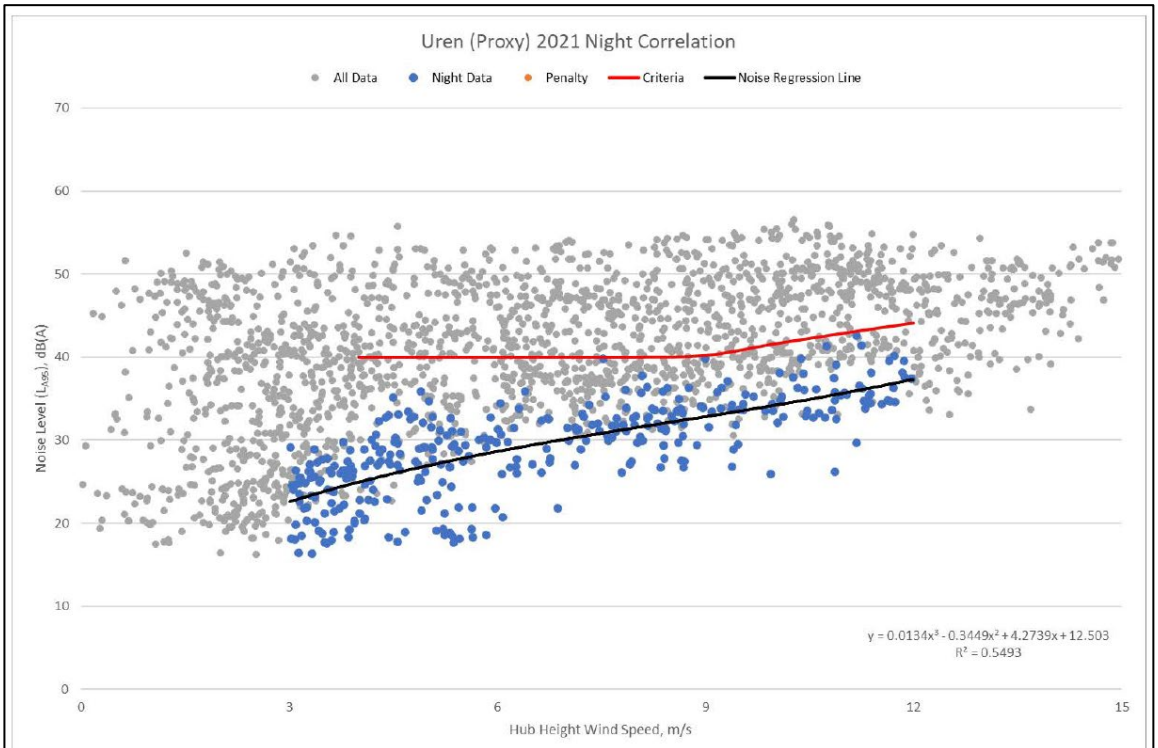

Figure 32: Uren (Proxy) Night 2021 Correlation

160 Mr Turnbull concluded that compliance with permit condition 19(a), including the assessment of special audible characteristics in accordance with permit condition 19(b), was achieved at both Mr Zakula's property and at Mr Uren's former property. In relation to night time compliance, he concluded that the criteria were achieved at all wind speeds at both locations, and so permit condition 19(c) was also met.

161 Mr Turnbull also conducted a secondary assessment, using data recorded at the plaintiffs' houses. He used the same methodology that he had used to assess the data from the proxy locations.

162 After filtering, there were 1,795 data points recorded at Mr Zakula's house, 973 of those at night. From this data Mr Turnbull prepared the correlation graphs for the 24 hour period and the night period shown in **Figure 11** and **Figure 12** below.

Figure 11: Graph showing 24 hour correlation at Mr Zakula's house, from Mr Turnbull's report dated 16 June 2021, page 79.

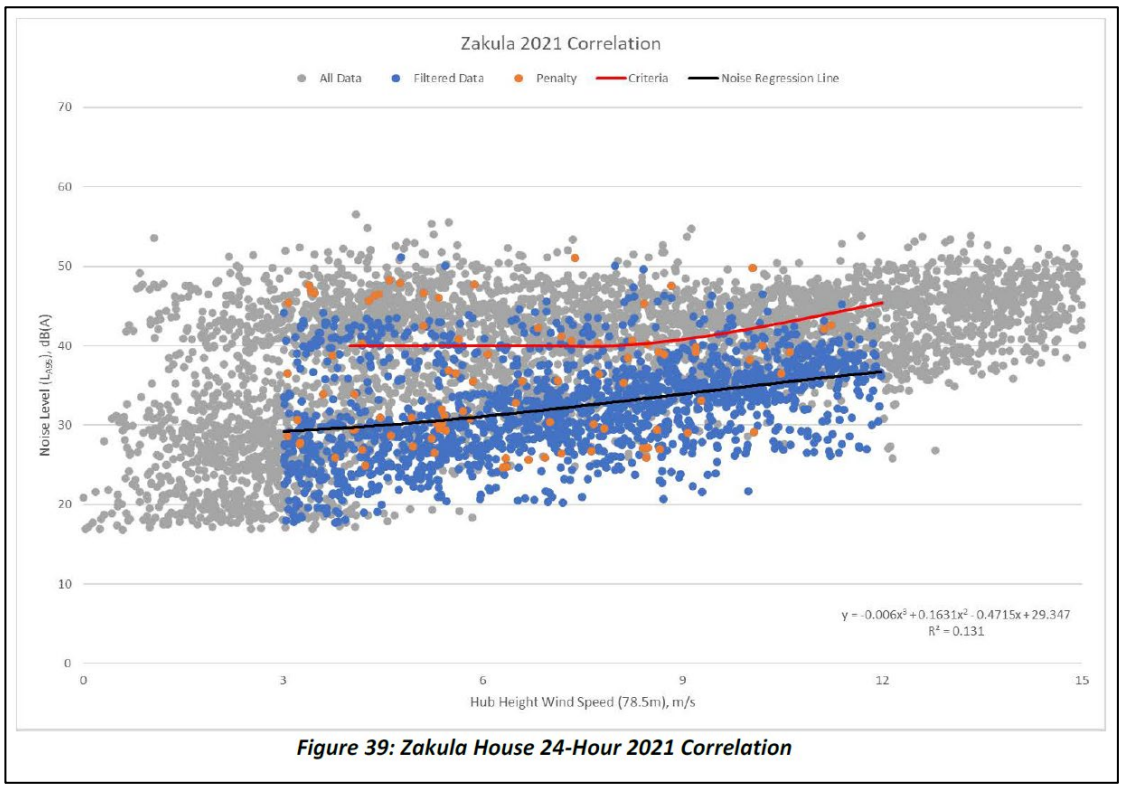

Figure 39: Zakula House 24-Hour 2021 Correlation

Figure 12: Graph showing night time correlation at Mr Zakula's house, from Mr Turnbull's report dated 16 June 2021, page 82.

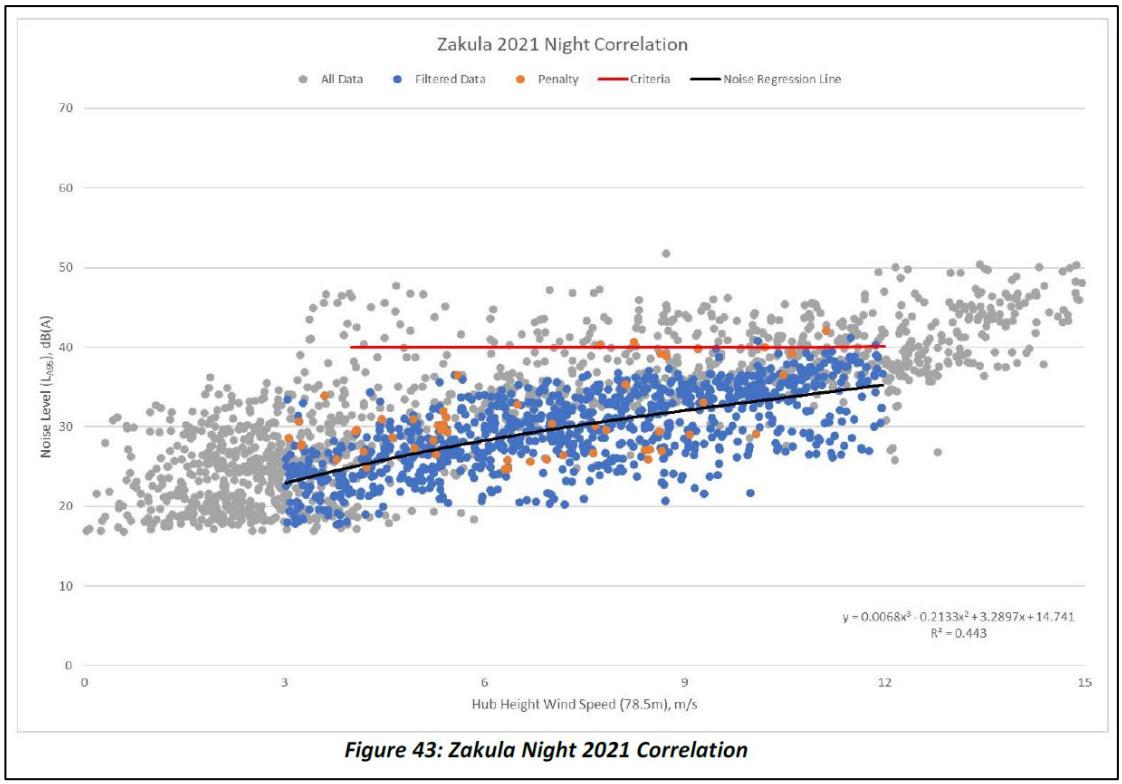

Figure 43: Zakula Night 2021 Correlation

163 There were 1,321 filtered data points from Mr Uren's former house, of which 695 were recorded at night. This data is represented in the correlation graphs at **Figure 13** and **Figure 14** below.

Figure 13: Graph showing 24 hour correlation at Mr Uren's former house, from Mr Turnbull's report dated 16 June 2021, page 79.

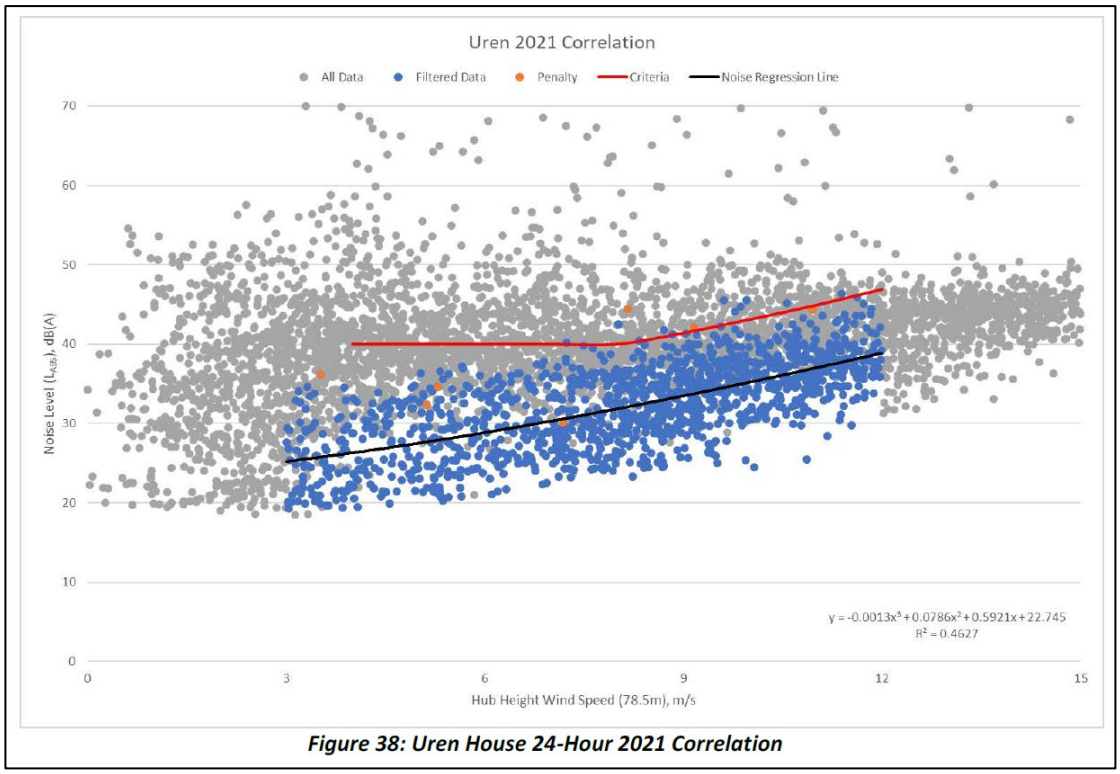

Figure 38: Uren House 24-Hour 2021 Correlation

Figure 14: Graph showing night time correlation at Mr Uren's former house, from Mr Turnbull's report dated 16 June 2021, page 81.

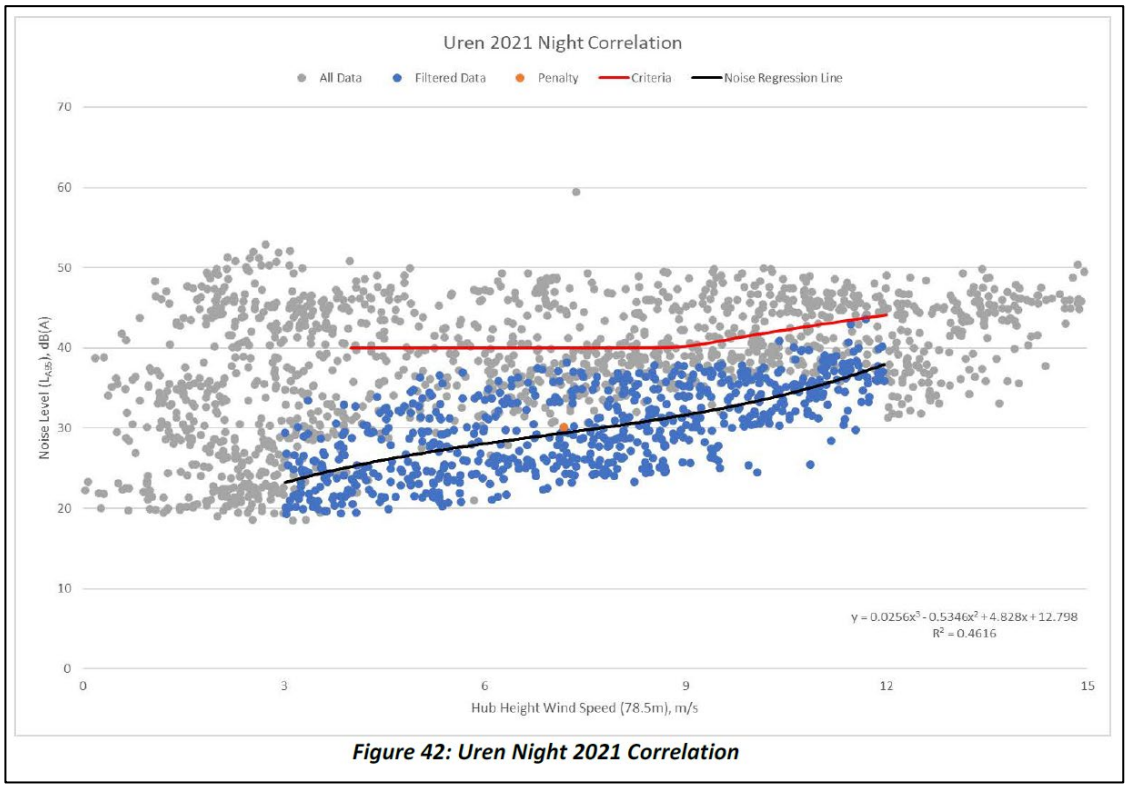

Figure 42: Uren Night 2021 Correlation

164 Again, Mr Turnbull considered that this demonstrated compliance with condition 19 at both locations, over the 24 hour period and at night.

Compliance with condition 19(a)

165 As will be clear from the preceding paragraphs, Mr Turnbull was meticulous in his approach to assessing the wind farm's compliance with condition 19 of the permit. He went to some lengths in his report to be transparent about his methodology, and gave clear and considered explanations of it in answer to questions at trial.

166 It is difficult to measure wind farm noise at a nearby location because the sound received at that location will be a mix of sounds from the wind farm and other sources. There are various approaches to measuring the sound levels generated by wind turbines, and excluding the contribution from other sources, as discussed at [139] to [144] above. The NZ Standard, which is applied by condition 19 of the permit, prescribes the first of these methods — subtracting background noise. That is, it provides for the sound levels generated by wind turbines to be worked out by subtracting background sound levels recorded at the relevant location from operational sound levels recorded at the same location. It does not contemplate the measuring of wind farm noise using the other approaches that were employed by Mr Turnbull in his assessment.

