SUPREME COURT OF SOUTH AUSTRALIA

(Full Court)

STIRLING MCGREGOR v TILT RENEWABLES AUSTRALIA PTY LTD & ORS

[2019] SASCFC 142

Judgment of The Full Court
(The Honourable Chief Justice Kourakis, The Honourable Justice Kelly and The Honourable Justice Hinton)

15 November 2019

ENVIRONMENT AND PLANNING - ENVIRONMENTAL PLANNING - DEVELOPMENT CONTROL - APPLICATIONS

ENVIRONMENT AND PLANNING - COURTS AND TRIBUNALS WITH ENVIRONMENT JURISDICTION - SOUTH AUSTRALIA - ENVIRONMENT, RESOURCES AND DEVELOPMENT COURT AND ITS PREDECESSORS - OBJECTOR'S APPEALS

Appeal against an order of the Environment, Resources and Development Court (the ERD Court) confirming a development approval given for a wind farm by Mid Murray Council (the Council).

The development application was to be assessed against the Mid Murray Council Development Plan as consolidated on 24 October 2013 (the Development Plan), pursuant to the Development Act 1993 (SA) (the Act). The Development Plan adopted the Environment Protection (Noise) Policy 2007 (the Policy), and the Policy incorporated, by cl 34, the Wind Farms Environmental Noise Guidelines 2003. The Environment Protection Authority had since published the 2009 Guidelines, on which the parties proceeded at trial as the applicable Guidelines.

The appellant, who resides interstate but owns a dwelling about seven kilometres from the closest turbine, was one of the objectors against the development approval in the ERD Court. At trial, the objectors relied on evidence, by way of affidavits, of persons who

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On Appeal from ENVIRONMENT, RESOURCES AND DEVELOPMENT COURT OF SOUTH AUSTRALIA (FULL BENCH) [2018] SAERDC 15

Appellant: STIRLING MCGREGOR Counsel: MR B HAYES QC WITH MR P QUINN - Solicitor: PIPER ALDERMAN
First Respondent: TILT RENEWABLES AUSTRALIA PTY LTD Counsel: MR S HENRY SC WITH MR D BILLINGTON - Solicitor: FINLAYSONS
Second Respondent: MID MURRAY COUNCIL No Attendance

Hearing Date/s: 05/02/2019

File No/s: SCCIV-18-361

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resided within the vicinity of wind farms at Waterloo in South Australia and Cape Bridgewater in Victoria.

The appellant appeals on the following grounds that the ERD Court:

1. Failed to properly address the affidavit evidence, and expert opinion evidence which attributed the symptoms therein described to the nearby wind farms (grounds 1, 3.3 and 5).

2. Erred in its finding at paragraph [79] that there was '[n]o credible evidentiary basis' to suggest that noise from the development would unreasonably interfere with other land uses (grounds 2, 3.1 and 3.2).

3. Erred in holding that as the noise likely to be generated by the wind farm would comply with the Policy that that of itself would ensure that the Development Plan provisions directed to the protection of health and amenity would be satisfied, and thereby erred in equating the Policy with those provisions (ground 4).

4. Failed to properly consider evidence that the Policy contained significant errors of fact (ground 6).

5. Erred in holding that Dr Hansen had no relevant experience in measuring wind turbine noise (ground 7).

Held per Kourakis CJ (Kelly and Hinton JJ agreeing), dismissing the appeal:

1. It was not necessary for the ERD Court to consider whether or not it accepted that the deponents were credible or reliable as to the experiences stated in the affidavits which were tendered.

2. The ERD Court had regard, but, correctly, gave very little weight, to the subjective perceptions and accounts of those residents because there was no evidence that their experiences had been medically validated or scientifically assessed against noise studies generally, or studies of wind farms in particular. Moreover, the objectors did not prove any equivalence in the Waterloo and Cape Bridgewater Wind Farms, and the residences in those localities, and the proposed development.

3. The ERD Court's conclusion in paragraph [79] is properly explained.

4. The ERD Court did not find that satisfaction of the 2009 Guidelines necessarily satisfied the other provisions of the Development Plan which guarded against unreasonable interference with neighbouring land uses and protected the health and amenity of nearby residents. Ground 4 misconstrues the ERD Court's reasons.

5. On the proper construction of the Development Plan, compliance with the 2009 Guidelines could generally be expected to satisfy those provisions designed to minimise noise impacts.

6. The scientific soundness of the 2009 Guidelines is not, in itself, a proper enquiry for planning authorities when evaluating a particular development application.

7. The ERD Court made no error in preferring Mr Turnbull's evidence on the basis of his considerably greater experience in modelling proposed wind farms.

Development Act 1993 (SA) ss 23-29, 33; *Environment Protection Act 1993* (SA) ss 13, 28, 34, 47; *Environment Protection (Noise) Policy 2007* (SA); *Wind Farms Environmental Noise Guidelines 2009* (SA), referred to.
McLachlan & Ors v Mid Murray Council & Tilt Renewables Australia Pty Ltd [2018] SAERDC 15, discussed.

STIRLING MCGREGOR v TILT RENEWABLES AUSTRALIA PTY LTD & ORS
[2019] SASCFC 142

Full Court: Kourakis CJ, Kelly and Hinton JJ

1 **KOURAKIS CJ**: This is an appeal against an order of the Environment, Resources and Development Court (the ERD Court) confirming a development approval given for a wind farm (the development) by Mid Murray Council (the Council).

2 The application for approval of the development was lodged with the Council on 28 February 2014 by Trustpower Australia Holdings Pty Ltd, which is now known as Tilt Renewables Australia Pty Ltd (Tilt). The application described the development as follows:[1]

> The Palmer Wind Farm is generally located on the eastern side of the Mount Lofty Ranges near the areas of Palmer and Sanderston.
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> …
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> More specifically Trustpower are seeking approval for the use of the nominated land for the installation of up to 114 wind turbines and other buildings and related structures needed for the purposes of generating electricity from wind and then transmitting this electricity to the national grid (including above ground and underground transmission cabling and a substation). This includes supporting infrastructure, buildings and structures (including access tracks, wind monitoring masts and management and monitoring facilities) that are necessary for the ongoing operation and maintenance of the development.
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> …

3 Prior to the hearing of the appeal to the ERD Court, the development application was amended to propose:

> … 103 wind turbine generators (WTGs) … clustered in three main groups in the vicinity of Palmer and Sanderston. The indicative layout comprises the following distribution:
>
> - Area A (northern) – 15 WTGs;
> - Area B (central) – 50 WTGs; and
> - Area C (southern) – 38 WTGs.

[1] Exhibit 1R1 at p 4.

4 Tilt plans to erect the wind turbines on numerous parcels of land disbursed within an area which extends approximately 30 kilometres in a north-south direction and comprises approximately 11,550 hectares.[2]

5 The appellant, Mr McGregor, lives in Melbourne but owns a dwelling about seven kilometres from the closest turbine. He was one of several objectors against the development approval in the ERD Court. The others were Mr Royal and Mr McLachlan. I will refer to them collectively as the objectors. Mr McGregor alone appeals against the judgment on the following grounds:

1. The Court's reasons for decision are defective because they fail to identify and analyse the evidence that would have supported or refuted its findings in relation to the effect of noise from the wind farm on health and amenity.

2. The Court erred in finding that no credible evidentiary basis was advanced to suggest that the noise from the wind farm would interfere unreasonably with other land uses: paragraph [79].

3. Further, and in relation to ground 2, the Court:

    3.1 ignored or alternatively failed to properly consider or analyse opinion evidence given by expert witnesses; and

    3.2. ignored or alternatively failed to properly consider or analyse uncontested evidence given in sworn affidavits (Exhibits 4A11-4A22) from 11 persons living adjacent to operating wind farms in South Australia and Victoria in relation to noise and amenity; and

    3.3. made no findings in respect of the evidence referred to in paragraph 3.2 above where that evidence supported a finding that the noise generated by the proposed wind farm would not satisfy the provisions of the Development Plan directed to the protection of health and amenity and refuted the Court's finding made at [79].

4. The Court erred in holding that as the noise likely to be generated by the wind farm would comply with the relevant Environmental Protection (Noise) Policy that that of itself would ensure that the Development Plan provisions directed to the protection of health and amenity would be satisfied, and thereby erred in equating that Policy with those provisions: paragraphs [66], [67], [79], [95].

5. The Court ignored or alternatively failed to properly consider or analyse evidence that, notwithstanding predicted compliance with the relevant Environmental Protection (Noise) Policy, the Development Plan provisions directed to the protection of health and amenity would not be satisfied such that the proposed development was inconsistent with the provisions of the Development Plan.

6. Ignored evidence or alternatively failed to properly consider or analyse evidence that the relevant Environmental Protection (Noise) Policy contained significant

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[2] Exhibit 2R1 at pp 26 to 32.

errors of fact and instead found that the Policy is a comprehensive method for predicting and assessing the likely noise impact from a wind farm [50].

7. The Court erred in holding that Dr Kristy Hansen had no relevant experience in measuring wind turbine noise [70] and ignored or alternatively failed to properly consider evidence to the contrary.

6 Grounds 1, 3.3 and 5 impugn the ERD Court's findings, and the adequacy of its reasons, on the question of the effect of noise from the wind farm on the health and amenity of nearby residents. The objectors' case was that adverse health effects of the kind described in the affidavits referred to in ground 3.2 were commonly suffered by residents of the localities in which wind farms were built. The ERD Court found that, notwithstanding the affidavit evidence from residents of other wind farms concerning the adverse health effects they had experienced (the affidavit evidence), there was no evidence that similar symptoms would be caused by the particular wind farm proposed by Tilt. There was no evidence that the other wind farms, their geographic and climatic location, and the relative location of the deponents' homes to them, were closely comparable for the purposes of the pathogenesis of the conditions they described. Indeed, the objectors did not adduce any expert medical opinion that the particular symptoms and experiences described by the deponents were caused by the wind farms in their locality. For those reasons, it was not necessary for the ERD Court to consider whether or not it accepted that the deponents were credible or reliable as to the experiences stated in the affidavits which were tendered. Those grounds must be dismissed.

7 Grounds 2, 3.1 and 3.2 challenge the ERD Court's finding at paragraph [79] of its reasons that there was no credible evidence that the development would not comply with the Environment Protection (Noise) Policy 2007 (the Policy) adopted by the Mid Murray Council Development Plan as consolidated on 24 October 2013 (the Development Plan) and its other provisions.[3] The relevant part of the Policy was guidelines governing noise emitted by wind farms to which I will refer as the 2009 Guidelines. In making that finding, the ERD Court did not ignore the affidavit evidence called by the objectors about the noise emitted from wind farms. The Court's finding was made notwithstanding the affidavit evidence because the objectors had not modelled the noise which would be emitted from the wind farm proposed by Tilt and did not adduce evidence that the wind farms in the locality of the deponents were relevantly comparable. Those grounds too must be dismissed.

8 Ground 4 misconstrues the ERD Court's reasons. The ERD Court did not find that satisfaction of the 2009 Guidelines necessarily satisfied the other provisions of the Development Plan which guarded against unreasonable

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[3] *McLachlan & Ors v Mid Murray Council & Tilt Renewables Australia Pty Ltd* [2018] SAERDC 15 at [79] (*McLachlan*).

interference with neighbouring land uses and protected the health and amenity of nearby residents. The ERD Court considered the questions of noise interference to other land uses separately from the effect of noise on the health and amenity of nearby residents. On the latter question, it did not confine its consideration to the Policy. The ERD Court's approach to the 2009 Guidelines on the former question is the subject of ground 6.

9 Ground 6 reflects the primary case of the objectors before the ERD Court. It was that the 2009 Guidelines were flawed in certain fundamental respects, and that therefore no, or very little, weight should have been placed on it in assessing compliance with the other provisions of the Development Plan regulating the noise emitted by the development. The ERD Court proceeded on the basis that compliance with the 2009 Guidelines, which was adopted by the Plan, would, in the generality of cases, ensure compliance with the provisions of the Development Plan which protect other land uses from unreasonable noise interference. The construction and application of the Development Plan by the ERD Court in that respect was correct. Moreover, the objectors did not adduce evidence, or put a case, that, for the particular development proposed by Tilt, compliance with the 2009 Guidelines was not sufficient to protect other land uses in its locality.

10 The objectors' mistaken appreciation of the legal and practical significance of adoption of the 2009 Guidelines by the Development Plan fundamentally misshaped its case at trial and on appeal. It was the function of the ERD Court to evaluate the development itself. However, the objectors adduced no evidence that the development was, in all relevant respects, the same as the wind farms in the locality of the deponents of the affidavits. It was necessary therefore for the ERD Court to proceed on the basis of the modelling of the noise which would be generated by the proposed wind farm. They chose, instead, to attack the modelling of the expert called by Tilt on grounds including that the 2009 Guidelines was flawed. That approach was bound to fail because, on the proper construction of the Development Plan, compliance with the 2009 Guidelines could generally be expected to satisfy those provisions designed to minimise noise impacts, and because there was no evidence that supported a conclusion that the noise and health impacts on residents living close to other wind farms would be replicated in the case of the proposed wind farm. Indeed, the ERD Court accepted the expert opinion evidence adduced by Tilt that it was likely that the symptoms complained of by the deponents were psychogenic.

11 Ground 7 complains of a finding on the evidence of Dr Hansen, an expert witness called by the objectors. The ERD Court did not find that she had no relevant experience in measuring wind turbine noise. The ERD Court found that she had no experience in comprehensive modelling of the noise which would be emitted by proposed wind farms of the kind undertaken many times by

Mr Turnbull. That was factually correct. Dr Hansen had engaged, largely as an academic, in predicting from models the noise generated by existing wind farms and then testing the prediction by field work. That work is similar to the modelling of a proposed wind farm by reference to the 2009 Guidelines, but Dr Hansen's experience, even as to existing wind farms, was quite limited. The ERD Court made no error in preferring Mr Turnbull's evidence on the basis of his considerably greater experience in modelling proposed wind farms. The ERD Court was entitled to accept his evidence even though his modelling work was generally undertaken for proponents of wind farm developments. This ground too must be dismissed.

12 I elaborate on my reasons below.

The Development Plan – general provisions

13 The development application fell to be assessed under s 33(1)(a) of the *Development Act 1993* (SA) (the Development Act) against the Development Plan.

14 The site of the proposed development is located within the Rural Zone under the Development Plan. The Development Plan divides the Rural Zone into five policy areas, two of which are straddled by the development: the Marne Watercourse Policy Area 13 and the Hills Policy Area 14.

15 The following Council-wide Objectives and Principles of the Development Plan address the noise and other impacts of developments on residents in the locality:

> **Interface Between Land Uses**
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> **Objective 25** Development located and designed to prevent adverse impact and conflict between land uses.
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> **Objective 26** Protect community health and amenity and support the operation of all desired land uses.
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> …
>
> **Renewable Energy**
>
> …
>
> **Objective 98:** Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.
>
> …
>
> **Interface Between Land Uses**

87 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:

…

(b) noise;

…

88 Development should be designed and sited to minimise negative impact on existing and potential future land uses considered appropriate in the locality.

…

Noise

92 Development should be designed, constructed and sited to minimise negative impacts of noise and to avoid unreasonable interference.