167 Mr Turnbull's interpretation of condition 19 and the NZ Standard is that it permits these alternative approaches to be used, as an alternative to subtracting background noise. He referred to the fact that condition 19(a) requires measurement of the 'sound level from the wind energy facility' — not the sound level from the wind farm combined with sound from other sources. He also relied on the statement in the notes to the worked example in Appendix A to the NZ Standard, that:

> Since the "operational" measurements will be combined windfarm and background levels, it may be necessary to adjust these measurements to determine the "windfarm only" levels.

168 I do not accept that the NZ Standard is to be interpreted in this way. The NZ Standard, read as a whole, provides 'specific guidelines for the prediction, measurement and

assessment of sound' from wind turbines.[57] It 'deals specifically with the measurement of sound from WTGs in the presence of wind, a situation which has high potential for fluctuations and errors due to both increased background sound levels and wind effects at the microphone'.[58] It sets out a detailed procedure for measurement of sound in the outdoor environment that, if followed, 'can produce reasonably accurate and repeatable results'.[59]

169 The procedure prescribed by the NZ Standard involves taking background sound level measurements at relevant locations, as set out in cl 4.5. This is done both to determine the acceptable limit at a residential site, and to provide a base for compliance level testing when the wind farm is operational. Section 5 of the NZ Standard sets out a 'precise method' for post-installation compliance testing, based upon the method outlined for background sound level testing 'with the exception that the WTGs will now be operational'.[60] Compliance is to be assessed as provided in cl 5.4. To repeat:

> **5.4 Compliance assessment**
>
> To determine conformance with the limits set out in 4.4.2, a comparison shall be made between the best fit regression line of the background sound levels and the regression curve of the operational windfarm corrected for any special audible characteristics. If the background levels were not measured prior to installation (4.5.1), it may be necessary to obtain background sound level measurements for limited periods at critical windspeeds to satisfy 4.4.2 (e.g. if wind turbine or windfarm sound levels exceed 40 dBA L_{95}). This may be for a limited range of windspeeds and directions, with the WTG(s) non-operational.

170 A deliberate choice is made in the NZ Standard to measure lower centiles of sound distribution — L_{95}, the sound level that is exceeded for 95% of the 10 minute measurement period. This choice applies an inherent filter to both background and operational noise monitoring, to best capture the 'continuous background effects' with and without the operation of the wind turbines.[61] There is no prescription in the NZ

57 NZ Standard, cl 2.1.
58 Ibid, cl 1.3.
59 Ibid.
60 Ibid, cl 5.1.
61 Ibid, cls 2.3–2.4.

Standard of any other method for filtering data.

171 I accept that the NZ Standard allows the exclusion of data that obviously does not capture these 'continuous background effects' — such as data recorded when it is raining, when the wind turbines are not operating, or at wind speeds below the turbines' cut-in speed and above their rated wind speed. Beyond that, I do not consider that the note in the worked example relied on by Mr Turnbull permits a departure from the precise and detailed method prescribed in the NZ Standard for determining the contribution of wind turbines to the sound levels received at a relevant site. There are several reasons for that view.

172 First, the sentence relied on is taken out of context. It appears immediately after a sentence that describes the comparison of operational sound level measurements with background non-operational measurements required by cl 5.4. The 'adjustment' necessary to determine wind farm only sound levels is achieved by subtracting background sound levels from the operational sound measurements — the ultimate step in the comparison required by the NZ Standard.

173 Second, cl 5.4 contemplates that there may be situations where background sound levels were not measured before the wind farm commenced operation. The solution offered is not to attempt to measure 'wind farm only' sound levels by using proxy locations, intermediate locations, and one-third octave band analysis to exclude data points that may be dominated by extraneous noise sources. It is to turn the wind turbines off for long enough to measure the background sound levels at critical wind speeds and directions.

174 Third, the sentence is not a Trojan horse that permits departure from the method prescribed in the body of the NZ Standard, or the use of alternative methods for assessing compliance. The purpose of the worked example is to explain the application of the prescribed method, not to subvert or replace it.

175 While the NZ Standard was adopted more than 20 years ago, and is referenced in the

planning permits for many wind farms and now in Div 5, Pt 5.3 of the Environment Protection Regulations, it appears not to have been the subject of any judicial consideration.[62] This has had the unfortunate consequence that acoustic experts have developed their own interpretations of the NZ Standard, which have diverged in significant respects. I accept that, in assessing compliance with condition 19(a), Mr Turnbull applied an interpretation of the NZ Standard that he believed to be correct. However, for the reasons given, I have reached a different view. Ultimately, the proper interpretation of the NZ Standard is for a court or tribunal adjudicating a question of permit compliance; it is not a matter for acoustic experts.

176 While it is not relevant to the interpretation of the NZ Standard, it is notable that the 2010 NZ Standard does not permit adjustment of operational noise measurements by the methods used by Mr Turnbull. It explicitly requires the wind farm sound levels to be derived by subtracting the regression curve for background sound from the regression curve for post-installation measurements. Clause 7.5.3 of the 2010 NZ Standard provides:

> Post-installation measurements will capture both the wind farm sound and the background sound. In order to assess the wind farm sound level alone, the contribution of the background sound shall be removed from the regression curve drawn in 7.5.2 at each integer wind speed.
>
> ***C7.5.3*** *While a simple energy subtraction of background and post-installation sound levels is not strictly mathematically correct for L_{90} centile levels, the difference may be taken as the L_{90} wind farm sound levels.*

177 In summary, I do not accept that Mr Turnbull's conclusions demonstrated compliance with condition 19(a) at Mr Zakula's house or at Mr Uren's former house, because he did not use the method for assessing wind farm noise prescribed by the NZ Standard, as required by condition 19 of the permit. The method prescribed by the NZ Standard is to derive wind farm noise levels by comparing the background sound level

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62 The only consideration the parties were able to identify was a 2017 report and decision of Independent Hearing Commissioners appointed by the Palmerston North City Council in New Zealand, to hear and decide a review of resource consent conditions relating to the Te Rere Hau wind farm, which referenced the 2010 NZ Standard. In their report, at [453], the Commissioners noted that the parties had commenced with opposing interpretations of the 2010 NZ Standard but had developed conditions involving tailored solutions, and so 'we did not feel the need to rigorously interpret NZS6808:2010'.

regression line with the regression line for the operational wind farm.

MDA noise assessments

178 I am also unable to accept Mr Turnbull's opinion that MDA's reports demonstrated compliance with condition 19(a) at the plaintiffs' houses.

179 The MDA December 2016 report expressed no opinion about wind farm noise levels at either location. It was directed to demonstrating permit compliance at the specific locations identified in the NCTP.

180 Mr Turnbull also reviewed MDA's memos of 4 March 2016, concerning Mr Uren's complaints between 1 June and 14 July 2015, and of 18 May 2016, responding to Mr Zakula's complaints from 3 October to 31 December 2015. Sound recording equipment was not in place at Mr Uren's property during the complaint period, and was only installed at Mr Zakula's house on 2 December 2015. MDA's responses were based on a review of sound recordings taken at other properties — House 60 as a proxy for Mr Uren's house and, before 2 December 2015, House 66 as a proxy for Mr Zakula's house. Further, both memos were based on reviewing audio samples from the time periods complained about, at a rate of one minute for each 10 minute interval. The method had some inherent limitations, noted by MDA in its memos. In neither memo did MDA purport to assess compliance with condition 19(a) using the method prescribed in the NZ Standard.

181 By contrast, the MDA Zakula noise report and the MDA Uren noise report were based on operational noise monitoring data recorded at the relevant locations. As discussed, MDA reached the remarkable conclusion that the noise levels at both residences were *lower* overall than the background levels used for comparison.[63] No-one from MDA was called to explain these findings. They were plainly not tenable. It is simply not possible that it became quieter at either Mr Zakula's house or Mr Uren's house after the wind turbines started operating in March 2015.

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63 See [108]–[109] above.

182 The invalidity of MDA's conclusions in these two reports may have resulted from one or more of the following matters:

(a) No background sound level measurements were taken at either house. The background measurements used for comparison were taken at different locations — at House 66 in Mr Zakula's case, and at House 59 in Mr Uren's.

(b) The background sound level measurements were taken during construction of the wind farm. It is possible that the sound levels recorded were affected by construction activities, including heavy vehicles on Buffalo-Waratah Road.

(c) MDA applied data filtering to the noise monitoring data recorded at both houses between late 2015 and September 2016, as described at [115] above, including filtering for extraneous noise. MDA did not explain in any of its reports what, if any, filtering it applied to the data recorded when background sound level measurements were taken. I heard no evidence from anyone at MDA, and I am not confident that it filtered its pre-construction data in the same way as its operational noise monitoring data. I am not reassured by Mr Turnbull's opinion that it did, for the reasons given at [184] below.

(d) There was a high level of uncertainty about the accuracy of the wind speed data used by MDA in its analysis. This was exacerbated by the failure of both of the top-mounted sensors on the BH80 wind monitoring mast, the second of which failed in August 2016.[64]

(e) MDA included data recorded when at least 50 of the 52 turbines were in operation. It does not appear to have paid attention to which turbines were not operating. Data gathered when one of the turbines close to Mr Zakula's house was not operating — in particular turbine 16 — would not fairly represent typical wind farm noise levels there. The same would apply to noise levels recorded at Mr Uren's house when one of the nearby turbines was off, in

64 See [114] above; MDA December 2016 report, Appendix G – Site reference wind speed data – derivation.

particular turbine 42.

183 It is not necessary to make any finding about why MDA's assessments of wind farm operational noise at Mr Zakula's and Mr Uren's properties went astray. The findings MDA expressed in both reports are obviously unsound, and do not demonstrate permit compliance at either property.

184 The questions explored during the experts' evidence included what filtering was applied by MDA to its background and operational sound level measurements used to assess compliance with condition 19(a). Dr Thorne and Mr Huson both said that they did not know how MDA had filtered its background data, because they had never seen MDA's datasets.[65] Mr Turnbull volunteered that he had asked for and analysed the raw background data for locations 19, 61 and 66, and had satisfied himself that they had applied the same filtering to both pre-construction and operational data.[66] Dr Thorne was 'stunned' to learn that this raw data had been given to Mr Turnbull, when he had asked for the same information 18 months previously and it had never been provided.[67] The raw background data was apparently not discovered by Bald Hills, or produced by MDA in answer to a subpoena served on it in May 2020. The raw data files were belatedly produced by Mr Turnbull during the trial, in response to a subpoena for production served on him in June 2021.[68] It is unsatisfactory that Dr Thorne and Mr Huson did not have timely access to relevant data, and had no opportunity to analyse it while preparing their reports or before giving evidence. In those circumstances, it would be unfair to the plaintiffs to accept Mr Turnbull's opinion based on that data.

Applying condition 19(b) – special audible characteristics

185 The plaintiffs also impugned the way in which MDA and Mr Turnbull had assessed whether special audible characteristics were present and, when they were found, how the 5 dB penalty required by condition 19(b) had been applied. The NZ Standard

65 Transcript, 20 September 2021, 1037:30–1038:6, 1042:29–1043:5.
66 Transcript, 20 September 2021, 1047:24–1048:10.
67 Transcript, 20 September 2021, 1050:3–24.
68 Transcript, 22 September 2021, 1115:8–1117:6, 1157:8–1161:13.

states that sound from a wind turbine that has special audible characteristics — clearly audible tones, impulses, or modulation of sound levels — is likely to arouse adverse community response at lower levels than sound without such characteristics.[69] The subjective reaction to a sound with a special audible characteristic is generally similar to the reaction to a sound that is 5 dB louder but without the characteristic. For that reason, the NZ Standard applies a 5 dB penalty when a sound has a special audible characteristic.

186 The methods used by MDA and Mr Turnbull to identify special audible characteristics are described at [117] to [120] and [145] to [147] above. The plaintiffs contended that those methods were deficient in the following ways:

(a) their initial subjective assessment of whether SACs were present was inadequate, in particular for the night period;

(b) they did not use the prescribed IEC standard to test objectively for tones;

(c) they did not subjectively identify or objectively test for amplitude modulation or impulses; and

(d) they applied the 5 dB penalty only to those data points where SACs were found to be present, rather than to the regression curve.

187 Identifying whether SACs are present is initially a subjective exercise. Dr Thorne put a strong argument that they could only be identified subjectively, by the community who the 5 dB penalty is designed to protect, because only those people can say what sounds are annoying or disturbing to them. Complaints and noise diaries were his starting point. Mr Turnbull was of the view that the subjective assessment should be made by someone with acoustic qualifications, and then followed by an objective assessment to confirm whether the SACs are in fact present. Mr Turnbull's approach is reasonable when assessing for permit compliance in the absence of community

[69] NZ Standard, cl 5.3.1, set out at [63] above.

complaints. But where, as here, there have been complaints about annoying noises, those should guide any search for the presence of special audible characteristics.

188 As noted, the subjective assessments done by MDA involved three listening tests at Mr Zakula's property over the 10 month monitoring period, and five listening tests at Mr Uren's property over the course of a year. None of these tests took place at night time, and they lasted between 10 and 14 minutes. MDA detected tonality, and undertook a comprehensive objective assessment of all of its audio recordings to find when clearly audible tones were present. It did not identify impulses or amplitude modulation, and so undertook no objective assessment of its audio recordings to look for those characteristics. This was despite complaints by Mr Zakula and Mr Uren, recorded in Bald Hills' complaint register, that they were troubled by noises including 'whooshing', 'thumping', and the 'thundering thud of the blade passing the support column'.[70]

189 Mr Turnbull conducted his subjective assessments in the course of placing and checking his sound monitoring equipment. Like MDA, he observed tonality and did objective testing to identify when clearly audible tones were present. He did not observe impulses or amplitude modulation that was unusual for a wind farm. Again, he did not consider that the plaintiffs' complaints of 'whooshing' and 'thumping' noises warranted objective testing.

190 There was division between the acoustic experts as to whether the typical 'whoosh, whoosh' noise from wind turbines was a special audible characteristic if audible at a nearby dwelling. Dr Thorne considered that it was, if it was annoying to the residents. Mr Turnbull said that it was not, because it was a typical wind farm noise and was therefore not 'special'. Mr Huson's view was that the 'whoosh, whoosh' sound is a special audible characteristic if the amplitude modulation from peak to trough is more than 3 dB. I prefer Mr Huson's approach, which strikes a balance between subjective

70 Exhibit P5 – Bald Hills complaint register, complaints by Mr Uren on 11 March 2015 and 15 April 2015, complaint by Mr Zakula on 23 September 2015.

and objective considerations. It also gives effect to the purpose of cl 5.3 of the NZ Standard and condition 19(b), which is to compensate for sound that is likely to be annoying to the community.

191 I consider that the subjective assessments by both MDA and Mr Turnbull for the presence of special audible characteristics were insufficient, in relation to impulses and amplitude modulation. They should have conducted subjective listening tests at or near the plaintiffs' homes at night time, in the weather conditions associated with their complaints. They should have been prompted by the complaints of the plaintiffs, and their neighbours, to listen for impulses such as thumps, and amplitude modulation such as whooshing, on more than a handful of occasions. In particular, they should have identified any times when the 'whoosh, whoosh' sound made by turbine blades passing the tower involved a difference of 3 dB or more. Because these things were not done, I am not satisfied that condition 19(b) was properly applied by MDA or Mr Turnbull in their assessments of compliance.

192 I have no difficulty with their application of condition 19(b) in relation to audible tones. I am not troubled by MDA's use of ETSU-R-97 or Mr Turnbull's use of ISO1996-2 2007 to identify when clearly audible tones are present. The NZ Standard requires use of the Joint Nordic Method to assess for tonality. It does not prescribe IEC61400-11, which was still in draft form when the NZ Standard was adopted. Both MDA and Mr Turnbull used the Joint Nordic Method, in accordance with an accepted standard.

193 In addition, if a special audible characteristic occurs intermittently, the 5 dB penalty should only be applied when it is present — as provided in cl 5.3 of the NZ Standard. It is only if it is a constant noise that the penalty should be applied to the regression curve. This does mean, however, that it is necessary to objectively assess every audio recording, to determine which data points should have the 5 dB penalty added to them. If that exercise is not undertaken when SACs have been subjectively found to be present, the penalty should be added to the regression curve.

Compliance with condition 19(c) – protection of sleep at night

194 The Panel recommended the definition of a night compliance period, within which 'the wind energy facility should not exceed the standard more than 10% of the time'. The approach was intended by the Panel to 'protect the interests of occupants in undisturbed sleep'.[71]

195 The recommendation is reflected in condition 19(c) of the permit, which requires compliance at night to be separately assessed with regard to night time data. The condition adopts the definition of 'night' in the State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (**SEPP N-1**) — that is, the period between 10:00pm and 7:00am. There is no dispute about these aspects of condition 19(c).

196 Unfortunately, the critical sentence of condition 19(c) has been interpreted in widely divergent ways. The sentence reads:

> For sleep protection purposes, a breach of the standard set out at 19(a), for 10% of the night, amounts to a breach of the condition.

This indicates that, for the protection of sleep, there is a different, more stringent noise standard that applies at night time. But what is that standard, and how is compliance with it to be assessed?