93 Development should be consistent with the relevant provisions in the current Environment Protection (Noise) Policy.

Wind Farms Environment Noise Guidelines 2009 (the 2009 Guidelines)

16 The Policy incorporates, by cl 34, the *Wind Farms Environmental Noise Guidelines 2003*. The guidelines were prepared and published by the SA Environment Protection Authority (the Authority). The Authority has since published the 2009 Guidelines. At trial, the parties proceeded on the basis that the 2009 Guidelines applied.

17 The 2009 Guidelines set out the following noise criteria for wind farms:[4]

2.2 Noise criteria – new wind farm development

The predicted equivalent noise level ($L_{Aeq,\ 10}$), adjusted for tonality in accordance with these guidelines, should not exceed:

- 35dB(A) at relevant receivers in localities which are primarily intended for rural living, or
- 40dB(A) at relevant receivers in localities in other zones, or
- the background noise ($L_{A90,\ 10}$) by more than 5dB(A),

whichever is the greater, at all relevant receivers for wind speed from cut-in to rated power of the WTG and each integer wind speed in between.

The background noise should be as determined by the data collection and regression analysis procedure recommended under these guidelines (Section 3). It should be read from the resultant graph at the relevant integer wind speed.

(Footnotes omitted)

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[4] 2009 Guidelines at p 3 [2.2].

18 The following Council-wide Objectives govern renewable energy developments:[5]

Renewable Energy

Objective 96: Development of renewable energy facilities that benefit the environment, the community and the state.

Objective 97: The development of renewable energy facilities, such as wind farms and ancillary development, in areas that provide opportunity to harvest natural resources for the efficient generation of electricity.

Objective 98: Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment and other land uses.

19 Council-wide Principles of Development Control (PDC)[6] applicable to renewable energy provides:

Renewable Energy Facilities

396 Renewable energy facilities, including wind farms and ancillary development, should be:

(a) located in areas that maximize efficient generation and supply of electricity; and

(b) designed and sited so as not to impact on the safety of water or air transport and the operation of ports, airfields and designated landing strips.

Wind farms and Ancillary Development

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

(a) wind turbine generators being:

(i) setback at least 1000 metres from non-associated (nonstakeholder) dwellings and tourist accommodation;

(ii) setback at least 2000 metres from defined and zoned township, settlement or urban areas (including deferred urban areas);

(iii) regularly spaced;

(iv) uniform in colour, size and shape and blade rotation direction;

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5 Development Plan at pp 16 to 17.
6 Development Plan at p 75.

(v) mounted on tubular towers (as opposed to lattice towers);

(b) provision of vegetated buffers around substations, maintenance sheds and other ancillary structures.

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

(a) shadowing, flickering, reflection or glint;

(b) excessive noise;

(c) interference with television and radio signals and geographic positioning systems;

(d) interference with low altitude aircraft movements associated with agriculture;

(e) modification of vegetation, soils and habitats;

(f) striking of birds and bats.

399 Wind turbine generators should be setback from dwellings, tourist accommodation and frequently visited public places (such as viewing platforms) a distance that will ensure that failure does not present an unacceptable risk to safety.

20 The Desired Character statement for the Rural Zone relevantly includes the following text:[7]

> Wind farms and ancillary development such as substations, maintenance sheds, access roads and connecting power-lines (including to the National Electricity Grid) are envisaged within that part of the zone outside of the Barossa Valley Character Preservation district [sic] (as defined by Character Preservation legislation) and constitute a component of the desired character of this part of the zone. These facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, components (particularly turbines) may need to be:
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> • located in visually prominent locations such as ridgelines;
>
> • visible from scenic routes and valuable scenic and environmental areas; and
>
> • located closer to roads than envisaged by generic setback policy.
>
> This, coupled with the large scale of these facilities (in terms of both height and spread of components), renders it difficult to mitigate the visual impacts of wind farms to the degree expected of other types of development. Subject to implementation of management techniques set out by general/council wide policy regarding renewable energy facilities, these visual impacts are to be accepted in pursuit of benefits derived from increased generation of renewable energy.

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[7] Development Plan at p 211.

21 The Desired Character statement also sets out a list of forms of development which are acceptable in the Rural Zone '[o]ther than where qualified by the provisions for the Policy Areas'. The list includes:[8]

- wind farm and ancillary development outside of the Barossa Valley Character Preservation District; and
- wind monitoring mast and ancillary development outside of the Barossa Valley Character Preservation District.

22 Objective 2 of the Rural Zone,[9] under the heading 'Sustainable Industry' is:

> **Objective 2:** Accommodation of wind farms and ancillary development outside of the Barossa Valley Character Preservation District as defined by Character Preservation legislation.

Legal significance of adoption of 2009 Guidelines

23 It is necessary to address the question of law implicitly, but not expressly, raised in the grounds of appeal concerning the proper approach to the 2009 Guidelines before turning to the individual grounds.

24 Section 23 of the Development Act requires that Development Plans be made for the geographical parts of the State. The making and amendment of plans is undertaken by the local Councils and the Minister[10] and are scrutinised by Parliament.[11] They are legislative instruments. A Development Plan may adopt any plan, policy, standard, document or code made under the Development Act or any other Act or made by a statutory body.[12] The effect of Council-Wide Principle 93 is to incorporate, by reference, the 2009 Guidelines as a principle of the Development Plan.

25 The adoption of standards made by another statutory body in a Development Plan is not merely a matter of drafting convenience. It is designed to promote policy coherence across government. The 2009 Guidelines were promulgated by the Authority under the *Environment Protection Act 1993* (SA). It is a function of the Authority to prepare environmental protection policies[13] for approval by the Minister.[14] The policy so prepared may subsequently be declared to be an authorised environment protection policy by the Governor.[15] Breach of a mandatory provision of a policy is an offence.[16] The Authority must have regard

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8 Development Plan at p 212.
9 Development Plan at p 212.
10 *Development Act 1993* (SA) ss 24-26
11 *Development Act 1993* (SA) s 27
12 *Development Act 1993* (SA) s 23(5).
13 *Environment Protection Act 1993* (SA) s 13.
14 *Environment Protection Act 1993* (SA) s 28(11).
15 *Environment Protection Act 1993* (SA) s 28(12).
16 *Environment Protection Act 1993* (SA) s 34.

to any relevant environment protection policy when determining whether to grant, and the conditions on which to grant, an environmental authorisation.[17] The adoption of the Policy and thereby the 2009 Guidelines ensures consistency between State planning and environment protection regimes.

26 On the incorporation of the 2009 Guidelines, the ERD Court was bound by s 33 of the Development Act to evaluate all development proposals against it and the other provisions of the Development Plan.

27 The 2009 Guidelines provide a quantitative benchmark against which a proposed wind farm development must be evaluated for the purpose of ensuring that the noise it emits does not unreasonably interfere with other land uses in the locality. However, the proposed development must also be evaluated against the qualitative standards in Council-wide PDC 87, 92 and 398 and Council-Wide Objective 98.

28 The scientific soundness of the 2009 Guidelines is not, in itself, a proper enquiry for planning authorities when evaluating a particular development application. That is a matter for the authorities responsible for making Development Plans under the process prescribed by the Development Act.[18] On the other hand, if there is an omission, false premise or other defect in the 2009 Guidelines a relevant planning authority will be required to consider whether, for that reason, notwithstanding compliance with the 2009 Guidelines the development fails to meet the qualitative provisions of the Development Plan.