MDA

197 As mentioned, MDA's approach to condition 19(c) appears to have been to conduct a separate assessment of night time data, against the compliance standard determined in accordance with condition 19(a) and the NZ Standard. The NCTP, developed by MDA, said nothing about how compliance with condition 19(c) was to be assessed. There is no indication in MDA's reports or memos that it applied a different noise standard for the night period.

198 This approach gives no effect to the condition's sleep protection purpose, and is plainly not correct. On that basis, I cannot find that MDA's analysis demonstrated

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71 Panel Report, 210; see [59] above.

compliance with condition 19(c) of the permit.

Mr Turnbull

199 Mr Turnbull was instructed by Bald Hills' solicitors to take a different approach, set out at [148] above. The first step in this approach was assessment against the permit criteria provided by conditions 19(a) and 19(b) at each integer wind speed during the night period. If the permit criteria were not achieved for a particular wind speed, the second step was to determine if those conditions arose for more than 10% of the night period. Mr Turnbull considered this to be a reasonable interpretation of condition 19(c), which could be performed over a six week period without adjusting the procedure required by the NZ Standard.

200 This approach also does not apply a more stringent noise standard for the night period. Rather, it applies the same standard that applies during the day to night time data. It is only if that standard is not achieved at a particular wind speed that any attention is given to whether the non-compliance continues 'for 10% of the night'. It also does not allow for the eventuality that the standard may be exceeded at different wind speeds for more than 10% of the night. I do not consider that Mr Turnbull was able to demonstrate compliance with condition 19(c) using this method.

201 Another approach that Mr Turnbull had tried was to isolate the highest 10% of noise from the wind farm as the noise data that is most downwind. He said that the advantage of this methodology is that it can discriminate between the highest wind farm noises and the highest noises from other sources. The disadvantage is that it yields only a small data set, with nearly 97% of the data excluded even before filtering for extraneous noise. If he had enough data, this would be his preferred method. However, his six weeks of monitoring had not provided that data.

202 Mr Turnbull's alternative approach can be set aside as impractical. Compliance with condition 19(c) must be capable of ready assessment, which cannot be done using this method.

Dr Thorne

203 Dr Thorne's approach was to derive a regression curve from the loudest 10% of the night time data recorded, after filtering for periods of rain and adding any penalty required where special audible characteristics were present. He had considered whether the data should be more heavily filtered to capture wind farm noise alone, but was not convinced that was the correct approach. Condition 19(c) was breached if the regression curve was above the compliance line.

204 Mr Turnbull criticised this approach as being most likely to filter out noise levels resulting from the wind farm, and to result in an assessment of noise dominated by sources such as insects, birds and wind in the trees. He demonstrated this point by a graph showing the background noise measured at one location before the wind farm was constructed. The regression line for the highest 10% of data was above 40 dB(A) for all wind speeds, at a time when there was no noise from the wind farm. He said that Dr Thorne's interpretation could not be reasonable because it was not consistent with the intent of assessing wind farm noise.

205 At one level, this criticism is misplaced, because there is no need to assess compliance with condition 19(c) at times when the wind farm is silent. However, the use of an extreme example did illustrate the flaw in Dr Thorne's approach to condition 19(c) — it does not measure wind farm noise. It uses neither the method prescribed by the NZ Standard of comparing before and after noise levels, nor Mr Turnbull's approach of excluding data that is not considered to represent noise from the wind farm.

206 For that reason, I do not consider that compliance with condition 19(c) can be assessed using Dr Thorne's approach.

Mr Huson

207 Mr Huson proposed yet another interpretation, as follows:[72]

> The assessment period at night is from 10pm through to 7am the next morning. During this 9-hour period it is a requirement that the permitted night time sound level limit (from condition 19(a)) is not exceeded for more than 10% of

[72] Exhibit P90 - Expert report of W L Huson dated 22 March 2021, 10.

> the night time.
>
> Therefore, if wind farm noise levels exceed target night time noise limits for more than 0.9 hour between 10pm and 7am the next morning then that amounts to a breach of the Permitted noise limit described in Condition 19(a).

Under this interpretation, condition 19(c) would be breached if six 10 minute LA_{95} results — one hour in total — exceed the condition 19(a) noise limit in any night. Mr Huson considered that individual nights had to be considered in the application of condition 19(c), because the averaging of sound level data from nights over a six week period diminishes the assessment of adverse effects on sleep night by night that condition 19(c) is designed to protect.

208 This interpretation has a number of advantages. It is simple and readily applied, and may be used to investigate a complaint about wind farm noise on a particular night. It was put to Mr Huson that his interpretation was not consistent with using a regression line, as the NZ Standard requires. He responded:

> No, it is consistent with using a regression line because the target noise limit that you're comparing each value against is derived from a regression line through background data - and it's background plus 5, so that's your target limit and you use a regression analysis to get that target. Once you've got that target, you can then assess any individual 10-minute value.

209 It was Mr Turnbull's view that the NZ Standard was wholly unsuitable for assessing compliance on an individual night.[73] He considered that it made no sense to compare a single data point, or a handful of data points, from a single night with a background sound level regression line. The approach did not compare like with like.

210 Bald Hills submitted that this approach should be rejected because it was not consistent with the NZ Standard, and was not expressly provided for in condition 19(c) itself. It argued that condition 19 as a whole, including condition 19(c), is directed at ensuring compliance with the NZ Standard. This was said to be plain from the introductory words of the condition and the chapeau to conditions 19(a) to (c). It embraced Mr Turnbull's view that the NZ Standard was not suitable for assessing

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73 Transcript, 23 September 2021, 1335:20–1337:5, 1340:1–1342:7, 1344:17–22.

compliance on a single night, because it was not possible to measure the contribution from the wind farm to the noise levels on a single night.

211 Having given anxious consideration to these arguments, I consider that the approach proposed by Mr Huson is the proper approach to assessing compliance with condition 19(c). My reasons for reaching that conclusion are as follows.

212 First, it has the considerable advantage that it is easy to understand and apply, and provides a simple means of investigating a complaint about wind farm noise. No other approach fulfils this basic function.

213 Second, the NZ Standard serves at least two separate purposes in condition 19. The first purpose is to set the acceptable limit for noise from the wind farm. Clause 4.4.2 provides that the acceptable limit, at any residential site, is the background sound level (L_{95}) exceeded by no more than 5 dBA, or a level of 40 dBA L_{95}, whichever is the greater. This is the 'standard' with which the wind farm must comply. The second purpose served by the NZ Standard is to provide a method for assessing compliance with this standard, as required by condition 19(a). Condition 19(c) contemplates using a different method for a separate assessment of night time compliance with the standard.

214 Third, Mr Huson's approach gives effect to the evident purpose of condition 19(c) — protecting the sleep of those who live near the wind farm. The Panel proposed a special night time condition 'in order to form a hard measure against which sleep can be protected'.[74] Assessment of compliance using the method provided in the NZ Standard is not a 'hard measure' for protecting sleep. It averages noise data over a long period, in a way that tends to mask the adverse effect of one or two noisy nights in particular weather conditions.

215 The Panel foreshadowed that 'an evidenced breach of NSZ6808 for more than 10% of

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74 Panel Report, 207–8.

a SEPP N1 night would be a breach against which action could be pursued'. The action contemplated by the Panel was:[75]

> In such circumstances at night, the Panel considers that a complaint would be lodged. Monitoring equipment should then be made available to the complainants dwelling. If a substantiated instance of 10% breach were recorded, the following action would flow. The first step would be for the wind farm operator to identify the relevant climatic circumstances, with particular note being taken of the wind direction and any unpredicted difference between the 10m and hub height wind speeds. The operator would then be provided with a period within which to 'noise optimise' the turbine or turbines considered likely to be the source of the complaint. If a further substantiated instance of 10% breach were recorded after optimisation had occurred, the operator would then be invited to consider climate specific turbine shutdown. Only if this failed would formal action against the operator be commenced.

All of this indicates that the Panel had in mind assessing compliance on individual nights, in part so that the wind farm operator could identify the weather conditions in which it should noise optimise or shut down specific turbines. By contrast, during day and evening hours, the Panel considered 'that normal NZS6808 averaging provisions should apply'.[76]

216 Fourth, I am not convinced that there is any real danger that this approach will hold the wind farm responsible for noise from other sources — such as crickets or frogs, or wind in the trees, or farm machinery. These sounds were present in the environment before the wind farm was constructed, and are represented in the background sound level data on which the noise limit is based. There is no suggestion that these noises have been the subject of complaint to the wind farm, while the Bald Hills complaint register records many complaints specifically about wind turbine noise.

217 Fifth, this approach allows for the exclusion of outlying data points that clearly do not represent wind farm noise. As Mr Turnbull explained, there are a range of ways to identify and exclude data points where other sounds predominate. These include making a subjective assessment of individual audio recordings made on nights of concern. While it is not permissible to use these methods to assess compliance with

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75 Ibid, 208.
76 Ibid.

condition 19(a), it may be appropriate to do so in assessing compliance with condition 19(c).

A further alternative

218 During the trial, I proposed a further interpretation of condition 19(c) for the acoustic experts' consideration. This interpretation involved taking the loudest 10% of operational night time data, filtering it in the same way as background sound level data, adding any required penalties for special audible characteristics, and plotting the 90th percentile of that data. Both Mr Turnbull and Mr Huson considered this to be an available interpretation. Dr Thorne pointed out that it did not allow for the application of cl 5.4 of the NZ Standard — that is, making a comparison between the regression line of the background sound levels and the regression curve of the operational wind farm.

219 On reflection, I have concluded that this suggested approach has the same difficulty that I identified in the approach taken by Dr Thorne, in that it does not measure wind farm noise. In addition, like the approaches taken by MDA and Mr Turnbull, the averaging of data over a long period tends to diminish the adverse effects of noisy nights that may occur intermittently. For the reasons given, Mr Huson's approach is the preferable one.

Summary of conclusions on permit compliance

220 In summary, I find that Bald Hills has not established that the sound received at either Mr Zakula's house or Mr Uren's house complied with the noise conditions in the permit at any time. The Minister's letter of 23 March 2019 did not determine that question.

221 Bald Hills did not demonstrate compliance with condition 19(a) of the permit, either by Mr Turnbull's assessment of the noise monitoring data he recorded in 2021, or his review of MDA's noise assessments. Mr Turnbull's method for assessing compliance with condition 19(a) was not the method prescribed by the NZ Standard, properly interpreted. MDA initially did not assess compliance at Mr Zakula's house or at

Mr Uren's house, but at other nearby locations. The noise assessments MDA conducted at both locations in 2015 and 2016 were plainly flawed.

222 Neither Mr Turnbull nor MDA demonstrated compliance with condition 19(c), in relation to the night period. They applied essentially the same approach to assessing compliance with this condition that they applied to condition 19(a), which is not what condition 19(c) requires. Rather, it provides a 'hard measure' for protecting sleep and requires assessment on individual nights.

223 In addition, I have concluded that neither Mr Turnbull nor MDA properly applied condition 19(b) in assessing compliance with conditions 19(a) and 19(c). They subjectively identified and objectively assessed their noise monitoring data for tonality, in accordance with condition 19(b), and applied the 5 dB penalty appropriately. However, their subjective assessment of the presence of impulses and amplitude modulation was inadequate, particularly at night. They undertook no objective assessment of the presence of either of these special audible characteristics, which had been the subject of complaints from the plaintiffs.

Issue 5 – Relevance of planning permit compliance

224 There was a difference between the parties as to the significance of demonstrating compliance with the permit. Strictly speaking this issue need not be determined, given my conclusions in relation to permit compliance. It was common ground that failure to comply with the noise conditions in the permit would support a conclusion that the wind turbine noise was both substantial and unreasonable.

225 The plaintiffs submitted that, even if Bald Hills could establish that it complied with the noise conditions in the permit at their homes, this was of limited relevance in a common law nuisance action. They relied on the authorities of *Lawrence v* ***Fen Tigers*** *Ltd*[77] and ***Seidler*** *v Luna Park Reserve Trust*[78] to support the proposition that establishing that noise emissions are within the limits set by a planning permit would

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77 [2014] 1 AC 822 (***Fen Tigers***).

78 (Supreme Court of New South Wales, Hodgson J, 21 September 1995) (***Seidler***).

be of no assistance to Bald Hills on the question of reasonableness. They submitted that it was for the Court, not the planning authority, to determine reasonable noise limits.

226 As to whether the noise conditions in the permit are reasonable, the plaintiffs submitted as follows:

(a) First, they pointed out that the permit only regulates noise at Mr Uren's property, and is not applicable at Mr Zakula's house. They argued that this had the consequence that permit compliance could not be a defence to nuisance at that property.

(b) They then submitted that the permit conditions only represent the Minister's opinion as to appropriate noise conditions, and cannot be taken to represent a community standard of reasonable noise emissions. There had been no evidence to support a finding that the NZ Standard is an appropriate yardstick for the law of nuisance, as distinct from planning.

(c) The plaintiffs further submitted that the NZ Standard is concerned with average noise conditions, and does not regulate the intermittent periods of loud noise that they claim amounts to a nuisance. They argued that if the permit allows noise that is at times intolerable, it cannot stand in the way of a finding of intermittent nuisance.

(d) Finally, they drew attention to the fact that the NZ Standard is not a universal standard for noise emissions from wind farms. They relied on evidence of lower noise limits applied in other instances, including a 35 dB noise limit recently adopted in Victoria for newly approved wind farms.

227 Bald Hills submitted that the noise conditions in the permit are relevant in a private nuisance claim, at least in the following ways:

(a) where a permit includes a detailed and carefully considered framework of

conditions governing acceptable noise limits, it provides a useful starting point for the Court's consideration of the same issue;

(b) they may provide evidence of the relative importance of the permitted activity as part of the pattern of uses in the area;

(c) when assessing the character of the locality, as discussed below; and

(d) where nuisance is established, they are highly relevant in determining the appropriate remedy — in particular whether an injunction should be granted requiring the defendant to abate the nuisance.

228 Bald Hills argued that the noise conditions in the permit were imposed as a result of considered policy, supported by a body of scientific evidence, and enshrined in the NZ Standard. The planning approval for the wind farm followed a decade-long process, including the Panel hearings and report in 2004. It relied heavily on the Panel's consideration of acoustic amenity and its careful articulation of the noise conditions that were included in the permit. Bald Hills also referred me to the scientific research on which the noise limits in the NZ Standard were based,[79] and to the recent application of the NZ Standard by the *Environment Protection Amendment (Wind Turbine Noise) Regulations 2021* (Vic).

Consideration

229 *Fen Tigers* concerned a private nuisance action brought by two people who owned a house near land that was used, pursuant to planning permission, for various motor sports. The permissions limited the frequency and times of activities at the speedway and motocross track, but placed no limit on the noise emitted by the activities. The trial judge held that noise from the motor sports amounted to a nuisance, notwithstanding the planning permission. The issues on appeal included the

[79] Birgitta Berglund and Thomas Lindvall (eds), 'Community Noise' (Archives of the Centre for Sensory Research, 1995, Vol 2, Issue 1).

interrelationship between public law of planning and private nuisance.

230 The Supreme Court of the United Kingdom held that planning permission was not a determinant of liability. Lord Neuberger held:[80]

> The grant of planning permission for a particular development does not mean that that development is lawful. All it means is that a bar to the use imposed by planning law, in the public interest, has been removed. Logically, it might be argued, the grant of planning permission for a particular activity in 1985 or 2002 should have no more bearing on a claim that that activity causes a nuisance than the fact that the same activity could have occurred in the 19th century without any permission would have had on a nuisance claim in those days.
>
> Quite apart from this, it seems wrong in principle that, through the grant of a planning permission, a planning authority should be able to deprive a property owner of a right to object to what would otherwise be a nuisance, without providing her with compensation, when there is no provision in the planning legislation which suggests such a possibility.

His Lordship further stated that the fact that the activity said to give rise to a noise nuisance has planning permission 'is normally of no assistance to the defendant'.[81] This was so regardless of whether the planning permission related to a major development or implemented a strategic planning decision.[82]

231 Lord Sumption agreed with Lord Neuberger's view of the limited relevance of planning permission to the question of private nuisance. His Lordship explained:[83]

> It may at best provide some evidence of the reasonableness of the particular use of land in question. But planning authorities are concerned with the public interest in development and land use, as that interest is defined in the planning legislation and any relevant development plans and policies. Planning powers do not exist to enforce or override private rights in respect of land use, whether arising from restrictive covenants, contracts, or the law of tort. Likewise, the question whether a neighbouring landowner has a right of action in nuisance in respect of some use of land has to be decided by the courts regardless of any public interest engaged.

232 The members of the Supreme Court were in agreement that planning permission

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80 *Fen Tigers*, [89]–[90] (Lord Neuberger).

81 *Fen Tigers*, [94] (Lord Neuberger).

82 *Fen Tigers*, [91] (Lord Neuberger), [154] (Lord Sumption), [162] (Lord Mance), [169] (Lord Clarke), cf [223] (Lord Carnwath).