29 Planning authorities must evaluate developments against the provisions of Development Plans, including those which adopt other statutory standards. Full compliance with any one provision of a Development Plan is neither necessary nor sufficient to warrant approval unless the applicable Development Plan so provides. It is a matter of balancing all applicable provisions in the particular circumstances of a proposed development. However, the adoption of the comprehensive, quantitative standard formulated by the Authority will necessarily attract considerable weight relative to the qualitative provisions of the Development Plan for a number of reasons. The first is the need for coherence in environmental and planning regulatory regimes. Secondly, a wide range of subjective and differing opinions may be held about compliance with the qualitative provisions of Development Plans. The purposes of the adoption of the qualitative 2009 Guidelines are both to protect the amenity of the locality, and its other land uses, and to provide a reasonable level of objective certainty in applications for approval of what are often controversial wind farm developments.

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[17] *Environment Protection Act 1993* (SA) s 47.
[18] *Development Act 1993* (SA) ss 24-29.

30 The ERD Court therefore correctly directed itself:[19]

> [50] The 2009 Guidelines were developed by the Environment Protection Authority over a period of four years, with the assistance of a technical subgroup and input from stakeholders.[20] They are a refinement of the 2003 Guidelines. The 2009 Guidelines (and the 2003 Guidelines before them) set out the only comprehensive method for predicting and assessing the likely noise impact from a wind farm applicable in South Australia. The purpose of the adoption of a standard such as the 2009 Guidelines is to provide well researched and considered benchmarks against which proposals can be assessed. The process which yielded the 2009 Guidelines, and the 2003 Guidelines before them, is far more rigorous than any process a relevant authority, or this Court, could undertake. It is clear from the Introduction to the 2009 Guidelines, and from Council wide PDC 93, that it is intended, in a planning assessment, that a proposed development be assessed against the Guidelines.
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> …
>
> [66] The 2009 Guidelines set out the policy in South Australia with respect to wind farm noise. The 2003 Guidelines, which are an earlier version, are referenced in the Development Plan. We do not consider that it is a reasonable approach to a noise assessment to point to a moment in time which would represent the absolute worst case scenario and condemn a proposal on that basis. The Development Plan speaks, in PDCs 87 and 92, of protection against 'unreasonable' interference with amenity. The approach taken in the 2009 Guidelines is consistent with this.
>
> [67] … We have accepted that the 2009 Guidelines set out the method for predicting wind farm noise which is accepted in the Development Plan. We accept that the standards set out in the 2009 Guidelines are adequate to preserve amenity with respect to noise to the degree required by the relevant provisions of the Development Plan. Dr Hansen's complaints about the adequacy of the 2009 Guidelines really amounts to a personal view that a wind farm should be assessed against a very much more restrictive standard. It is not for us to impose such a standard in the face of the specific provisions of the Development Plan and the 2009 Guidelines.
>
> …
>
> [79] The provisions of the Development Plan with respect to noise must be read together with the other provisions relevant to the assessment of a wind farm. Those provisions include the very clear indication that wind farms are sought in the Rural Zone. …
>
> (Footnote in original)

31 Of course, in a particular case it is open to planning authorities to find that, notwithstanding compliance with the 2009 Guidelines, the noise to which a person, or class of persons, will be exposed is excessive and an unreasonable

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[19] *McLachlan* [2018] SAERDC 15 at [50], [66]-[67], [79].
[20] 2009 Guidelines at p 1.

interference with their land use. There was no evidence on which such a finding properly could have been made with respect to the development, whatever may be the position in the case of other wind farms.

32 Grounds 4 and 6 must therefore be dismissed.

Evidence as to noise impact

33 The following expert witnesses gave evidence on the noise impacts of wind farms:

- Mr Steven Cooper, an acoustical consulting engineer;
- Dr Bruce Rapley, who holds a BSc in Biological Systems, a MPhil in Technology and a PhD in Health Sciences;
- Dr Kristy Hansen, who holds a degree in Mechanical Engineering and a PhD;
- Mr Christopher Turnbull, an acoustic engineer;

34 Mr Cooper and Dr Rapley were called by Mr McGregor, Dr Hansen by the objector, Mr Royal and Mr Turnbull by Tilt.

35 Mr Turnbull holds an honour's degree in Mechanical Engineering (1991) and a Masters of Engineering Science Degree (1995). He is the principal acoustic engineer in a private consultancy he established in 2002 after many years of practice with Bassett Acoustics and the Defence Science and Technology Organisation. He has made environmental noise assessments of more than 60 wind farms.

36 Mr Turnbull's conclusion was that the noise which he predicted would be generated by the development would fall below the limits set by the 2009 Guidelines of 35 dB(A) in rural localities and 40 dB(A) in other areas. He did so on the premise that the ground surface between the development was not 'hard ground', like concrete or water, but vegetated farmland. His other selected parameters were described as 'conservative'.[21]

37 Mr Turnbull also had regard to the World Health Organisation Guidelines for Community Noise which recommends a 30 dB(A) indoor noise level. He allowed for the attenuation offered by the building façade of homes and equated that standard to a 45 dB(A) outdoor noise level with windows open.

38 Mr Turnbull's modelling predicted compliance with all standards.

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[21] *McLachlan* [2018] SAERDC 15 at [51].

39 A particular criticism made by the objectors at trial was that the 2009 Guidelines mistakenly asserted that infrasound was no longer produced by modern wind turbines. Infrasound is very low frequency (below 20hz) sound.

40 The 2009 Guidelines state:[22]

> Infrasound was a characteristic of some wind turbine models that has been attributed to early designs in which turbine blades were downwind of the main tower. The effect was generated as the blades cut through the turbulence generated around the downwind side of the tower.
>
> Modern designs generally have the blades upwind of the tower. Wind conditions around the blades and improved blade design minimise the generation of the effect. The EPA has consulted the working group and completed an extensive literature search but is not aware of infrasound being present at any modern wind farm site.

41 However, Mr Turnbull's evidence was that modern wind turbines, constructed with blades upwind of the tower, still produced infrasound, but at levels which are well below the level of perception at residential setback distances. Studies conducted by him confirmed 'that the level of infrasound from wind turbines is no greater than the noise encountered from other natural and non-natural noise sources such as waves breaking.' Mr Turnbull had presented the results of his studies at the fourth International Conference on Wind Turbine Noise in 2011 in Rome, and the results appeared in a peer reviewed paper in 'Acoustics Australia', the journal of the Australian Acoustical Society. Mr Turnbull's findings, which were consistent with a separate study conducted by the Authority, were that:

- the measured levels of infrasound from wind farms are well below the threshold of perception; and
- the measured infrasound levels around wind farms are no higher than levels measured at other locations where people live, work and sleep; and
- the characteristics of noise produced by wind farms are not unique and are common in everyday life.

42 Mr Turnbull explained that the low frequency content of a wind farm is similar to that of road traffic noise. Mr Turnbull demonstrated that the dissipation over distance of noise from wind farms across the range of frequencies is similar to the dissipation of noise from passing trucks. Mr Turnbull explained that:

> Low frequency sound produced by wind farms is not unique in overall level or content. Low frequency sound can be easily measured and heard at a range of locations at levels well in excess of the level in the vicinity of a wind farm.

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[22] 2009 Guidelines at p 15 [4.7].

43 Accordingly, notwithstanding the failure to qualify the statement in the 2009 Guidelines regarding infrasound produced by modern farms with the adjective 'audible', Mr Turnbull expressly acknowledged and addressed the fact that they produce infrasound 'well below the level of perception'.

44 Moreover, as I earlier observed, the existence and significance, if any, of errors in the 2009 Guidelines was not a matter of direct concern to planning authorities other than to provide a basis on which to apply the qualitative principles of the Development Plan if it were necessary to do so to prevent excessive interference with other land uses.

45 Mr Turnbull disputed the opinions of Mr Cooper, Dr Hansen and Dr Rapley that the sound from a wind turbine is dominant in the low frequency range. He maintained that the main content of sound generated by a wind turbine is in the range known generically as the mid-frequencies (between approximately 160Hz and 1000Hz).

46 Mr Turnbull also gave evidence that noise from the development would not have as a component a dominant frequency falling within a narrow band. Noise with such a component exhibits a characteristic described as tonality which causes greater discomfort than sound with more evenly distributed frequencies at the same volume. If tonality is present the acceptable volume threshold must be reduced. However, it was Mr Turnbull's opinion that there was no need for an adjustment of that kind for the noise which would be emitted by the development's turbines.

47 Dr Hansen held a PhD in Mechanical Engineering (June 2012) from the University of Adelaide and lectured in Fluid Dynamics at Flinders University. Whilst a research associate with the University of Adelaide, she developed a noise prediction model that was validated with measurement data. Her primary responsibilities were in field measurement design and implementation. She has published, with others, a text on wind turbine noise.

48 The appellant contends that Dr Hansen's work included 'actual, full-spectrum noise measurements from comparable wind turbines at locations including Waterloo and Hallett'. He contends that her qualifications went to the real issue of the effect of low-frequency wind turbine noise on residents, pointing out that Dr Hansen based her conclusions on measurements which were taken inside and outside homes. Her work was accepted by Mr Turnbull to be 'unique'.

49 Dr Hansen was cross-examined about her experience:

> Q Now, you don't have any lecturing experience in acoustics.
>
> A No, I start lecturing acoustics this year.

Q But you've been a lecturer in acoustics since the commencement of the academic year of 2017.

A That's correct, yes.

…

Q Sure. Dr Hansen, you would agree, I would think, that one of the things that acoustical engineers do is that they make predictions of noise levels in respect of noise sources that aren't yet in place.

A Yes.

Q Do you agree with that.

A Yes.

Q And they compare the predicted levels against noise policies that have been set by other people or other bodies.

A Yes.

Q Yes. And do you have any practical experience in making actual predictions of noise levels in respect of noise sources that don't yet exist.

A Not that don't exist, no.

Q No. You've measured noise.

A I've done predictions, but only for the Waterloo Wind Farm which exists.

Q Yes.

A There was no need for me to do a prediction for a wind farm that didn't exist.

Q Yes, okay. So these questions are a bit sort of high level, I understand. But what I'm getting at is what experience you have in predicting future noise levels.

A I would say that there's no difference between predicting existing noise levels and predicting future noise levels. In fact, it's even more instructive to predict existing noise levels because you can compare your results with measurements.

…

Q Well, let's just break it down. You've never done a prediction for a wind farm that hasn't yet been built.

A No, I haven't. But I don't see what the difference is.

Q Well, you don't need to.

A Okay.

> Q Have you done predictions for other perhaps pieces of industrial plant that don't yet exist.
>
> A No.
>
> Q So would it be correct for me to say that you have no practical experience in predicting future noise levels and comparing those future noise levels with guideline levels set by legislation.
>
> A No, because as I said before, there's no difference between predicting existing noise levels and predicting future noise levels.

50 Dr Hansen criticised the 2009 Guidelines because they were based on some averaging of background noise and that they therefore allowed for some periods in which the noise generated by the development would be relatively higher than the background levels. In Dr Hansen's opinion that greater differential would impact on the amenity of the locality.

51 Dr Hansen opined that traffic noise and wind farm noise were different. Her opinion was challenged in cross-examination:

> Q. Mr Turnbull's comment is that the sound from the distant wind farm is similar in level and spectral content to the sound of a distant passing truck. Now, do you agree with that or disagree with it.
>
> A. I agree. But we don't know whether the truck is using its exhaust brakes and most people couldn't sleep if a truck was going past regularly.
>
> Q. Yes. And one thing we shouldn't do, I would suggest to you, is compare the spectral content of road traffic noise up close to it with the spectral content of wind farm noise a long way away from it, because we know very well that for both sources we have far greater attenuation with distance of the mid to high frequencies and far less attenuation with distance of the low frequencies; correct.
>
> A. Yes.
>
> Q. So, as long as you're careful to compare like with like, I would suggest to you there's no real difficulty in applying the findings from studies that are concerned with road traffic noise to wind turbine noise, I would suggest to you.
>
> A. No, because the studies which are related to road traffic noise consider continuous road traffic noise. Like, the hum that you hear in a typical residence, not the individual traffic noises such as truck pass byes, exhaust brakes and these unusual events.

52 Dr Hansen and Mr Cooper made measurements, inside and outside of homes at Waterloo and Hallett in South Australia and Cape Bridgewater in Victoria, taken when wind turbines were both operating and shut down. Their measurements showed that low-frequency noise generated by those wind turbines dominates the middle to high frequencies over distance. Studies at Waterloo

showed that the large turbines generated low-frequency noise which is detectable inside homes at a distance of up to 8.6 kilometres. The objectors also relied on the data collected by the Authority on noise levels near the Waterloo Wind Farm, which showed that when the wind turbines were operating they generated low-frequency noise levels inside homes between 17 and 23 dB(A) above the levels enjoyed when turbines were not operating.

53 The objectors' case was that, in order to avoid the 'thumping' character of wind turbine noise, wind turbines should be separated by a distance proportionate to the diameter of their rotor blade in the order of five time abreast and eight times downwind. The spacing of the wind turbines in the development was less than that. However, the objectors offered no modelling of the development itself to prove that it would produce a thumping noise which was inconsistent with the 2009 Guidelines or the qualitative provisions of the Development Plan.

The affidavit evidence

54 The objectors relied on evidence, received by way of affidavits, of persons who resided within the vicinity of wind farms at Waterloo in South Australia and Cape Bridgewater in Victoria.

55 The affidavit evidence adduced by the objectors can be summarised as follows:

- Wanda Allott – She hears the turbine noise and feels vibrations inside her house, finds it difficult to sleep, and suffers mild nausea and cardiac arrhythmia.

- Daryn Quick – He hears and feels a 'deep whirring noise' in his body. He suffers from depression and irritability.

- Roger Kruse – He feels the noise and vibrations come up through his pillow and experiences thumping and swooshing. He suffers from vivid and distressing nightmares.

- Colin Schaefer – He finds the noise annoying and intrusive, more at night time than during the day. He suffers ringing in the ears and ear pressure. He feels 'agitated and nervy'.

- John Faint – He hears loud noises which feels like pulsating or thumping. He suffers abnormal ear pressure affecting his hearing. He also hears a high-pitched squeal which is particularly distressing. He has difficulty sleeping and experiences nightmares.

- Melissa Ware – She feels constant vibrations rumbling through the house which drives her 'mad most nights and days'. She suffers from headaches,

vibrations, internal shaking, ringing, and pressure in the ears and temple. She feels sad and irritable and experiences nightmares and despair.

- Julie Quast – She suffers from nightmares and inexplicable weeping. She feels tired and depressed. She experiences a pressure in her ears.

- Sonia Trist – She feels agitated and is emotionally labile. She hears a repetitive noise.

- Shane Allott – He suffers fatigue, irritability, aggression, anxiety and depression. He suffers severe headaches daily when at home and the turbines are turning. He suffers nausea and vertigo.

- Kym Dickson – He feels vibrations in his body when the turbine noise is extremely loud. Feels the noise physically hit his skin. He experiences frequent sleep interruption and wakes with ringing in both ears. He feels annoyed and frustrated. He has experienced many more headaches since the wind farm commenced operation.

56 Even though the deponents often attributed their sensations and moods to the wind farms, their statements were not admissible or were of little weight insofar as they asserted that the wind farms in their vicinity were the physiological cause of their symptoms. Their evidence could only show temporal connection, but one which was not susceptible to objective scrutiny. No medical evidence was adduced either confirming the evidence and timing of their symptoms, or excluding other causes in each particular case. No expert epidemiological evidence, that similarity in their symptoms was statistically significant when compared to other sections of the community or a particular control group, was called.