83 *Fen Tigers*, [156] (Lord Sumption).

could, depending on the circumstances, be of assistance in determining whether the defendant's activity was reasonable.[84] Lord Carnwath held:[85]

> Where the evidence shows that a set of conditions has been carefully designed to represent the authority's view of a fair balance, there may be much to be said for the parties and their experts adopting that as a starting point for their own consideration. It is not binding on the judge, of course, but it may help to bring some order to the debate. However, if the defendant seeks to rely on compliance with such criteria as evidence of the reasonableness of his operation, I would put the onus on him to show compliance …

233 The decision of the Supreme Court of New South Wales in *Seidler* is an Australian example of a similar approach to the interaction between public regulation and private nuisance. The plaintiffs, who lived in an apartment next to Luna Park in Sydney, claimed that noise from a newly installed roller coaster amounted to a nuisance. The roller coaster had both development consent from the local council and approval from the Environment Protection Agency (**EPA**). The noise levels emitted by the roller coaster (and its passengers) were consistent with the EPA's approval. Justice Hodgson was nevertheless satisfied that the noise produced by the roller coaster was excessive and intrusive, and not reasonable in all the circumstances. The approval of the EPA 'did not amount to a statutory authority to commit a nuisance'.

234 The planning permit for the wind farm was granted by the Minister in 2004, following the Panel's consideration of the permit application and a related environment effects statement. The noise conditions in the permit were as recommended by the Panel in its report. However, the adoption of the NZ Standard, including the acceptable limit for wind turbine noise, was dictated by the Victorian Government's *Policy and Planning Guidelines for Development of Wind Energy Facilities*, adopted in May 2003.[86] I have no evidence about the considerations that informed the adoption of the NZ Standard in that policy document.

235 It may be accepted that the NZ Standard was developed by an expert technical

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84 *Fen Tigers*, [96] (Lord Neuberger), [154] (Lord Sumption), [162], [166] (Lord Mance), [169] (Lord Clarke), [224]–[226] (Lord Carnwath).

85 *Fen Tigers*, [226] (Lord Carnwath).

86 Panel Report, 78, 192–3.

committee convened by Standards New Zealand, and was informed by both international research on wind farm noise and the European standard for the assessment and rating of noise from wind farms. I do not doubt that it reflected the then current state of knowledge about the effect of wind farm noise on neighbouring residents, and acceptable noise limits. However, more than 20 years have passed since the NZ Standard was adopted, and it is not the only benchmark for assessing whether the noise emitted from a wind farm is reasonable.

236 The NZ Standard has since been superseded by the 2010 NZ Standard. The Foreword to the 2010 NZ Standard notes that the NZ Standard 'was written prior to significant wind farm development in New Zealand'. While the basic methodology had proved robust, 'experience and research over the following decade brought to light numerous refinements and enhancements'. One significant change was the adoption of L_{90} in place of L_{95} as a measure of sound levels. This means that the sound level to be measured is the sound level that is exceeded for 90%, rather than 95%, of the 10 minute measurement period.

237 While the original recommended noise limits were retained in the 2010 NZ Standard, there was added provision for a more stringent noise limit where justified by special local circumstances. Clause 5.2 of the 2010 NZ Standard provides:

> As a guide to the limits of acceptability at a noise sensitive location, at any wind speed wind farm sound levels ($L_{A90(10\ min)}$) should not exceed the background sound level by more than 5 dB, or a level of 40 dB $L_{A90(10\ min)}$, whichever is the greater.

This is considered 'appropriate for protection of sleep, health, and amenity of residents at most noise sensitive locations',[87] which are defined to include any habitable space in a residential building. However, in relation to high amenity areas, a more stringent noise limit may be justified during evening and night times.[88] In that instance, wind farm sound levels during the evening and night time should not exceed

87 2010 NZ Standard, cls 2.4, 5.3.1.
88 Ibid, cl 5.3.1.

the background sound level by more than 5 dB or a level of 35 dB $L_{A90(10\,min)}$, whichever is the greater.[89]

238 Other jurisdictions in Australia have prescribed 35 dB rather than 40 dB as an acceptable wind farm noise limit in most circumstances. That is the case in New South Wales,[90] in Queensland at night,[91] in South Australia in localities primarily intended for rural living,[92] in Western Australia,[93] and in Tasmania at residences and for sensitive uses.[94]

239 In Victoria, since August 2021, wind turbine noise has been the subject of specific regulation under Div 5, Pt 5.3 of the Environment Protection Regulations. Wind turbine noise is deemed to be 'unreasonable noise' for the purposes of Pt 7.6 the *Environment Protection Act 2017* (Vic) if it exceeds the noise limit set out in the relevant noise standard. The NZ Standard is the 'relevant noise standard' for wind energy facilities approved before 31 December 2010 — including the wind farm. Wind farms approved after that date must comply with the noise standards set in the 2010 NZ Standard.

240 If Bald Hills had been able to establish that it complied with the noise conditions in the permit at the plaintiffs' houses, this would have given weight to its contention that the noise from the wind farm is at reasonable levels at both locations — even though Mr Zakula's house is not an 'existing dwelling' for the purposes of the permit. Although permit compliance is not determinative, the noise limits set in the NZ Standard and applied by condition 19 of the permit are a benchmark that have brought

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89 Ibid, cl 5.3.3.

90 Exhibit P63 – Department of Planning and Environment (New South Wales), *Wind Energy: Noise Assessment Bulletin – For State significant wind energy development*, December 2016, 7.

91 Exhibit P70 – Department of Infrastructure, Local Government and Planning (Queensland), *State code 23: Wind farm development*, July 2017, 22 – Table 2 – Acoustic criteria for non-host lots. The day time noise limit is 37 dB(A) or background noise plus 5 dB(A), whichever is the greater.

92 Exhibit P49 – Environment Protection Authority (South Australia), *Wind farms environmental noise guidelines*, July 2009, [2.2].

93 Exhibit P48 – Western Australian Planning Commission, *Guidelines for Wind Farm Development*, May 2004, [6.2].

94 Exhibit P83 – Environment Protection Authority (Tasmania), *EPA Board Communique*, August 2020, 1.

some order to the debate.[95] However, I would also have taken into account that it is a matter of judgment whether 40 dB or 35 dB is an acceptable noise limit for rural dwellings at night, and that Victoria is the only Australian state that has adopted the higher limit.

241 More significantly, I would have considered that the NZ Standard sets a limit on the extent to which continuous underlying noise levels may be increased by wind turbine noise, assessed over weeks or sometimes months. It is not directed to intermittent loud noise from wind turbines, and provides no means of determining whether a wind farm produces unreasonably annoying noise in certain weather conditions, or on a particular night. Demonstrated compliance with the NZ Standard and condition 19 would not necessarily have established that the noise that from time to time disturbed Mr Zakula's and Mr Uren's sleep was reasonable.

Issue 6 – Social and public interest value

242 Bald Hills submitted that there is a significant social and public interest value in operating the turbines to generate renewable energy. It relied on the fact that, in 2020, the wind sector was responsible for almost 36% of clean energy, and almost 10% of all energy, generated in Australia. Mr Arthur's evidence was that the wind farm produces up to 380,000 megawatts of electricity each year, which is enough to power 82,000 homes and avoids up to 364,000 tonnes of carbon dioxide emissions.

243 The wind farm makes a substantial contribution to Australia's renewable energy industry, and to the efforts of local, state and federal governments to reduce reliance on fossil fuels and limit the effects of climate change. I accept without reservation that this is a socially valuable activity, and that it is in the public interest for it to continue.

244 The evidence did not suggest, however, that there is a binary choice to be made between the generation of clean energy by the wind farm, and a good night's sleep for its neighbours. It should be possible to achieve both — indeed, that is what condition 19(c) of the permit requires. Further, condition 22 of the permit

95 *Fen Tigers*, [226] (Lord Carnwath).

contemplates that, in some weather conditions, the wind farm may have to noise optimise or selectively shut down some turbines to reduce noise to an acceptable level.[96] There was nothing to suggest that this could not have been done in response to the complaints of Mr Zakula or Mr Uren, while continuing to generate renewable energy.

Issue 7 - Hypersensitivity

Opposition to wind farm

245 Bald Hills contended that the plaintiffs' reaction to noise from the wind farm was informed by their opposition to and ill-feeling towards the wind farm over many years. It argued that this resulted in them being hypersensitive to noise from the wind farm.

246 To a significant extent, this argument relied on Mr Turnbull's opinion that the noise from the turbines at the plaintiffs' homes did not exceed 40 dBA at any wind speed, a noise limit based on internationally accepted research designed to protect people from annoyance and sleep disturbance. The force of this argument is diminished by the fact that I have not accepted Mr Turnbull's opinion, or the MDA noise assessments that he reviewed. Additionally, the noise limit prescribed by permit condition 19(a) and the NZ Standard relates to continuous underlying noise levels and not to intermittent loud noises.

247 Bald Hills sought to demonstrate that Mr Zakula and Mr Uren had a long history of opposition to the wind farm, and that their attitude to it coloured their subjective experience of noise from the wind turbines. Dr Thorne agreed with Mr Turnbull that different people can perceive the same sound differently, and that what one person finds annoying another may not even notice. The two experts also agreed that attitude can be a major factor in annoyance from noise, and that non-acoustic factors can be as annoying as the noise itself.

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96 See also Panel Report, 207–8, discussed at [214]–[215] above.

248 In Mr Uren's case, that argument carries weight. He was vehemently opposed to the wind farm from the outset, and outlined his concerns in a submission to the Panel in 2004. His concerns included the impact on his visual amenity, on his stock, and on the value of his properties. He continued to express these concerns after the permit was issued, including in letters to the Council and the Deputy Premier.

249 Glenn Furlong, the wind farm's asset manager, gave evidence that, during the construction phase in 2014, Mr Uren blocked an entrance gate in an attempt to stop construction equipment coming on to the site, by parking his car in the gateway. Mr Furlong said that this happened on about six occasions. Mr Uren denied ever having blocked a gateway, and said that this was done by friends of his from the CFMEU. I am satisfied that Mr Uren was at least present during some of these blockades, and was involved in altercations about construction traffic on local roads. As I describe below, Mr Uren also joined Mr Zakula in protesting against the wind farm during an open day held in 2018.

250 There is no doubt that Mr Uren did not like the wind farm and was unhappy about its impact on the amenity of his home. Once built, the wind turbines were impossible for him to ignore, with the view from the front veranda of Mr Uren's former home dominated by the central group of turbines. I will return to the question of whether he was hypersensitive after considering the evidence of the other witnesses who live and work near the wind farm.

251 Mr Zakula, on the other hand, does not have a history of opposing the wind farm. He had no involvement in the planning approval process, made no submissions to the Panel, and was not involved in community groups opposed to the wind farm. The permit had already been issued when he purchased his property in 2008. It was only after the purchase that he became aware that a wind farm was proposed nearby. His concerns about the wind farm date from mid-2015, when he was first disturbed by noise from the turbines. Despite his many complaints, Bald Hills took no remedial action to reduce the noise levels, and more than six years later his sleep is still

disturbed by noise from the turbines. This has hardened his attitude to the wind farm, which he thinks is not complying with the noise conditions in the permit and is adversely affecting his wellbeing.

Evidence of neighbours

252 A number of witnesses were called to give evidence about their experience of noise from the wind farm. The plaintiffs called six former plaintiffs — Don and Sally Jelbart, Dorothy and Don Fairbrother, Alexander McDougall and Stuart Kilsby. They also relied on the evidence of Roberto Soler, who works for the Kilsby family as a resident farm manager. Bald Hills called its asset manager, Mr Furlong, as well as Darcy O'Halloran, a site supervisor, and Robert Anderson, a farm hand who lives near the wind farm.

253 **Don Jelbart** owns three separate properties near the wind farm: his home, a property located slightly to the south of his home, and Tenement A. His experience of noise from the wind farm varies, depending on his whereabouts. He said that when he is at home, he hears all manner of noises. He described feeling a 'deep throbbing pulse' from the wind turbines, or a 'low groan that gets right into your head'. He said that he has on occasion got up out of his chair, thinking that a truck is coming up his driveway, only to realise that he is just hearing the sound from the wind turbines.

254 Mr Jelbart said that his experience is 'much worse' inside his home than outside, and is particularly bad at night. Sometimes, the turbines are louder than his television, even after he has turned the volume up. He often wears earplugs to bed, however he is still woken up during the night. He attributes this sleep disturbance — which he said he has experienced for about the last six years — to the noise from the wind turbines. He sometimes wakes up with a headache. In an attempt to block out some of the noise, he has moved to a room in the back of his house, and has planted some trees.

255 According to Mr Jelbart, the noise at Tenement A is 'horrific during the day'. He said that if he has to spend a couple of hours there, he will either put in earplugs or leave

the property altogether. He described the noise at Tenement A as a 'pulsing throb', sometimes with a 'whoosh', and often with a 'gearbox noise', a 'grinding sort of mechanical noise', which signals that there is a gearbox in need of attention. The noise varies depending on where he is on the property and which way the wind is blowing. Mr Jelbart said that although he can always hear the noise when the wind is blowing, it is particularly bad when the breeze is gentle and when the wind is coming from the south or the south-west. He said that the noise seems to be worse in the winter months.

256 Mr Jelbart agreed that he had lived in the area for most of his life and had been opposed to the wind farm for a long time. He had been the president of a community organisation call the Tarwin Valley Coastal Guardians, formed in about 2004, which had made submissions to the Panel about the permit and had also been involved in a proceeding at the Tribunal about an increase in the permitted height of the turbines. He agreed that he was staunchly opposed to the wind farm even being built, and opposed the grant of the permit on a number of grounds. His biggest concern was about the destruction of wedge-tailed eagles, a concern which had proved to be true. He agreed that the wind farm had divided the community, and that some friendships had come to an end.

257 **Sally Jelbart** also spends her time across several properties. She described the noise at Tenement A during winter as being like waiting at an airport with 'a dozen planes around you and they are all, you know, waiting for their turn to go on to the runway. It's loud.' She said that she can hear the turbines at Tenement A at all times of the year, but that they sound different during summer. At Tenement A, the noise is 'on top of you' and sometimes, after spending a few hours there, she thinks 'that's enough, I need to go and work somewhere else, do something else', and she has to leave to escape the noise.

258 Mrs Jelbart said that when she is at home at night, when the wind has died down, the sounds from the wind farm can be very audible — 'it can be a thumping, a groaning,

a whirring, a grinding; you can get all of these sounds in five minutes and then it's just on repeat, on repeat, on repeat'. She described the noise as having 'a deep undertone to it which really sort of — it sort of gets in your head. It just vibrates through you.' Like Mr Jelbart, she can hear the turbines over the sound of their television, even if the volume is turned up high. The noise wakes her up regularly during the night and in the early hours of the morning. When she wakes up, she often has a headache. Because she experiences so much tension, she has taken to wearing a mouthguard to bed to protect her teeth.

259 Mrs Jelbart has been a vocal opponent of the wind farm since it was first proposed. She was a member of the Tarwin Valley Coastal Guardians, a group that was opposed to the wind farm. She was concerned about poor regulation and compliance in the wind industry, about the industrialisation of the landscape, and about the raptors and other big birds being injured by the turbines. She was also concerned about division in the community, and said that in fact the wind farm has divided those who have benefitted from it and those who have not.

260 **Dorothy Fairbrother** and her husband Don live and work on their farming property on Buffalo-Waratah Road, Tarwin Lower. The property is located between Mr Zakula's house and where Mr Uren used to live. Mrs Fairbrother described the sound from the wind turbines as 'a swishing, throbbing noise that just didn't disappear'. She said that the noise is more prominent in the evening. It can be heard over the television at times, and so she turns up the volume of the television to camouflage the noise. She described the noise as being similar to 'dripping tap syndrome' that keeps 'going and going and going' at night time, and interrupts her sleep. She does not hear the noise every night. It is worst when the wind is blowing from the north-west, which occurs more in autumn and winter. During bad periods, which can last up to three weeks, her sleep is interrupted every night.

261 Mrs Fairbrother suffers from 'bad headaches' due to the noise of the turbines at night, for which she takes paracetamol and stronger medication when required. She does

not take anything to help her to get to sleep - she tries to 'just suffer it out'. She and Mr Fairbrother tried to alleviate the noise by double glazing the windows in their house, but that did not help a lot. Now they just keep the windows shut and the curtains drawn. They also spent three to four weeks sleeping in another bedroom, which made no difference.

262 While working outside on the farm, Mrs Fairbrother can hear a 'throbbing' noise that can become 'mechanical'. The noise becomes more prominent closer to the turbines. Sometimes she has to turn her back on the turbines because she gets motion sickness.

263 Mrs Fairbrother agreed that she had opposed the approval of the wind farm, and had made submissions to the Panel to that effect. She was concerned about division in the community, between lifelong friends and family members, and environmental effects. She was not opposed to renewable energy; her concern was with siting the wind farm too close to where people are living.

264 **Don Fairbrother** has had long-term hearing problems. His hearing has deteriorated since 2015, and he has had a cochlear implant in his right ear since 2019. He uses a hearing aid in his left ear, which he takes out at night. Mr Fairbrother first noticed noise from the wind farm in March 2015, when he returned from a trip to Melbourne. He could not believe how loud it was. At that time, he could hear the noise without his hearing aid in.

265 The noise that Mr Fairbrother first heard from the wind farm was a very audible 'whooshing noise and a thumping noise as the blade goes past the tower'. Inside their home, in the evenings, he could hear a 'thumping' and 'pulsing' noise. At night, with his hearing aid out, he could hear the noise but it was not as loud. He would wake up in the early morning with a really severe headache, and when he put his hearing aid in, he realised what was going on. When he woke at night with a headache he would take Panadol, but would always have trouble getting back to sleep. Even with his hearing aid out he was tossing and turning, having broken sleep, sensing the noise. Mr Fairbrother said that the noise is less audible in the summer period, and not the

problem that it is in the wintertime.

266 His hearing has since deteriorated and now he cannot hear the wind farm noise at night when his hearing aid is removed. However, he is still woken at night intermittently by the wind farm.

267 Mr Fairbrother opposed the wind farm from the time it was first proposed. He made submissions to the Panel opposing the approval of the wind farm, and continued to oppose it after it was approved. His concerns included its effect on bird life, including the orange-bellied parrot and white-bellied sea eagles, as well as the impact on the visual amenity and value of his property. He has a poor opinion of the wind industry and the way in which it is regulated.

268 **Alexander McDougall's** family company, The Firs Pty Ltd, owns two plots of land in the vicinity of the wind farm, in addition to a farm in Strzelecki. Before the construction of the wind farm, Mr McDougall's parents had planned to build a house on one of those plots and he had planned to build a house on the other. He said that his family no longer plans to build on either property, because they could not live there and a house would not add value. He continues to live in Strzelecki, and spends six days a week farming the two properties in Tarwin Lower.

269 Mr McDougall splits his time evenly between farming the 'northern property' (also known as the Firs Tenement) and the 'southern property'. When he is at the northern property, he hears different noises coming from the wind turbines. For example, he described hearing a 'whoosh whoosh whoosh' sound, and, sometimes, 'a mechanical noise, almost like a metal cog or something that clanks'. He recalled times where he had been on his work phone in the paddock and had been unable to continue his conversation due to the sound coming from the wind turbines. The noise is affected by wind speed and direction, and there seems to be a lot more noise in July and August. Mr McDougall had, on occasion, spent the night at the northern property. On those nights, even though he was exhausted, he had been woken up due to the noise from the wind turbines.

270 The McDougalls' northern property shares a boundary with Mr Uren's former property. Mr McDougall said that when he is working the cattle yards in that corner of the northern property he can quite clearly hear a lot of noise from the turbines. He described hearing a 'whirring noise', which 'can get in your head', cause disorientation and headaches, and 'doesn't seem to go away'. Mr McDougall said that he had been inside Mr Uren's house a number of times during the day while Mr Uren was living there. He could hear the sound of the turbines in the background while he was inside the house.

271 Mr McDougall's experience of the noise coming from the wind turbines at the southern property is the same as his experience at the northern property. The noise is particularly bad at the top of the property and there are days when the noise up there is too much, and he looks for another job somewhere else on the property. There are spots on the southern property where he can go for some relief, and his motorbike can drown out some of the noise.

272 Mr McDougall did not actively oppose planning approval for the wind farm, being in his early 20s at the time. His late father was upset that the family could not build homes on the properties and move there to live.

273 **Stuart Kilsby**'s family lived on their farm in Tarwin Lower until they moved away in 2012 or 2013. Mr Kilsby's father did not think they would be able to stay on the farm once the wind farm started operating due to the 'noise issue'. Before then, Mr Kilsby had planned to build a house on the property, and had picked out a site overlooking the whole farm, with views of Bass Strait, the Inverloch inlet and Wilsons Promontory. He no longer plans to build that house. He now lives in Inverloch while working six or seven days a week on the farm in Tarwin Lower.

274 Mr Kilsby described a vibration and a 'whistling' noise, coming from five or six turbines, all operating at different times — he called it a 'humming vibration sound' in his ears. He said that the turbines are very loud but at different times, depending on which way the wind is coming from. Wind from the south-west or east makes the

noise particularly bad. Mr Kilsby has slept at the farm a few times, mostly during the calving and lambing period, and has noticed that the wind farm noises are louder at night, when there is less interference from other noises that he usually hears during the day.

275 After the turbines started spinning, Mr Kilsby's father could not handle the noise and left the farming to his son. Mr Kilsby felt anxious to come and work at the farm, knowing that he would be hearing the noise all day. At the farm, he struggled to concentrate. He had difficulty getting the noise out of his head, even after leaving the farm. Sometimes, he had to leave the farm when the noise became really bad. He used to take his wife and young children to the farm for camping or picnics, but he no longer does this because he is concerned about the noise from the turbines.

276 Mr Kilsby was a teenager when planning approval was sought for the wind farm. He was aware that his father had opposed the approval, because he did not want the wind farm so close to the family's farm, and thought that the noise from the turbines would be a nuisance. Mr Kilsby recalled his father also being concerned about the farm losing value and adverse effects on bird life in the area, and he shared those concerns. He agreed that, by the end of 2018, he wanted the wind farm to shut down — 'anything to get the noise to stop'.

277 **Roberto Soler** is employed by the Kilsby family as a farm manager. He worked on the farm for a few months in 2014, and then returned in 2018. He now lives in the farmhouse on the Kilsby property, where he also stayed in 2014.

278 Mr Soler said that when he is out farming during the day, he can hear sounds coming from the wind turbines. He said that what exactly he hears depends on the wind and his proximity to the turbines. When it is windy, the sound is louder. When there is no wind, he does not hear anything. He described the louder sounds as being like, 'when you are beside a road busy of cars, you know, traffic or a river, something like that.' He said that, when the sound is loud, he will often have trouble hearing what other people are saying, and will have to raise his voice, call the person or send them

a text message. He said that the noise is worse when the wind is blowing from the east. The noise gets in his head and is constant; he gets 'tired with that because it's all the time the same noise'.

279 When Mr Soler is inside the farmhouse, he finds the noise annoying when he is trying to read a book. However, it is not so bad when the television is on. The noise is worst at night, when the house is quiet. The worst thing is that the noise is constant. In 2014, when he was staying at the property, he slept well. Now, he has trouble falling asleep due to the sound coming from the turbines. It can take him one hour or more to fall asleep. He said that his partner, Katherine, has told him that the noise from the turbines has woken her up in the middle of the night.

280 **Robert Anderson** works as a senior farmhand on a property in Tarwin Lower. He is now semi-retired and works about 16 hours a week. Since about 1970 Mr Anderson has lived in a house on the property, which is owned by the Box family and now has 17 wind turbines on it. The house is 500 to 600 metres west of turbine 40, and about one kilometre east of turbines 31 and 33. It has no insulation or sound-proofing of note, and most of the windows are single glazed.

281 When Mr Anderson is outside working on the farm, he can hear the whoosh from each blade as it goes around. The sound varies with the seasons and how hard the wind is blowing. He is not annoyed by noise from the turbines: 'I just live there with them. They just don't worry me'. Mr Anderson recalled one occasion when he could hear a 'banging and rattling' noise from one of the turbines. He was told that the noise was caused by a bit of polystyrene and the issue has since been rectified.

282 Inside the house, he can hear the wind turbines if he turns off the television and really listens hard. He can also hear them inside the bathroom where the noise comes in through the small louvre windows. Normally, there is no noise whatever. He has no trouble getting to sleep and is never woken by noise from the turbines.

283 **Glenn Furlong** works for the owner of the wind farm as its asset manager, in the site

office at the wind farm. He usually works between 7am and 3 to 4pm Monday to Friday, and most of his day is spent in the office — a transportable clad building, steel frame construction, single uninsulated glass, and single plaster walls. The closest turbine, number 25, is 244 metres from the office, and three other turbines are within 400 metres.

284 When Mr Furlong is working in his office during the day, he does not hear any noise coming from the wind turbines unless a window or a door is open. If a window or a door is open and he can hear the turbines, the sound has no impact on him. He said that he may hear a little bit of noise coming from the switchyard — a 'low humming sound occasionally' — but that he generally does not hear the wind turbines.

285 When he is working outside during the day, he can hear the turbines. Their sound varies with the intensity and direction of the wind, and sometimes they are more audible on a colder, more still day. Mr Furlong described a 'light whooshing sound', which is difficult to distinguish from the 'sound of wind in a tree'. He added that he does not find the turbines a strain to be around, or a distraction. He has never heard a grinding or a thumping sound from the turbines.

286 Mr Furlong agreed that he does not sleep at the office. During the day there are seven fulltime employees in the office, and there is typical office noise, including from the split system heating and cooling units.

287 **Darcy O'Halloran** is the site supervisor at the wind farm. He works onsite between 7:00am and 5:00pm, and typically spends 95% of his day inside the site office and 5% of his day outside. He does not hear noise from the turbines when he is in the office; he usually hears other noises such as the humming of the air-conditioner and the substation nearby. When he is outside the office, he usually hears the sound of the closest turbine to the office. He described hearing the 'whooshing' of the blades in certain wind conditions, which is a little louder if there is a prevailing westerly wind. The noise does not have any particular effect on him.

288 Mr O'Halloran acknowledged that he does not sleep at the office.

289 In addition to the evidence of these witnesses, I have reviewed the Bald Hills complaint register. Between March 2015 and January 2020, it recorded 169 complaints about noise from the wind farm. Most of these complaints were from Mr Zakula, Mr Uren, Mr and Mrs Jelbart, Mr and Mrs Fairbrother, Mr Kilsby and his brother, John Kilsby. There were also a small number of complaints from other nearby residents in 2015 and 2016. For example:

(a) On 6 May 2015, Lindsay Overall reported that on the evening of 4 May 2015, the noise was noticeable from the time he got home and was audible inside his house, leading to disturbed sleep. He described the wind as quite mild, coming from a north-west to south-west direction, and the noise as a 'low whirring in a circular pattern with the rotation of the blades'.

(b) On 10 June 2015, Phil Western advised that he could hear a humming or whirring sound, when the wind was coming from the east and south-east, at a range of wind speeds. He could hear the noise inside his house, but mainly on the lee side.

(c) In April 2016, Tim Le Roy sent two emails complaining about clearly audible noise at his house, about 3 kilometres east of the wind farm.

290 Having considered this evidence as a whole, I do not consider that Mr Zakula and Mr Uren are hypersensitive to noise from the wind farm. I accept that Mr Uren's negative attitude to the wind farm increased the degree to which he was annoyed by noise from the turbines. However, I do not regard his reaction as excessive or unreasonable. It is in keeping with his neighbours' experience of wind farm noise. Unlike Mr Uren, Mr Zakula did not have any predisposition against the wind farm before it started operating. His antipathy to it stems from persistent noise that disturbs his sleep, and the way in which the wind farm has responded to his complaints.

291 The evidence of Mr Furlong and Mr O'Halloran that the turbine noise does not bother

them during the day does not indicate that Mr Zakula and Mr Uren are overly sensitive to wind farm noise. Both men work for the wind farm, and their positive relationship with it may affect their perception of sound from the turbines. More importantly, they do not sleep at work, and have no experience of the noise at night. More telling are the decisions of Mr McDougall and Mr Kilsby not to build homes on their farms, because they choose not to live with the noise from the wind turbines. Both of them prefer to commute long distances instead. Mr Anderson appears to have a high tolerance for noise and to be a sound sleeper, while Mr Soler's experience of turbine noise appears to me to be a typical one.

Open day protest

292 Bald Hills made a great deal of a protest staged by Mr Zakula and Mr Uren on the wind farm's open day held in October 2018. Mr Zakula parked a trailer in front of the Mechanics Institute in the main street of Tarwin Lower, near where buses were picking up people to take them to the wind farm. He had made up a billboard for the trailer that said:

> **BALD HILLS NOISE FARM**
> - IS NOT PERMIT NOISE COMPLIANT
> - IS NOISY AND A NUISANCE
> - CAUSES SLEEP DEPRIVATION
> - CAUSES A PATHWAY TO DISEASE
> - CAUSES STRESS AND ANXIETY
> - AFFECTS YOUR MENTAL HEALTH

Mr Uren joined Mr Zakula later that morning, along with a few other people. He described it as a friendly protest. Mr Zakula had a megaphone, and used it to make some loud statements to the same effect as his billboard.

293 Someone from Bald Hills called the police, and soon afterwards two police officers from Inverloch attended and spoke with Mr Zakula and Mr Uren for five to ten minutes. Mr Uren said that they explained to the police that they were conducting a peaceful protest and were not doing any harm. The police did not ask them to move on, and there were no arrests, although Mr Zakula stopped using the megaphone after their visit. Mr Zakula, Mr Uren, and the trailer remained outside the Mechanics

Institute for the rest of the day.

294 I do not consider this protest to be evidence that Mr Zakula and Mr Uren are hypersensitive to wind farm noise. It was a protest about noise from the wind farm, which by then had been troubling them for more than three years. The protest appears to have been peaceful and to have required no intervention from police.

Issue 8 – Character and established uses in the locality

295 Bald Hills contended that the noise emitted by the wind farm was reasonable, given the character of and the nature of established uses in the locality. It put this contention in two ways. First, it relied on observations by the Panel and the opinion of a planning expert, Robert Milner, about acoustic amenity in the Rural Zone. Second, it submitted that the wind farm itself was an established use in the locality.

296 As to the first, it may be accepted that, for planning purposes, acoustic amenity is not as weighty a consideration in the Rural Zone as it is in a residential zone. As the Panel found, the decision guidelines for the Rural Zone 'envisaged that dwellings may be exposed to noise emerging from lawful land uses and operations on adjoining or nearby land'.[97] That said, noise was still a relevant environmental consideration, and the Panel recommended the imposition of noise conditions to preserve the acoustic amenity of existing dwellings and protect occupants' undisturbed sleep.[98] It also observed that 'a critical factor is the presence of an unambiguously representative pre development background sample data set', obtained onsite, without any significant adjustment.[99]

297 Like the relevance of permit compliance,[100] the level of acoustic amenity prescribed by planning policy for a given zone is not determinative of the nature of the locality. Before the wind farm was built, the locality was a rural area, comprising mainly

97 Panel Report, 204.
98 Ibid, 204-210.
99 Ibid, 204.
100 See [229]–[233] above.

cleared pastoral land used for grazing and cropping, with a few smaller hobby farms. Some uncleared areas of remnant native vegetation remained on private land, in addition to the Cape Liptrap Coastal Park, Bald Hills Wetland Reserve, and Kings Flat Reserve.[101]

298 There was no evidence that the farming activities in the area were noisy, particularly at night. The Bald Hills area is near the coast, with Bass Strait to the west, Cape Liptrap to the south, and Waratah Bay to the south-east. Some witnesses mentioned being able to hear the surf on occasion; no-one suggested that this was an unpleasant noise or that it disturbed their sleep. By contrast, the noise from the heavy vehicle traffic during the construction of the wind farm was unusual, and Mr Fairbrother found it intrusive at night time.[102]

299 There is no doubt that the wind farm radically changed the nature of the locality.

300 The extent to which a defendant's own activities can be relied on to establish the nature of established uses in the locality was another issue considered by the Supreme Court in *Fen Tigers*. The majority's resolution of that issue was, with respect, unhelpfully circular:[103]

> [T]o the extent that those activities are a nuisance to the claimant, they should be left out of account when assessing the character of the locality, or, to put it another way, they should be notionally stripped out of the locality when assessing its character. Thus, in the present case, where the judge concluded that the activities at the stadium and the track were actually carried on in such a way as to constitute a nuisance, although they could be carried on so as not to cause a nuisance, the character of the locality should be assessed on the basis that (i) it includes the stadium and the track, and (ii) they could be used for speedway, stockcar, and banger racing and for motocross respectively, but (iii) only to an extent which would not cause a nuisance.
>
> In so far as the respondents' activities at the stadium and the track cause no nuisance, they are lawful. There is therefore no reason to disregard them when assessing the character of the neighbourhood. Indeed, it would be unrealistic, and indeed unfair on the respondents, if those activities were disregarded. However, in so far as the activities are unlawful, in particular in so far as they

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101 Panel Report, 14–19; Milner report, 3.3 – Established land use activities in the surrounding area.

102 Transcript, 15 September 2021, 636:10-31.

103 *Fen Tigers*, [65]–[66], [71]–[74] (Lord Neuberger). See also [154] (Lord Sumption), [162]–[164] (Lord Mance), [169] (Lord Clarke), cf [187] (Lord Carnwath).

> constitute a nuisance to the appellants, it would seem to me to be illogical, as well as unfair to the appellants, to take those activities into account. It would involve the respondents invoking their own wrong against the appellants in order to justify their continuing to commit that very wrong against the appellants.

301 The circularity of this approach was acknowledged by Lord Neuberger, who considered it preferable to either ignoring the defendant's activity altogether, or taking the alleged nuisance into account without modification.[104] His Lordship concluded that a defendant to a nuisance claim can rely on its activities as constituting part of the character of the locality, but only to the extent that those activities do not constitute a nuisance. If the activities cannot be carried on without creating a nuisance, then they should be entirely discounted when assessing the character of the neighbourhood.[105] Taking the view of Lord Neuberger's approach most favourable to Bald Hills, its activities could only be taken into account if they comply with the noise limits imposed by the permit and Div 5, Pt 5.3 of the Environment Protection Regulations.