57 Dr Hansen theorised that even if the infrasound produced by the development was inaudible, it may cause annoying 'pressure fluctuations'.

58 Dr Rapley postulated that low frequency noise may stimulate inner hair cells of the human ear and affect the volume of fluid in the inner ear. Those physiological effects may be stressful and adversely affect health.

59 That evidence, and the response of Professor Wittert, who was called by Tilt, was summarised in the following paragraph of the ERD Court reasons:[23]

> [82] Dr Rapley also put forward, in evidence, a theory about human responses to infrasound and low frequency noise. Dr Rapley believes that infrasound may stimulate the inner hair cells of the human ear.[24] He also believes that low

[23] *McLachlan* [2018] SAERDC 15 at [82].
[24] Exhibit 4A6 at para 16.13.

> frequency noise can affect the volume of fluid in the inner ear.[25] Dr Rapley is concerned that humans may sensitise to the effects of low frequency noise and infrasound, which will then aggravate adverse health effects.[26] Dr Rapley believes that low frequency noise can lead to stress.[27] Professor Wittert in his statement gave a brief critique of Dr Rapley's statement.[28] Professor Wittert pointed out that much of Dr Rapley's evidence was unreferenced and beyond Dr Rapley's expertise.[29] Professor Wittert said, in response to Dr Rapley's statement, that infrasound and LFN (low frequency noise) are ubiquitous in the environment and without harmful effects unless they reach very high sound pressure levels[30] (ie, well beyond those reached by WTGs). Professor Wittert pointed out that Dr Rapley's evidence about low frequency noise was based upon a paper by Dr Salt in which the theoretical concern was advanced, but it was conceded that no empirical evidence supported the theory.[31] Professor Wittert referred to subsequent data, including a study by Tobin, Brett and Colagiuri,[32] which further negate the notion that low frequency noise or infrasound from wind farms constitutes a health problem.
>
> (Footnotes in original)

60 In his statement Professor Wittert explained anecdotal evidence as follows:

> Anecdotal evidence refers to evidence from anecdotes **(i.e. a short story taken from personal experience or observation)**. Such reports are often *cherry-picked and may not be representative of what is generally experienced by others in the population. Anecdotal evidence is therefore considered dubious support of a claim. This is true regardless of the veracity of individual claims.* Anecdotal evidence is open to misuse in a manner sometimes referred to as to the 'person who' fallacy ('I know a person who …'; 'I know of a case where …' etc). Individual cases prove nothing (e.g. 'my grandfather smoked 40 a day until he died at 90' and 'my sister never went near anyone who smoked but died of lung cancer').
>
> [http://en.wikipedia.org/wiki/Anecdotal_evidence]
>
> Exceptional or confirmatory anecdotes are much more likely to be remembered. Psychologists have found that people are more likely to remember notable examples than typical examples.
>
> Another problem with anecdotal evidence is that various forms of cognitive bias may affect the collection or presentation of evidence. For instance, someone who claims to have had an encounter with a supernatural being or alien may present a very vivid story. This phenomenon can also happen to large groups of people through a process known as

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25 Exhibit 4A6 at para 16.13.
26 Exhibit 4A6 at para 18.1.
27 Exhibit 4A6 at para 19.
28 Exhibit 2R4 at pp 39 to 43.
29 Exhibit 2R4 at p 41.
30 Exhibit 2R4 at p 4.
31 Exhibit 2R4 at p 42.
32 Exhibit 2R4, Annexure 11.

subjective validation, whereby people consider information to be correct if it has any personal context and significance.

Anecdotal evidence is also frequently misinterpreted because it is easily obtainable, which leads to an overestimation of prevalence. Where a cause can be easily linked to an effect, people overestimate the likelihood of the cause having that effect (availability).

Vivid, emotionally-charged anecdotes seem more plausible, and are given greater weight.

(Emphasis in original)

61 Professor Wittert explained the ways in which anecdotes may lead to fallacious reasoning:

- ***Fallacious reasoning*** such as the ***post hoc ergo propter hoc*** fallacy, which is the human tendency to assume that if one event happens after another, then the first must be the cause of the second.

- ***Inductive reasoning*** whereby an anecdote illustrates a desired conclusion rather than a logical conclusion, leading to hasty or faulty generalisations. …

In medicine, anecdotal evidence is also subject to placebo effects: it is well-established that a patient's (or doctor's) expectation can genuinely change the outcome of treatment. Only double-blind randomized placebo-controlled clinical trials can confirm a hypothesis about the effectiveness of a treatment independent of expectations. Moreover, placebo effects have been shown to work in the opposite direction i.e. the nocebo effect whereby expectation or anxiety about an adverse event make its occurrence more likely (Crichton, Dodd et al. 2013).

A further point to consider is that a statistical correlation between things does not in itself prove that one causes the other (a causal link). A study found that television viewing was strongly correlated with sugar consumption, but this does not prove that viewing causes sugar intake (or vice versa).

In science and logic, the 'relative strength of an explanation' is based upon its ability to be tested, proven to be due to the stated cause, and verified under neutral conditions in a manner that other researchers will agree has been performed competently and can independently verify.

(Emphasis in original)

62 It is also necessary to set out Professor Wittert's opinion on the affidavit evidence:

Opinion relating to Affidavits: It is possible that some people are particularly sensitive to, and annoyed by the noise generated by turbines, however taking all of the data together there is no evidence to suggest that the operation of the turbines, in a compliant wind farm is responsible for Environmental Sleep Disorder. The most likely explanation for the sleep disturbance, when it does occur as described, is the presence of psychophysiological insomnia.

(Emphasis in original)

63 Professor Wittert supported his conclusion by reference to a number of studies of health complaints made by residents living close to wind farms observing that:

> … It is considered that the reported historical and geographical variations in complaints are consistent with psychogenic hypotheses that expressed health problems are 'communicated diseases' with nocebo effects likely to play an important role in the aetiology of complaints.

64 Professor Wittert's conclusions were as follows:

> **10. Conclusions**
>
> **10.1Wind farm Noise and adverse health effects**
>
> There is no evidence that audible noise resulting from the operation of wind turbines constitutes a significant risk to health provided the development is compliant with current guidelines **(Appendix 9).**
>
> Annoyance is acknowledged to occur in a generally small, but probably variable number of individuals and the extent to which this is problematic in a compliant wind farm may depend more on non-acoustic than acoustic factors.
>
> There are undoubtedly some particularly noise sensitive individuals, but it would be surprising if their first awareness of this as adults occurred in the context of exposure to wind turbines. However, I am not aware of any specific enquiry in this regard.
>
> The weight of evidence is that when adverse health effects occur they are either circumstantially related or mediated by psychological distress, or both.
>
> The extent to which psychological distress and or sleep disturbance and/or other adverse health effects occur is dependent on a number of other internal and external factors (attitude, visual amenity, nocebo effects, financial interest, et cetera).
>
> **10.2 Low-frequency noise and Infrasound and adverse health effects.**
>
> **10.2.1 Low-frequency noise**
>
> The problem with low-frequency noise, as with high-frequency noise, relates to annoyance associated with audibility and the same range of moderating non-acoustic factors. There is no evidence that adverse health effects can be directly attributable to inaudible low-frequency sound emissions.
>
> **10.2.2.1 Infrasound**
>
> There is no evidence that inaudible infrasound is associated with any significant physiological or pathophysiological consequences.
>
> There is no evidence that the level of infrasound produced by wind turbines constitutes a problem to health.