302 Bald Hills relied on the fact that Mr Zakula purchased his property and built his house after the wind farm had received planning approval. It submitted that, in those circumstances, the character of the locality must include the wind farm, and the lawful noise associated with its operation. The difficulty with this submission is that Bald Hills has not demonstrated that the wind farm noise levels at Mr Zakula's property meet the limits set by the permit and the NZ Standard.

303 In conclusion on this issue, I find that Mr Zakula's and Mr Uren' properties are in a rural locality that is 'relatively quiet and remote'.[106] Sounds associated with stock rearing, grazing and other farming activities are typical of the area during the day. There is no evidence that these activities cause intrusive noise at night. Traffic on nearby roads is light and usually creates limited disturbance.

304 The wind farm itself could only be taken into account as an established use in the

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104 *Fen Tigers*, [72]–[73] (Lord Neuberger).
105 *Fen Tigers*, [74] (Lord Neuberger).
106 Milner report, 29.

locality to the extent that the noise from the wind turbines complies with the permit and regulations concerning environmental noise at the plaintiffs' properties. I am not satisfied that it does.

Issue 9 – Precautions taken

305 Bald Hills submitted that regard must be had to the reasonable steps it had taken, over many years, to investigate complaints made by the plaintiffs and ensure compliance with the noise limits in the permit. It relied on the compliance monitoring by MDA, its engagement and consultation with the Minister, and the curtailment regimes adopted in December 2016 and May 2017. I have made findings at [66] to [80] above about the steps taken by Bald Hills to demonstrate permit compliance, and at [103] to [121] as to its responses to the complaints made by Mr Zakula and Mr Uren.

306 Unlike the Minister, I am not satisfied that Bald Hills has demonstrated compliance with the noise conditions in the permit at Mr Zakula's house or at Mr Uren's house at any time. While their numerous complaints were investigated and responded to, no remedial action was taken by Bald Hills to reduce the noise from wind turbines received at either property. The curtailment regimes that were adopted in December 2016 and May 2017 were not taken in response to complaints from Mr Zakula or Mr Uren. They were directed to achieving compliance at other sites nominated in the NCTP, namely House 28, House 61, Tenement A and Tenement B.

Issue 10 – Other possible precautions

307 There are at least two further precautions that Bald Hills could reasonably have taken to reduce the noise levels at the plaintiffs' homes — implementing selective noise optimisation, and addressing a known gearbox tonality issue. While Bald Hills belatedly offered to discuss practical solutions to improve the acoustic amenity of Mr Zakula's home, I am not satisfied that the proposed further soundproofing measures would have been either reasonable or effective.

Selective noise optimisation

308 The first precaution that Bald Hills could have taken was to follow the procedure

contemplated by the Panel and provided in permit condition 22 — that is, to identify the meteorological conditions in which condition 19 is breached, in particular condition 19(c) at night, to attempt to noise optimise relevant turbines, and then if necessary to selectively shut down relevant turbines. This was not done, because Bald Hills — on MDA's advice — did not consider that the noise conditions in the permit had been exceeded at either house. As I have found, condition 19(c) was not properly interpreted or applied by MDA.

Gearbox tonality issue

309 The second precaution that Bald Hills could have taken was to address the tonality issue identified by MDA in December 2016. It will be recalled that the curtailment strategy applied in December 2016 and May 2017 was only an interim or preliminary strategy. The MDA December 2016 report recommended that Bald Hills implement a longer term strategy of addressing 'tonality related compliance requirements through the mitigation of tonal emissions rather than continued reliance upon noise optimisation modes'.[107] MDA repeated this recommendation to Bald Hills in May 2017.[108]

310 By way of background, all 52 turbines at the wind farm are Senvion MM92 turbines. Bald Hills and Senvion had entered into an Operations and Maintenance Agreement and an Engineering Procurement and Construction Agreement (**EPC Agreement**). The EPC Agreement included a sound emission warranty, that 'the tonal audibility at distances larger than or equal to the Reference Position is less than or equal to +2 dB'.[109] The audibility of tones was to be determined using the methods described in IEC 61400-11, at the Reference Position 126 metres from each turbine. Breach of the sound emission warranty entitled Bald Hills to liquidated damages, calculated in

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107 MDA December 2016 report, [7.2], quoted at length at [73] above.

108 See [74] above.

109 Exhibit D18 contains the body of the EPC Agreement, not including the annexures. Annexure K, containing the sound emission warranty, is attached to Exhibit D46 Resonate Acoustics, *Bald Hills Wind Farm Sound Power and Tonality: Interim Report for Turbines T26, T33 and T40* (Report, 13 April 2017) 16-20 (**Resonate Interim Report**).

accordance with an agreed formula, for which Senvion provided a bank guarantee.[110]

311 **Resonate** Acoustics was engaged by Senvion to measure the sound power levels and tonality of certain wind turbine generators at the wind farm. Resonate undertook testing onsite over four days in December 2016.

312 On 13 April 2017, Resonate produced an interim report on sound power and tonality. The report indicated that tones exceeding the 2 dB limit were detected over a range of wind speeds at turbines 33 and 40. Resonate found that tones exceeding the warranty were detected at both turbines at a range of wind speeds between 6 m/s and 15 m/s, however there was variation in the frequency and level of the tones across the turbines. The highest measured audibility was 4.1 dB, measured at turbine 40 at a wind speed of 11 m/s.

313 Senvion sent the interim report to James Arthur and Matthew Croome of Bald Hills on 13 April 2017. The covering email acknowledged that the tonality was 'not ideal' and advised that it had been 'assessed and identified as arising from the gearbox/gearbox mounting pin assembly in limited number of [turbines]' and was 'receiving the full attention of our corporate engineering team'.

314 Resonate returned to the wind farm at various times between December 2016 and July 2017 and measured the sound power level and tonality at 11 turbines.

315 On 28 August 2017, Resonate produced a summary report.[111] The report indicated that 10 of the 11 turbines tested were emitting tones in breach of the sound emission warranty. These included turbines 16 and 23, near Mr Zakula's house, and turbines 26 and 39 further to the west. They also included turbines 40, 46 and 47, west of Mr Uren's house. It was Mr Arthur's evidence that he understood the tonality problem to be present in a 'significant amount' of the remaining 41 turbines, although

110 Exhibit D11 – James Arthur statement (amended), [78].

111 Exhibit P36 – Resonate Acoustics, *Bald Hills Wind Farm Sound Power and Tonality Tests: Summary Report* (Report, 28 August 2017).

they have not yet been tested.[112]

316 Further testing conducted by Resonate in February 2019 confirmed that turbines 23, 26 and 33 exceeded the tonal guarantee in some operating modes, at some wind speeds. On 29 March 2019, Senvion sent Resonate's reports about these three turbines to Mr Arthur. Senvion's covering email explained the potential solutions for the tonality issue, and advised that there was 'at least one clear solution for each of the turbines' which would result in demonstrated compliance with the acoustic warranty.

317 At some point, Senvion also produced a proposal to implement a modified power cover (a Type G power curve) on two turbines, to assess an expected reduction in tonality levels. There is no evidence that this proposal or any other 'clear solution' was implemented before April 2019, when Senvion entered voluntary administration.

318 By December 2019, Bald Hills had terminated the Operations and Maintenance Agreement and the EPC Agreement with Senvion, and had entered into an Operations and Maintenance Agreement with Vestas. Since that time, Vestas has provided operations and maintenance services at the wind farm.

319 In September 2020, Vestas gave a presentation to ICG entitled 'Senvion MM92 WTG – Tonality: Gearbox Tonality Investigation'. The slides for that presentation set out the following background:[113]

> - The Bald Hills Wind Farm, completed in 2015, consists of 52 Senvion MM92 wind turbines. Since commissioning, Senvion had been working with the owner, Infrastructure Capital Group (ICG) to resolve a gearbox tonality issue present in the majority of the turbines which breached Senvion' s contractual noise warranty and generated noise complaints from the community.
> - It's Vestas' understanding that Senvion engaged both the gearbox manufacturer ZF, and acoustics consultant Resonate to perform preliminary investigation work including acoustic testing of some turbines while running in four different modes (combining Open, Type

112 Transcript, 17 September 2021, 857:11–26.

113 Exhibit P43 – Vestas presentation entitled 'Senvion MM92 WTG Tonality: Gearbox Tonality Investigation', August 2020, 3. Vestas later provided ICG with a revised version of this presentation without the reference to the 'noise complaints from the community', under cover of an email dated 18 September 2020.

G, and HCO). Presentations & reports from this have been shared with Vestas by ICG but requested not to be shared directly with ZF.

- Senvion had suggested possible solutions involving a combination of Tuned Mass Dampers (TMD) and alterations to the drive train, but none of these were ever trialed at Bald Hills before Senvion GmbH entered voluntary self-administration in April 2019 and the subsequent award of the maintenance contract to Vestas.

- ICG requested Vestas to investigate the still-unresolved tonality issue offering potential solutions and assistance in mitigation of the issue.

320 In the presentation, Vestas identified several 'low hanging fruit' solutions, based on previous investigations, including implementing a Type G power curve to help reduce tonal audibility. It also proposed development, implementation and validation of a solution to the root cause of the gearbox tonality issue, which was yet to be identified.

321 Mr Arthur's evidence in chief was that Vestas had identified an engineering solution to address the cause of the tonality, which was in the process of being tested and, if successful, could be implemented. It was not clear from his evidence what, if anything, had been done to solve the issue since Vestas' presentation in September 2020. In answer to questions from me, Mr Arthur said that it had taken Vestas some time to reinvestigate, and he thought that in the next couple of months they were going to test a solution identified by Senvion back in 2019.

322 Bald Hills and ICG appear to have given greater priority to pursuing contractual remedies against Senvion. As early as April 2017, ICG identified that it was entitled to liquidated damages for breach of the sound emission warranty in the EPC Agreement.[114]

323 In June 2020, ICG requested reimbursement from the guarantor, **ANZ** Bank, for various defect rectification costs under the EPC Agreement. These included the replacement of the gearboxes on turbines 12 and 33, both of which had failed. It also foreshadowed a future claim for the costs associated with rectifying a generic defect associated with the gearboxes, which would depend on the solution chosen.

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114 Exhibit P33 – Email from Adrian Kong of ICG to Craig Whalen and James Arthur of ICG, 5 April 2017.

324 In March 2021, ICG sent ANZ a fourth withdrawal notice for reimbursement from the liquidated damages account. This included a claim for phase 1 of the gearbox tonality investigation. ANZ requested more information about the gearbox tonality defect rectification works. ICG's agreed response was:[115]

> Since we last updated you in November 2020 we have not progressed the tonality fix while other matter take priority. However, Vestas have investigated a fix which is similar to the fix previously proposed by Senvion – one or a combination of Tuned Mass Damper, application of modified power curve and/or adjustment of main shaft bearing clearances. Assuming the tonality fix proposed by Vestas is successful, and in the worst case scenario has to be implemented on all 52 turbines, it is anticipated that the cost of implementing the solution would be [redacted].

325 As at September 2021, there was still no solution to the tonality issue first identified by MDA in December 2016.[116] While various options have been identified over the years, and funds appear to be available to pursue them, the solution is still at the investigation stage. Bald Hills could reasonably have addressed this issue at a much earlier time.

Soundproofing

326 A third measure proposed by Bald Hills is further soundproofing to reduce noise levels inside Mr Zakula's home. Obviously, Bald Hills could only take this measure with Mr Zakula's agreement and co-operation.

327 Mr Arthur wrote to Mr Zakula on 14 December 2020, and again on 9 March 2021, offering to discuss making a contribution to implementing a noise mitigation solution at Mr Zakula's property. The suggested solutions included acoustic insulation in walls or ceilings, window glazing, vegetative screening and noise masking.

328 While Mr Zakula did not recall receiving either letter, it seems likely that he did. In April 2021, his solicitor conveyed her clients' cynicism about Mr Arthur's motives in reaching out to them for the very first time in December 2020, having ignored or

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115 Exhibit P46 – Email from James Arthur of ICG to Hugh Webster and Min-Yee Hall both of ICG, 15 March 2021, and following email chain.

116 Transcript, 17 September 2021, 858:5–16. The gearboxes on turbines 12, 20 and 33 had been replaced for other, unrelated reasons.

refused previous requests for practical solutions to their noise complaints over many years. Mr Arthur's offer was certainly made very late, and it is hard to credit his claim that Bald Hills took Mr Zakula's concerns seriously, when it has never acknowledged that he had cause to complain about noise from the wind farm.

329 More to the point, Mr Zakula had already taken substantial measures to soundproof his home. The house is double brick, and the cavity space is injected with thermal and acoustic insulation. There is also insulation in the ceiling. His windows are all double glazed. He has replaced one of his bedroom windows with bluestone blocks, and no longer leaves his remaining windows open at night. He has also planted windbreaks around his property that screen the wind farm from view.

330 Bald Hills relied on an acoustic engineering assessment conducted by Andrew Mitchell of Cogent Acoustics, which suggested some additional soundproofing measures that might be taken. These included installing two extra layers of 13 mm thick acoustic grade plasterboard on the underside of the ceiling, upgrading the existing glazing and sliding doors, replacing the laundry door with a solid core timber door, and installing air-conditioning. Unfortunately, due to COVID-19 restrictions, Mr Mitchell was not able to inspect Mr Zakula's home before preparing his first report, and so he did not appreciate that an air-conditioner would also require an off-grid power source. In a supplementary report, he proposed a solar panel array with a battery storage system.

331 Mr Zakula was not enthusiastic about Mr Mitchell's proposed measures, in particular the suggestions that he replace his colonial style timber windows with aluminium framed windows, and install an air-conditioner. He regarded these measures as incompatible with his lifestyle. He was also sceptical about whether they would work.

332 In preparing his report, Mr Mitchell assumed that noise levels from the wind farm outside Mr Zakula's house were up to 45 dB(A). He also assumed that, where wind farm noise levels were above 40 dB(A), this would correspond with higher wind speeds and higher background noise levels, which would mask wind farm noise to a

greater degree. He had not proposed measures to eliminate special audible characteristics. He would not guarantee that the modifications he suggested would stop Mr Zakula experiencing a noise nuisance inside his home.

333 Mr Zakula has already taken extensive measures to soundproof his home, including bricking up his bedroom window with bluestone blocks. Because Bald Hills has not demonstrated that it is complying with the noise conditions in the permit at Mr Zakula's house, I do not consider it is reasonable to expect him to further modify his home, in significant ways, in an attempt to reduce the wind farm noise to bearable levels. Further, I am not confident that the measures proposed by Mr Mitchell would achieve that in practice, given that he was unable to inspect Mr Zakula's home and based his opinion on assumed rather than measured noise levels.

Issue 11 – An unreasonable interference?

334 My conclusions in relation to issues 3 to 10 are, in summary:

(a) Noise from the turbines on the wind farm disturbed Mr Zakula's sleep on hundreds of occasions since the wind farm began operating in 2015. Wind turbine noise disturbed Mr Uren's sleep on around 100 occasions between May 2015 and December 2018. This amounted to a substantial, albeit intermittent, interference with the acoustic amenity of the plaintiffs' properties at night. In Mr Zakula's case, the interference is ongoing.

(b) Bald Hills did not establish that the sound received at either Mr Zakula's house or Mr Uren's house complied with the noise conditions in the permit at any time.[117]

(c) Even if Bald Hills had been able to establish compliance with the noise conditions in the permit at the plaintiffs' houses, this would not have been determinative of reasonableness. The noise limits under the permit and the Environment Protection Regulations are at the higher end of the range applied

117 See [220]–[223] above for a more detailed summary of conclusions in relation to permit compliance.

in Australia. Significantly, while the NZ Standard and condition 19(a) limit the extent to which continuous underlying noise levels are increased by wind turbine noise, they are not directed to intermittent loud noise from wind turbines, and provide no means of determining whether a wind farm produces unreasonably annoying noise in certain weather conditions, or on a particular night.

(d) The wind farm makes a substantial contribution to Australia's renewable energy industry, and to efforts to reduce reliance on fossil fuels and limit the effects of climate change. This is a socially valuable activity, and it is in the public interest for it to continue. However, there was no evidence that the wind farm could not continue to operate while also reducing the noise from some turbines to a reasonable level.

(e) Neither Mr Zakula nor Mr Uren are hypersensitive to noise from the wind farm.

(f) The locality is rural, relatively quiet, and remote. Sounds associated with stock rearing, grazing and other farming activities are typical of the area during the day. These activities do not cause intrusive noise at night. Traffic on nearby roads is light and usually creates limited disturbance. Because Bald Hills has not shown the wind farm to comply with the noise conditions in the permit, I have not considered the wind farm as one of the established uses in the locality.

(g) The precautions taken by Bald Hills were to investigate and respond to the numerous complaints made by Mr Zakula and Mr Uren. No remedial action was taken by Bald Hills to reduce the noise from the wind turbines received at either property. While some remedial action was taken to reduce noise levels at other locations, this was not shown to achieve compliance with the noise conditions in the permit at the plaintiffs' properties.