The ERD Court reasons

65 After discussing Mr Turnbull's evidence in considerable detail, the ERD Court accepted his evidence:[33]

> [64] Mr Turnbull was the only witness who conducted measurements and predictions relating to noise in compliance with the 2009 Guidelines. Mr Turnbull has the relevant qualifications and a great deal of experience in the prediction of wind farm noise. His statement is comprehensive and his evidence was given with absolute confidence. We accept Mr Turnbull's evidence in its entirety.

66 The ERD Court correctly put to one side the general criticisms made by Dr Hansen of the 2009 Guidelines. In particular the ERD Court rejected her criticism that the 2009 Guidelines averaged background noise levels:[34]

> [65] Dr Hansen, in her statement, commented that the method of prediction in the 2009 Guidelines involved some 'averaging' of the background noise levels.[35] Dr Hansen expressed concern that it would be possible, at times, for low background noise levels to coincide with worst case noise generation by the wind farm, at which time the noise levels specified in the 2009 Guidelines would be exceeded and there would be a detrimental impact upon amenity.
>
> [66] The 2009 Guidelines set out the policy in South Australia with respect to wind farm noise. The 2003 Guidelines, which are an earlier version, are referenced in the Development Plan. We do not consider that it is a reasonable approach to a noise assessment to point to a moment in time which would represent the absolute worst case scenario and condemn a proposal on that basis. The Development Plan speaks, in PDCs 87 and 92, of protection against 'unreasonable' interference with amenity. The approach taken in the 2009 Guidelines is consistent with this.
>
> (Footnote in original)

67 The ERD Court did not accept Dr Hansen's opinion on the inadequacy of the 2009 Guidelines:[36]

> [67] Dr Hansen explained at length in her statement her reservations about the methods of measurement and prediction provided for in the 2009 Guidelines. We have accepted that the 2009 Guidelines set out the method for predicting wind farm noise which is accepted in the Development Plan. We accept that the standards set out in the 2009 Guidelines are adequate to preserve amenity with respect to noise to the degree required by the relevant provisions of the Development Plan. Dr Hansen's complaints about the adequacy of the 2009 Guidelines really amounts to a personal view that a wind farm should be assessed against a very much more restrictive standard. It is not for us to impose such a standard in the face of the specific provisions of the Development Plan and the 2009 Guidelines.
>
> …

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[33] *McLachlan* [2018] SAERDC 15 at [64].
[34] *McLachlan* [2018] SAERDC 15 at [65]-[66].
[35] Exhibit 2A2 at para 5.1.
[36] *McLachlan* [2018] SAERDC 15 at [67], [69].

> [69] Those paragraphs of Dr Hansen's statement which deal with infrasound, tonality and amplitude modulation really outline her fears that those matters may be inadequately allowed for in the 2009 Guidelines. These fears are not based on reliable data, and that material does not assist us in our assessment of the proposal against the Development Plan. In so far as her evidence touched on human health, we disregard it as it is beyond her expertise.
>
> (Footnote omitted)

68 Importantly, Dr Hansen did not give evidence that any particular resident or group of residents in the locality of the development would experience a predicted and objectively quantified level of noise which would be so loud as to unreasonably interfere with the amenity and use of their land.

69 The ERD Court accepted, in the first sentence of the following paragraph, that Dr Hansen could give expert evidence on noise assessments but preferred the evidence of Mr Turnbull on noise predictions for the reasons given in the second sentence:[37]

> [70] Dr Hansen's qualifications in mechanical engineering gives her the expertise to comment upon noise assessments. Her experience, however, does not include the undertaking of any comprehensive noise predictions of the kind undertaken many times by Mr Turnbull. Where the evidence of the two witnesses is at odds, we rely on Mr Turnbull's evidence.

70 The ERD Court also rejected Mr Cooper's criticism of the 2009 Guidelines:[38]

> [73] With respect to noise, Mr Cooper was critical of the adequacy of the 2009 Guidelines. He had reservations about the use of dB(A) in the 2009 Guidelines. For the same reasons as those set out above in relation to Dr Hansen's evidence, we did not find that evidence useful in our assessment of the noise impacts of the proposal.

71 The ERD Court concluded that on Mr Turnbull's prediction, the development would comply with the 2009 Guidelines, and that there was no *credible evidentiary basis* that it would unreasonably interfere with other land uses:[39]

> [79] The provisions of the Development Plan with respect to noise must be read together with the other provisions relevant to the assessment of a wind farm. Those provisions include the very clear indication that wind farms are sought in the Rural Zone. On the basis of Mr Turnbull's evidence, the proposed development is in sufficient compliance with the provisions of the Development Plan with respect to noise. The proposed wind farm will comply with the 2009 Guidelines. No credible evidentiary basis has been advanced to suggest that the noise from the wind farm will interfere unreasonably with other land uses.

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37 *McLachlan* [2018] SAERDC 15 at [70].
38 *McLachlan* [2018] SAERDC 15 at [73].
39 *McLachlan* [2018] SAERDC 15 at [79]

72 The ERD Court found that Dr Hansen's concerns about the adverse health effects of infrasound were not substantiated:[40]

> [81] Dr Hansen, in her evidence, expressed concern about a potential for adverse effects on amenity or health to arise from infrasound generated by the proposed wind farm. Dr Hansen acknowledged that infrasound is below the normal human audibility threshold,[41] however, she theorised that it may cause discernible pressure fluctuations which could cause annoyance.[42] We have quoted, above, paragraphs 66 to 76 of Mr Turnbull's statement.[43] As we have said, we accept Mr Turnbull's evidence and therefore accept that the level of infrasound from wind turbines is no greater than from other non-natural and natural noise sources such as waves breaking. We also accept that the characteristics of noise produced by wind farms are not unique and are common in everyday life. We do not consider that Dr Hansen's concerns about infrasound have been substantiated, and those concerns do not therefore weigh against the proposed wind farm.
>
> (Footnotes in original)

73 The ERD Court accepted 'all of Professor Wittert's evidence and his conclusions'.[44] Accordingly, it rejected the opinions of Dr Rapley, Mr Cooper and Dr McBride:[45]

> [83] Whilst we accept that Dr Rapley is an expert in human responses to acoustic elements in the environment, we find that Professor Wittert is more qualified than Dr Rapley in the area of health and epidemiology. Professor Wittert's evidence was far better substantiated by scientific studies than Dr Rapley's and Professor Wittert was a more impressive witness. We prefer the evidence of Professor Wittert to the evidence of Dr Rapley with respect to human health.
>
> [84] Mr Cooper, in his evidence, also ventured into the area of health. Like Dr Rapley, he was concerned about potential sensitisation to wind farm noise.[46] Ultimately, Mr Cooper's concerns about noise were based upon the anecdotal evidence of nine residents who live in the general locality of the existing Waterloo Wind Farm and two residents who live in the general locality of the Bridgewater Wind Farm.
>
> …
>
> [91] Dr McBride was concerned about the adverse health effects of the persistent interruption of a normal sleep pattern by noise and the possible emergence of environmental sleep disorder as a result. We do not consider, however, that Dr McBride's attribution of environmental sleep disorder and the disruption of sleep patterns to the operation of wind turbine was substantiated. In addition to his reliance on the anecdotal evidence, Dr McBride assumed that noise from wind turbines possessed 'unique impulsive characteristics which, for a significant

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40 *McLachlan* [2018] SAERDC 15 at [81].
41 Exhibit 2A2 at para 9.24.
42 Exhibit 2A2 at para 9.26.
43 See above at para 61.
44 *McLachlan* [2018] SAERDC 15 at [94].
45 *McLachlan* [2018] SAERDC 15 at [83]-[84], [91].
46 Exhibit 4A4 at para 320.