(h) There are two other precautions that Bald Hills could reasonably have taken.

It could have followed the procedure contemplated in condition 22 of the permit and selectively noise optimised or shut down relevant turbines to reduce noise levels at the plaintiffs' properties at night and during certain weather conditions. It could also have addressed the gearbox tonality issue identified by MDA in December 2016. Neither has been done.

335 Having regard to all of these matters, I find that noise from the wind turbines on the wind farm has amounted, intermittently, to a substantial and unreasonable interference with Mr Zakula's enjoyment of his land at night. I reach the same conclusion about the effect of wind turbine noise at Mr Uren's house until December 2018. The wind farm noise has been a common law nuisance at both properties at night.

Issue 12 – A continuing nuisance?

336 Bald Hills accepted that, if it was found to be causing a nuisance at Mr Zakula's property, an intermittent interference with his acoustic amenity would continue at night. In other words, it accepted that the nuisance would continue. It also accepted that Mr Zakula would be entitled to some relief.

INJUNCTION

Issue 13 – Should an injunction be granted?

337 The primary remedy sought by Mr Zakula is an injunction to restrain Bald Hills from continuing the nuisance. Ordinarily, a plaintiff who has established that the defendant's activities constitute a nuisance is entitled to an injunction to restrain the defendant from continuing to commit the same nuisance in future, in addition to damages for past nuisance.[118] However, the Court has a discretion to award damages instead of an injunction, where damages would be an adequate remedy.

338 Bald Hills submitted that factors relevant to the exercise of that discretion include:[119]

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118 *Fen Tigers*, [101] (Lord Neuberger).

119 Defendant's closing submissions dated 1 October 2021, [160]–[162], referring to *Fen Tigers* [125]

(a) whether the detriment can be fairly compensated by money;

(b) whether the defendant has acted in a high-handed or unsatisfactory manner;

(c) whether an injunction would operate oppressively or be disproportionate to the damage done to the plaintiff;

(d) the extent to which the activity in question provides a public benefit;

(e) the existence of, and compliance with, a planning permit; and

(f) the extent to which an injunction may affect the interests of third parties.

339 Bald Hills contended that damages would be an appropriate remedy in Mr Zakula's case. This contention was based largely on its claim to have demonstrated compliance with the noise conditions in the permit at Mr Zakula's house, a claim that I have not accepted. For the reasons already given, I am not satisfied that Bald Hills has taken reasonable precautions to avoid creating the nuisance. As I discuss below, in relation to aggravated damages, I consider that Bald Hills has responded to Mr Zakula's complaints since 2015 in an unsatisfactory manner.[120] I do not regard the soundproofing measures proposed in Mr Mitchell's report as a reasonable alternative to an injunction.[121]

340 While there is undoubted public benefit in the generation of renewable energy, I consider that Bald Hills can continue to achieve that while also reducing the wind turbine noise at Mr Zakula's house to reasonable levels.[122] The nuisance occurs intermittently, at night. Mr Zakula has clearly identified that his sleep is most disturbed in the cooler months, when the wind is in the west to south-west, and at low to medium wind speeds. The permit contemplates noise optimisation of relevant turbines during weather conditions associated with unacceptable noise levels. Until

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(Lord Neuberger), [154]–[161] (Lord Sumption), [171] (Lord Clarke); *Cohen v City of Perth* (2000) 112 LGERA 234, [174]–[176].

120 See [383]–[388] below.

121 See [326]–[333] above.

122 See [244] above.

Bald Hills has attempted to abate the nuisance in this way, it is premature to suggest that it can only reduce the noise by shutting down or decommissioning turbines. Further, as advised in the MDA December 2016 report, if Bald Hills resolves the gearbox tonality issue, it may no longer need to operate any of its turbines in noise optimisation mode.[123] Some funds appear to be available to put towards the cost of fixing the gearboxes on turbines that do not meet the tonal audibility guarantee in the EPC Agreement with Senvion.[124]

341 It follows that I do not accept that third parties not before the Court stand to be adversely affected if an injunction is granted. Bald Hills should be able to continue to generate and sell electricity while also abating the nuisance at Mr Zakula's house. There is no evidence on which I could find that abating the nuisance would be likely to result in lost jobs, interrupted electricity supply, disappointed investors, or frustrated government policy.

342 Bald Hills submitted that the fact that Mr Zakula moved into his house well after the permit was granted was a further reason why an injunction should not be granted. That argument would have had more force if the wind turbines had been operating when Mr Zakula bought his land and built his house, and if permit compliance had been established. While it is no defence to a private nuisance claim that the plaintiff has 'come to the nuisance', the fact that a plaintiff has chosen to live next to an activity that generates noise within permitted limits might be a reason to award damages instead of granting an injunction.[125] However, that is not what has occurred in this case.

343 For those reasons, I am not persuaded that I should exercise my discretion to award

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123 See [73], [309] above.

124 Note 21 to the Bald Hills financial statements for the year ended 31 March 2021 indicates that at that date $6,697,084 was held in Liquidated Damages Accounts for warranty securities provided under the EPC Agreement with Senvion. The previous year the figure was $11,708,469. The note records that the funds in the accounts are accessible by Bald Hills, although it is obliged to seek written approval from its lenders before funds can be transferred to non-restricted accounts. See Exhibit P85 – *Bald Hills Wind Farm Pty Ltd, General Purpose Annual Report for the year ended 31 March 2021* (Report, 31 March 2021) 31.

125 *Fen Tigers*, [47]–[58] (Lord Neuberger), [161] (Lord Sumption).

damages instead of an injunction. I will grant an injunction.

Issue 14 – Terms of the injunction

344 The plaintiffs submitted that the primary object of an injunction should be to abate the nuisance, and the secondary object should be to minimise the burden of the injunction on Bald Hills. They accepted that the state of the evidence meant that it would be difficult for the Court to do anything other than make educated guesses about the burden of various measures. The plaintiffs put forward four approaches to framing the injunction:

(a) The first possible approach would simply be for the Court to order Bald Hills to abate the nuisance forthwith. This would have the advantage of permitting Bald Hills to select the least costly abatement method, while also protecting Mr Zakula's interests.

(b) A second approach would be for the Court to stipulate the method of abatement — for example to order Bald Hills to noise optimise certain turbines, at certain times, in certain weather conditions. However, the plaintiffs acknowledged that the evidence did not provide a firm basis for assessing what abatement methods would be effective.

(c) A third approach would be for the injunction to be directed to the circumstances inside Mr Zakula's house — for example, by ordering Bald Hills to abate the nuisance so that noise emissions from the turbines do not increase indoor sound levels by more than 5 dB at any time. This was the approach taken in *Seidler* — the case about the noisy roller coaster at Luna Park in Sydney. The plaintiffs did not favour this approach, because of a lack of certainty about its effectiveness, and likely disputation about how to measure the contribution of the wind farm to sound levels inside the house.

(d) The final possible approach was also modelled on the injunction granted in *Seidler*. It involved the Court imposing a firm abatement measure, but giving

the defendant liberty to apply for relief from that measure if and when it could propose something more tailored. The plaintiffs submitted that this was the least attractive of the available options, as it would not bring an end to the litigation and would likely involve further costly disputation.

345 The plaintiffs submitted that the first approach would be the preferable one in this case.

346 Initially, Bald Hills did not make any submission as to the appropriate terms of any injunction. Its primary position was that no injunction should be ordered. After I pressed the question during closing submissions, Bald Hills submitted that if an injunction were granted, it should be in the form ordered in ***De Gruchy*** *v The Owners – Units Plan No. 3989*.[126] That case involved a structure-borne noise nuisance in the plaintiff's apartment, caused by differential thermal expansion between the roof of the apartment building and lower level walls and slabs. Accepting that it would take time for the defendant to develop and implement an effective solution, McWilliam AsJ granted injunctions restraining the defendant from continuing to permit the nuisance in the plaintiff's apartment, and requiring the defendant to take necessary measures to prevent the nuisance occurring. The injunctions were stayed for a period of 12 months, pending implementation of a solution by the defendant.[127]

347 The plaintiffs opposed any injunction being stayed. They submitted that Bald Hills has had many years to abate the nuisance, and should not need another year to think about how to do it. They emphasised that Bald Hills is yet to fix the tonality issue in any turbine.

Consideration

348 Neither side sought an injunction that required Bald Hills to take specific steps to abate the nuisance. Both preferred an injunction in general terms. I agree that is the appropriate course in this case.

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126 [2020] ACTSC 65 (***De Gruchy***).
127 *De Gruchy*, [226]–[232].

349 The evidence indicates that various methods are available to reduce wind turbine noise at Mr Zakula's house at night time. Bald Hills could fix the gearbox tonality issue, in particular for turbines 16 and 23 immediately to the south-west of Mr Zakula's house. It could apply permit condition 19(c) in the manner contemplated by the Panel,[128] identifying wind and weather conditions in which prescribed noise levels are exceeded for more than 10% of a night. Bald Hills could then noise optimise the operation of relevant turbines when those conditions are present, until noise levels are no longer excessive. If necessary, it could selectively shut down some turbines on nights when the noise is most likely to be disturbing.

350 However, Bald Hills has not attempted to use any of these methods with a view to reducing the wind turbine noise at Mr Zakula's house to reasonable levels. It is not possible to say which of them, alone or in combination, will achieve that outcome. Finding the solution is likely to involve some trial and error.

351 I accept that Bald Hills should have some time to work out an effective solution, which minimises the burden on it and allows the wind farm to continue to generate as much electricity as possible. However, I consider that the year allowed to the defendant in *De Gruchy* is longer than would be reasonable in this case. There is no need here to design a solution, obtain planning approval, and then carry out construction work to implement it. Engineering solutions for the gearbox tonality issue were identified as long ago as 2019, and it should be possible to implement one or more of them quickly — if that has not already occurred. The nuisance has been ongoing and unabated since 2015, and Mr Zakula should not have to endure another winter in which his sleep is disturbed by excessive wind turbine noise. In my view, a stay of three months is sufficient.

352 I will grant an injunction restraining Bald Hills from continuing to permit noise from wind turbines on the wind farm to cause a nuisance at Mr Zakula's house at night, and requiring it to take necessary measures to abate the nuisance. The injunction will

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128 See [214]–[215] above.

be stayed for three months.

DAMAGES

353 Both plaintiffs sought damages to compensate them for a decline in value of their properties due to the nuisance, and for distress, inconvenience and annoyance. They also sought aggravated and exemplary damages.

Issues 15, 16 and 17 – Damages referable to Uren properties

354 Mr Uren did not adduce expert valuation evidence in support of his claim that the noise nuisance caused by the wind farm caused either of the Uren properties to decline in value. Instead, he attempted to prove that loss inferentially, by reference to valuation evidence about other nearby properties — namely Mr Zakula's property, and properties owned by the Fairbrothers, the McDougall family company, and the Kilsby family. Bald Hills objected to this evidence on the ground of relevance.

355 On 14 September 2021, I upheld Bald Hills' objection, and gave reasons for that ruling on transcript. In summary, I held that it was not open to me to cobble together a valuation of the Uren properties, absent noise from the wind farm, based on valuations of other nearby properties. Valuation of land is properly a matter for expert evidence, and it is not permissible for the Court to piece together a valuation of its own.[129] Accordingly, evidence of the value of other properties was not logically probative of whether the sale prices for the Uren properties were depressed by wind turbine noise. Even if I had been persuaded that the evidence was relevant, I would have excluded it under s 135(c) of the *Evidence Act 2008* (Vic). That was because I considered that it would have involved an undue waste of time to permit Mr Uren to try to prove this aspect of his claim in such a roundabout way, in view of his unexplained failure to prove it directly, in the conventional way.

356 In the absence of evidence to support this aspect of Mr Uren's claim, I am unable to make any finding that noise from the wind farm caused the Uren properties to decline

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129 *Challenger Property Asset Management Pty Ltd v Stonnington City Council* (2011) 34 VR 445, [17], citing *101 Collins Street v City of Melbourne* (Supreme Court of Victoria, Batt J, 2 April 1996) 83. See also *Yelland Security Pty Ltd v Plus Architecture International Pty Ltd* [2021] VSC 416, [477].

in value, or to what extent. Mr Uren is not entitled to damages for a decline in value of the properties.

357 Bald Hills also disputed that Mr Uren was entitled to any remedy in respect of nuisance after 18 March 2016, the date on which the southern property was sold. As mentioned, with the agreement of the new owner, Mr Uren continued to live in the house on the southern property until December 2018, when he moved into the Tarwin Lower township. Bald Hills submitted that Mr Uren had not established that he had any interest in the property after March 2016, and that the evidence about the basis on which he continued living there after that date was equivocal.

358 In his evidence in chief, Mr Uren said that the southern property was sold to Ross Svenson on 4 January 2016, and the sale settled on 18 March 2016. The house needed a bit of work, and Mr Svenson was 'happy to have someone kicking around', so he let Mr Uren stay there after the sale. Mr Uren paid rent, in an amount agreed with Mr Svenson. Although he stayed in the house, Mr Uren spent a lot of time away from it over the next couple of years — he stopped at his friend Bart Harrold's place and also went up to visit friends in East Gippsland. He moved out of the house for good in December 2018.

359 During cross-examination, Mr Uren agreed that he stopped farming the southern property after it was sold to Mr Svenson, and that he spent some time away from the property after that time. Mr Uren insisted that he had a written agreement with Mr Svenson about staying in the house after March 2016. He said that he had not discovered it, because he had misplaced it since moving. He said that he had tried to find the agreement, but had not been able to, and could not produce it.

360 Bald Hills argued that this evidence did not establish, on the balance of probabilities, that Mr Uren had exclusive possession of the house on the southern property pursuant to a lease after March 2016. It pointed out that a remedy for nuisance is only available to a person who has an interest in the relevant land, and that no remedy is available

to a person who occupies land as a mere licensee.[130] The test to be applied to distinguish between a lease and a licence is whether there is a grant of exclusive possession during the term.[131] Bald Hills submitted that I should find that Mr Uren occupied the house between March 2016 and December 2018 as a mere licensee.

361 The plaintiffs did not dispute the legal basis for Bald Hills' submission, but argued that it was more probable that Mr Uren continued to live in the house pursuant to a lease rather than a licence. They submitted that the more common way for someone to occupy and live in a house is under a lease, while a licence is a less usual and more legalistic arrangement.

362 Although the evidence in relation to this issue is sparse, I am satisfied that Mr Uren leased the house on the southern property from its new owner, Mr Svenson, between March 2016 and December 2018. The two men had a written agreement, under which Mr Uren paid rent to Mr Svenson and was able to continue living in the house. Mr Uren spent a good deal of time elsewhere, but the house remained his principal place of residence until he moved out in December 2018. There was no suggestion that any other person — including Mr Svenson — used or lived in the house before that time. It is more probable than not that the agreement between Mr Uren and Mr Svenson was a 'tenancy agreement' for the purposes of the *Residential Tenancies Act 1997* (Vic), and that Mr Uren had the rights and duties of a tenant under that Act, including the right to quiet enjoyment of the premises.[132]

363 Mr Uren had a freehold interest in the southern property until March 2016, and from then until December 2018 he had a leasehold interest in the house on the southern property. He is therefore entitled to damages for nuisance until December 2018.

Issues 18 and 19 – Damages referable to Zakula property

364 In the alternative to an injunction restraining Bald Hills from continuing the nuisance,

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130 *Brown v Tasmania* (2017) 261 CLR 328, [385] (Gordon J), citing *Hunter v Canary Wharf Ltd* [1997] AC 655, 692, 694–695 (Lord Goff) (***Hunter***).

131 *Swan v Uecker* (2016) 50 VR 74, [31], and the authorities cited.

132 *Residential Tenancies Act 1997* (Vic), ss 3 – definition of 'tenancy agreement', 67, as at 15 June 2015.

Mr Zakula sought damages either for a claimed diminution in value of his land attributable to the nuisance, or for the cost of abating the nuisance. Since I have decided that an injunction should be ordered, it is not strictly necessary to assess this aspect of Mr Zakula's damages claim. However, I can indicate that, if I had considered damages to be an adequate alternative to an injunction, I would have assessed this head of damage at $200,000.

365 Mr Zakula relied on the expert opinion of a valuer, Gerald McMahon of CBRE, dated 13 August 2021, to the effect that the continuing noise nuisance reduced the value of Mr Zakula's property from $850,000 to $650,000. Mr McMahon had been asked to assume the existence of a nuisance in the form of 'intermittent production of an unreasonable amount of noise and infrasound by the wind turbines' operated by Bald Hills on the adjoining land.

366 Based on comparable sales, Mr McMahon considered that Mr Zakula's land was worth $25,000 per hectare, excluding structures. He valued the house and other buildings at $284,300. A key piece of sales evidence was the price of $12,357 per hectare (excluding structures) obtained for a nearby property at 1080 Buffalo-Waratah Road, Tarwin Lower. Mr McMahon observed:

> The distinctive feature of this property is that is has three wind turbines positioned through the middle of the property from which a registered proprietor earns annual income. Whilst, it does provide additional income, the positioning of the turbines precludes a dwelling as there is no unencumbered space inside the recommended 1 kilometre exclusion zone. This limits the appeal of the property to rural/lifestyle purchasers who predominantly buy to reside on the property. Therefore, the purchaser pool in this case, is limited to either adjoining owners or local farmers seeking to increase their overall landholding; or, investors seeking an investment yield from the wind turbines in addition to leasing the property.

The price per hectare for that property was 17.75% less than the sale price of a nearby property at 1255 Walkerville Road, where there were no wind turbines (and hence no rental income from turbines) but where a dwelling could be built outside the one kilometre exclusion zone.

367 Mr McMahon took into account that the existence of a noise nuisance had been recognised by the Council, and was a matter of public record. He considered that would have a negative impact on the market value of Mr Zakula's property. He was of the view that a 'severance factor' was the most appropriate approach to assessing the impact of the noise nuisance, and further noted that 'rural lifestyle properties with existing structures such as the subject have only one market that being the occupation of a dwelling in rural setting'.[133] Based on after sales evidence reflecting severance rates of 5.5% to 50%, Mr McMahon applied a severance factor of 25% to the land and the dwelling. This resulted in a valuation of $20,000 per hectare, excluding structures, and a total valuation of $650,000 for land and structures.

368 Most unfortunately, Mr McMahon died unexpectedly, shortly before he was due to give evidence at the trial of this proceeding. His reports were tendered by consent, although his opinion could not be tested in cross-examination.

369 Bald Hills relied on the expert opinion of a valuer, Damian Kininmonth of Preston Rowe Paterson. In his report dated 2 September 2021, Mr Kininmonth opined that the sales analysis and methodology used by Mr McMahon were unacceptable and inappropriate. I did not understand Mr Kininmonth to dispute Mr McMahon's valuation of Mr Zakula's property at $850,000, excluding the effect of the noise nuisance from the wind farm. Rather, he took issue with Mr McMahon's opinion about the severance factor to be applied. Mr Kininmonth's main difficulty with Mr McMahon's methodology was that it measured the impact of not being able to develop (or use) the property as a residential dwelling, rather than the impact of noise or infrasound. He also considered that Mr McMahon had not demonstrated a proper basis for applying a severance factor of 25%. Mr Kininmonth expressed no opinion about the value of Mr Zakula's property.

370 In his evidence at trial, Mr Kininmonth agreed that, if I were to find that noise from the wind farm amounted to a nuisance at Mr Zakula's property, it would affect the

133 Exhibit P30 – Second valuation report of Gerard McMahon dated 13 August 2021, 33.

value of his property. He accepted that the property would be worth more as a rural lifestyle property, with a habitable dwelling, than as farm land. When pressed, Mr Kininmonth considered that a 17.5% reduction would represent a total loss of use of the property as a lifestyle property.

371 I accept Mr McMahon's opinion as to the impact of the noise nuisance on the value of Mr Zakula's property. There was no question that he was appropriately qualified to express the opinion. He had extensive experience in valuing rural properties. His opinion was based on comparable local sales, and his rationale was well articulated. The conclusions he drew from the sales information for 1080 Buffalo-Waratah Road were particularly persuasive.

372 I am fortified in this conclusion by Mr Kininmonth's acceptance that a noise nuisance of the kind I have found to exist would diminish the value of Mr Zakula's property. The lower severance factor of 17.5% put forward by Mr Kininmonth during cross-examination did not appear to me to be the result of considered analysis. In particular, it did not take account of the rental income for the wind turbines on 1080 Buffalo-Waratah Road, which enhanced the value of that property. There are no wind turbines on Mr Zakula's property and no rental income stream of interest to a prospective purchaser.

373 Had I awarded damages instead of an injunction, I consider that it would have been more appropriate to compensate Mr Zakula for the decline in value of his property, rather than assessing damages by reference to the cost of further soundproofing measures at his house. It would have been a matter for Mr Zakula how he used that money. If he chose to remain living at the property, he could — if he wished — have spent some of the damages award on further soundproofing his house. Mr Mitchell estimated the cost of his recommended soundproofing measures, including an off-grid energy supply, to be in the range $123,500 to $157,000 plus GST. Alternatively, Mr Zakula could have sold the property and moved away from the wind farm, in which case he would have been compensated for the impact of the noise

nuisance on the sale price.

Issue 20 – Damages for distress, inconvenience and annoyance

374 Both Mr Zakula and Mr Uren claimed damages for distress, inconvenience and annoyance due to the noise nuisance. They submitted that the nuisance was severe and persistent. Their significant distress and annoyance was recorded in their noise logs and diaries, and was observed by their neighbours. They suffered disturbed sleep on many nights, which they said was exhausting and debilitating. By reference to the damages awarded in ***McFadzean*** *v Construction, Forestry, Mining and Energy Union*,[134] to a plaintiff who lost two nights' sleep, the plaintiffs submitted that a figure of at least $100,000 per year should be awarded to each of them for the period during which they suffered the nuisance.

375 Bald Hills pointed out that the gist of the tort of nuisance is interference with a plaintiff's enjoyment of their property, and submitted that it is the proprietary, not the personal, loss of amenity that is to be compensated by an award of damages. It argued that in a case such as this, where the nuisance has not caused personal injury or property damage, the basis of any award of compensation for past nuisance is loss of amenity. It referred me to the summary of the relevant principles in *Dobson v Thames Water Utilities Ltd*,[135] as follows:

> (1) That damages awarded for nuisance, where there has been personal discomfort, are assessed on the basis of compensation for diminution of the amenity value of the land rather than damages for that personal discomfort.
>
> (2) That damages for diminution of amenity value are measured by reference to the size, commodiousness and value of the property not the number of occupiers.
>
> (3) That damages for compensation for diminution of amenity value of the land may be reflected either in diminution of capital value or rental value.
>
> (4) That damages for diminution in value frequently raise difficult issues of assessment which can usually be resolved by expert evidence. If such assessment is not reasonable or practicable then the principles on which

134 [2004] VSC 289, [2554]–[2559] (***McFadzean***).
135 [2011] EWHC 3253 (TCC), [1029].

> damages are assessed are sufficiently flexible to do justice between the parties by arriving at a sum for general damages for loss of amenity.

376 Bald Hills accepted that there are cases in which damages have been awarded for distress, inconvenience and annoyance in nuisance claims which were not assessed by reference to diminution in the capital or rental value of the plaintiff's property. In each such case the damages awarded were modest. In ***Stockwell*** *v State of Victoria*,[136] the plaintiff was awarded $5,000 for 'annoyance, inconvenience, distress, upset' and the steps taken for two winters to keep at bay the wild dogs that constituted the nuisance. In *De Gruchy*,[137] the plaintiff was awarded general damages in the sum of $15,000 in respect of the noise nuisance suffered for almost a year before she moved out of her apartment. It referred me to a number of other modest awards of general damages in comparable nuisance or negligence cases. On that basis, it said that any award of damages for distress, inconvenience should be in the order of $10,000 per year for each plaintiff.

Consideration

377 I accept Bald Hills' submission in relation to this aspect of the plaintiffs' claim.

378 The tort of nuisance is concerned with interference with the enjoyment of land, which is why only a person with an interest in the land is entitled to a remedy for nuisance. In a case where the nuisance has not caused personal injury or property damage, it is the loss of amenity that is to be compensated. Lord Hoffman explained it well in *Hunter v Canary Wharf Ltd*:[138]

> In the case of nuisances 'productive of sensible personal discomfort,' the action is not for causing discomfort to the person but … for causing injury to the land. True it is that the land has not suffered 'sensible' injury, but its utility has been diminished by the existence of the nuisance. It is for an unlawful threat to the utility of his land that the possessor or occupier is entitled to an injunction and it is for the diminution in such utility that he is entitled to compensation.
>
> … [D]iminution in capital value is not the only measure of loss. It seems to me that the value of the right to occupy a house which smells of pigs must be less than the value of the occupation of an equivalent house which does not. In the

136 [2001] VSC 497, [479]–[484] (***Stockwell***).
137 *De Gruchy*, [165]–[171].
138 *Hunter*, 706. See also 724–5 (Lord Hope).

> case of a transitory nuisance, the capital value of the property will seldom be reduced. But the owner or occupier is entitled to compensation for the diminution in the amenity value of the property during the period for which the nuisance persisted. To some extent this involves placing a value upon intangibles. But estates agents do this all the time. The law of damages is sufficiently flexible to be able to do justice in such a case …

379 Here, Mr Zakula and Mr Uren were never sure that they would be able to sleep in their own beds without being woken or kept awake by wind farm noise. There have been hundreds of occasions on which Mr Zakula's sleep has been disturbed, and a smaller number of nights on which he could not sleep at all. Mr Uren's sleep was disturbed by noise from the wind farm on at least 100 occasions before December 2018. At times, both men slept away from their homes. Mr Zakula spent the occasional night in his car at Walkerville beach, and Mr Uren spent longer periods staying with friends. This undoubtedly diminished the utility of their respective interests in their land. The value of living in a home in which one's sleep is intermittently disrupted is plainly less than the value of a home where a good night's sleep can be expected.

380 While it is not easy to place a value on this intangible loss, I have concluded that each plaintiff should be awarded damages for past loss of amenity in the amount of $12,000 per year — or $1,000 per month. This amount is consistent with the amounts awarded for comparable losses of amenity in *Stockwell* and *De Gruchy*.

381 The plaintiffs' reliance on *McFadzean* was misplaced, because that case did not involve a claim of private nuisance. The relevant plaintiff was awarded damages for the tort of intentional infliction of harm,[139] including by sleep deprivation. She was awarded $2,250 for physical injury, in the form of a migraine suffered after the defendants substantially deprived her of sleep over two consecutive nights.[140]

382 On that basis, I assess damages for past loss of amenity for Mr Zakula for seven years from June 2015, when he was first disturbed by noise from the wind farm, to June 2022, when the injunction will take effect, at $84,000. I assess Mr Uren's damages for

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139 Described in *Wilkinson v Downton* [1897] 2 QB 57.

140 *McFadzean,* [2552]–[2559]. Another plaintiff whose passage along a public road was obstructed was awarded $7,500 for public nuisance: see [2593]–[2605].

past loss of amenity over three years and ten months, from March 2015 to December 2018, at $46,000.

Issue 21 – Aggravated damages

383 The plaintiffs also sought aggravated damages, on the basis that Bald Hills knew or ought to have known that it was causing an unlawful nuisance. It was common ground that aggravated damages are compensatory, and may be awarded when the harm done by the defendant's wrongful act was aggravated by the manner in which it was done.[141] While Bald Hills drew attention to historical doubts as to whether aggravated damages were available for nuisance,[142] it accepted that they could be awarded in an appropriate case, for example where the defendant's conduct was 'of such a high-handed nature that it merited aggravated damages'.[143]

384 In my view, Bald Hills' conduct towards Mr Zakula and Mr Uren has been of that nature. They both repeatedly complained that noise from the wind turbines at their homes was disturbing their sleep. Mr Uren first complained in May 2015, while Mr Zakula did not formally complain until September 2015. Bald Hills never responded to either man's complaints by trying to reduce wind turbine noise at their homes. Rather, it denied that they had any cause for complaint, minimised their lived experience of the noise, and treated them as hypersensitive trouble-makers. In 2017, it accepted and relied on MDA's patently absurd conclusions that it was quieter at both properties after the wind farm started operating. The evidence of both Mr Zakula and Mr Uren left me in no doubt that, over time, they found the lack of any remedial action by Bald Hills to be frustrating and deeply discouraging. I accept that this compounded the effect of the noise nuisance that intermittently kept them awake at night.

385 When Mr Zakula, Mr Uren and others took their concerns to their local council, Bald

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141 *Uren v John Fairfax & Sons Pty Ltd* (1966) 117 CLR 118, 149 (Windeyer J).

142 Referring to *Willoughby Municipal Council v Halstead* (1916) 22 CLR 352; *Oldham v Lawson (No 1)* (1976) VR 654, 658–9.

143 *Stockwell*, [615]. See also *De Gruchy*, [181]–[182], [216].

Hills engaged lawyers and consultants who flooded the Council with submissions and reports that did not engage with the substance of the complaints.[144] After the Council determined that the wind farm noise was causing an intermittent nuisance at properties including Mr Zakula's and Mr Uren's, Bald Hills sought judicial review of the Council's resolution in this Court. The litigation, while ultimately unsuccessful, was a source of stress for both plaintiffs. Mr Uren found it terribly upsetting, and felt that Bald Hills was 'treating the little people like rubbish'.[145] Overall, Bald Hills' response to the complaints to the Council was strikingly disproportionate, and did nothing to mitigate the noise nuisance at the plaintiffs' homes. I am satisfied that it further aggravated the loss of amenity suffered by both plaintiffs in their homes.

386 The vigour with which Bald Hills disputed the complaints to the Council would have been better directed to finding a solution to the gearbox tonality issue first identified by MDA in December 2016. MDA advised Bald Hills at that time that it should identify an engineering solution to mitigate tonal emissions for specific turbines, rather than continue to rely on noise optimisation to achieve compliance. It is yet to do so. Its delay in finding a solution is largely unexplained, it being unclear why nothing was in place before Senvion went into voluntary administration in April 2019. Bald Hills' ongoing failure to fix the known tonality issues in turbines 16 and 23, closest to Mr Zakula's house, amounts to seriously high-handed treatment of him.

387 At one point during cross-examination of Mr Zakula, counsel for Bald Hills put to him that 'give and take' is important between neighbours.[146] While that is undoubtedly true, it is difficult to see what Bald Hills has given in response to Mr Zakula's complaints over a period of more than six years. Mr Arthur's belated offers in December 2020 and March 2021 to discuss acoustic treatments at Mr Zakula's property were, as I have found, not well directed. A reasonable neighbour would have tried to reduce the noise; Bald Hills has not.

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144 See *Bald Hills No 1*, [88]–[96], [111]–[115].
145 Transcript, 10 September 2021, 373:13–16.
146 Transcript, 9 September 2021, 272:3–11.

388 I consider that the manner in which Bald Hills has dealt with the plaintiffs' reasonable and legitimate complaints of noise has, over many years, at least doubled the impact of the loss of amenity each of them has suffered at their homes. On that basis, I award aggravated damages of $84,000 to Mr Zakula, and $46,000 to Mr Uren.

Issue 22 – Exemplary damages

389 The plaintiffs also sought a substantial award of exemplary damages, contending that Bald Hills had acted in contumelious disregard of their rights to sleep peacefully in their own homes. They submitted that Bald Hills should be punished for its conduct, in order to deter repetition of the nuisance by it, and to stand as a warning to other noise producing businesses, in particular wind farm operators.

390 I do not agree that Bald Hills' conduct has been of that order. Throughout, it has sought and relied on the advice of acoustic experts in relation to the noise emitted by its wind turbines. Their advice has consistently been that the noise levels have complied with the permit conditions, including at the plaintiffs' homes. As I have found, that advice was based in part on incorrect interpretations of the NZ Standard and condition 19(c) of the permit. While that is regrettable, it is not something for which Bald Hills should be punished. I consider that Bald Hills could have read MDA's reports more critically — in particular the 2017 noise assessments at Mr Zakula's property and Mr Uren's property — but its failure to do so does not amount to conscious wrongdoing.

391 I remain troubled by Bald Hills' failure to fix the gearbox tonality issue first identified in the MDA December 2016 report, considered against the way in which it responded to the plaintiffs' noise complaints. On balance, I have concluded that this concern is met by the awards of aggravated damages, and does not warrant any further mark of the Court's disapproval.

392 There will be no award of exemplary damages.

Issue 23 – Proper measure of loss and damage

393 In summary, the proper measure of Mr Zakula's loss and damage is $168,000, comprising $84,000 for past loss of amenity, and an additional $84,000 for aggravated damages. Had I not decided to grant an injunction requiring Bald Hills to abate the nuisance, I would also have awarded Mr Zakula $200,000 as compensation for the reduction in value of his property as a result of the nuisance.

394 The proper measure of Mr Uren's loss and damage is $92,000, comprising $46,000 for past loss of amenity, and an additional $46,000 for aggravated damages.

DISPOSITION

395 There will be judgment for the plaintiffs in the following terms:

(a) Bald Hills will be restrained from continuing to permit noise from wind turbines on the wind farm to cause a nuisance at Mr Zakula's house at night, and will be required to take necessary measures to abate the nuisance.

(b) The injunction will be stayed for three months.

(c) Bald Hills is to pay damages to Mr Zakula in the sum of $168,000, comprising $84,000 for past loss of amenity, and $84,000 for aggravated damages.

(d) Bald Hills is to pay damages to Mr Uren in the sum of $92,000, comprising $46,000 for past loss of amenity and $46,000 for aggravated damages.

396 I will hear the parties on the questions of interest and costs.

CERTIFICATE

I certify that this and the 147 preceding pages are a true copy of the reasons for judgment of Justice Richards of the Supreme Court of Victoria delivered on 25 March 2022.

DATED this twenty fifth day of March 2022.

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Associate