> proportion of individuals, will be extremely annoying.[47] As we have said, above,[48] we accept the evidence of Mr Turnbull that the characteristics of noise produced by wind farms are not unique and are common in everyday life.[49]
>
> (Footnotes in original)

74 The ERD Court was not satisfied that the development would adversely affect the health of nearby residents nor that it would detract unreasonably from the amenity of the locality:[50]

> [95] We do not consider that the proposed wind farm is at odds with Council wide Objective 26 of the Development Plan with respect to health. As to amenity, we accept that, from time to time, the noise and the appearance of the turbines and associated infrastructure will annoy some of the residents in the locality and some visitors to the locality. In our opinion, however, compliance with the 2009 Guidelines will ensure that the noise from the turbines will be kept within limits such as to preserve amenity to the degree contemplated by the Development Plan having regard to all of the relevant provisions.

75 The ERD Court's final conclusions were:[51]

> [192] We have considered all of the evidence adduced by each of the parties. The Development Plan makes it clear that wind farms and ancillary development are envisaged in the Rural Zone. The Desired Character statement for the Rural Zone says that wind farms and ancillary development are to 'constitute a component of the desired character' of that part of the Rural Zone which is outside of the Barossa Valley Character Preservation District. The site for the proposed development is in that part of the Rural Zone.
>
> [193] We understand the strong opposition to the wind farm on the part of some of the residents in the area whose views will be substantially affected by the introduction of new elements to their view, namely WTGs. The poles and wires forming part of the ancillary development have also drawn objection. We have assessed the visual impact of the proposed development against the relevant provisions of the Development Plan. The Development Plan anticipates and encourages the introduction of wind farm infrastructure as new components of the landscape in that part of the Rural Zone in which the site of the proposed wind farm is located. We consider that the wind farm applied for is sufficiently in conformity with the provisions of the Development Plan with respect to its appearance and impact upon visual amenity.
>
> [194] In relation to noise, we prefer the evidence of Mr Turnbull over the other witnesses. Again, to a significant extent, the provisions of the Development Plan anticipate that a wind farm, typically, will be a source of noise, and sets a standard for it to adhere to. We are satisfied that the proposed wind farm and its ancillary development will conform to that standard. There is no reason to anticipate that the

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47 Exhibit 4A23 at para 5.1.
48 See above at para 62.
49 Exhibit 2R7 at para 68.
50 *McLachlan* [2018] SAERDC 15 at [95].
51 *McLachlan* [2018] SAERDC 15 at [192]-[195], [199].

> proposed wind farm will have any impact with respect to noise beyond what is typical for a contemporary wind farm. The proposed development is sufficiently in accordance with the relevant provisions of the Development Plan with respect to noise.
>
> [195] In relation to the issue of human health, we have accepted the evidence of Professor Wittert. The proposed development will comply sufficiently with Council wide Objectives 25 and 26 with respect to health.
>
> …
>
> [199] The proposed development warrants the grant of development plan consent.

Failing to address the evidence

Grounds 2, 3.1 and 3.2

76 The appellant complains that the ERD Court erred in its finding in paragraph [79] that there was '[n]o credible evidentiary basis' to suggest that noise from the development would unreasonably interfere with other land uses. The appellant submits that the affidavit evidence of persons with first-hand experience of the negative effects of noise emitted by other wind farms was such a credible evidentiary basis. The appellant submits that the ERD Court must have ignored or failed to address the affidavit evidence in making the impugned finding.

77 The ERD Court did not refer to the affidavit evidence when evaluating the development against the provisions of the Development Plan which govern the noise generated by developments. However, as we have seen, it did so when dealing with Mr Cooper's evidence on the potential adverse health effects of wind farm noise.[52] The health effects on which the appellant relied were all secondary to the noise generated by wind farms.

78 The ERD Court did note that the evidence of Mr Cooper was based upon the accounts of nine residents who lived in the general locality of the Waterloo Wind Farm and two residents who lived in the general locality of the Cape Bridgewater Wind Farm, describing those accounts as anecdotal. Plainly enough, therefore, the ERD Court did not ignore the affidavit evidence. Immediately thereafter the ERD Court set out Professor Wittert's criticism of anecdotal evidence,[53] which it ultimately accepted.

79 I would dismiss grounds 2, 3.1 and 3.2. It is plain from the ERD Court's reasons as a whole that it had regard but, correctly, gave very little weight, to the subjective perceptions and accounts of those residents because there was no

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[52] *McLachlan* [2018] SAERDC 15 at [84] (reproduced in paragraph [73] above).
[53] *McLachlan* [2018] SAERDC 15 at [85].

evidence that their experiences had been medically validated or scientifically assessed against noise studies generally, or studies of wind farms in particular.

80 Moreover, the objectors did not prove any equivalence between the wind farms of Waterloo and Cape Bridgewater, and the residences in those localities, and the proposed development.

81 The difficulty in proceeding on the basis of individual personal experience or observation, outside of a scientifically devised and statistically sound selection, was explained at length by Professor Wittert whose opinions were accepted by the ERD Court. The fundamental difficulty is that the accounts brought before a court and selected by one party in adversarial litigation 'may not be representative of what is generally experienced by others in the population'.[54] A similar difficulty notoriously arises in contested applications for liquor licences when the parties bring before the court individuals selected by them to testify that existing facilities are or are not sufficient to cater for the public demand for alcohol. Individual accounts may also suffer from cognitive bias and subjective validation.

82 It is plain, therefore, that the ERD Court's reference to 'credible evidentiary basis' in paragraph [79] is a reference to those general difficulties with individual accounts.

83 The appellant's criticism that Professor Wittert was an endocrinologist and not an expert in acoustics must also be rejected. The issues he described are of general application in scientific, and in particular medical, evaluations.

84 It was logical therefore having, unsurprisingly, accepted the basic scientific principle articulated by Professor Wittert, that the ERD Court rejected the evidence of Dr McBride, who, to some extent, relied on those individual accounts.[55]

85 It is for that reason also that the appellant's complaint that the ERD Court failed to make a specific finding about each deponent is without merit. There was nothing to be gained by making a general finding, one way or another, as to the credibility or reliability of each deponent, because there was no evidential matrix upon which any conclusion could be drawn as to the extent to which the nearby wind farms contributed to the symptoms they described. The appellant's submission in this regard appears to be that because the affidavit evidence was admitted, and the deponents not challenged, the ERD Court was bound to accept that the deponent's subjective perceptions and temporal connection proved that the nearby wind farms caused their symptoms, unless Tilt proved to the contrary.

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54 Exhibit 2R4 (Report of Professor Wittert) at [1.4.2].
55 *McLachlan* [2018] SAERDC 15 at [90]-[91].

The submission is mistaken. It is the appellant's case on that issue which fails at the threshold for lack of proof.

Grounds 1, 3.3 and 5

86 The appellant complains that the ERD Court ignored the affidavit evidence, and expert opinion evidence which attributed the symptoms therein described to the nearby wind farms. He also complains that the ERD Court's reasons fail to adequately identify, analyse and explain the rejection of that evidence. The appellant complains that the ERD Court's process of analysing the expert evidence was 'cursory, at best'.

87 In paragraph [64] of the ERD Court's reasons, the ERD Court referred, albeit briefly, to the content of Mr Turnbull's evidence and the way in which it was given, with 'absolute confidence'. Importantly, they also explained that his evidence was preferred because he was the only witness who conducted measurements and predictions in accordance with the 2009 Guidelines. On the other hand, the burden of Dr Hansen's evidence criticised the 2009 Guidelines for not being stringent enough.[56]

88 At paragraph [73] of the ERD Court's reasons, the Court explained that Mr Cooper's evidence, like that of Dr Hansen, was not useful in its assessment of the noise impacts of the development because it was, by and large, a criticism of the adequacy of the 2009 Guidelines. As to Dr Rapley, the ERD Court observed that he did not have expertise in the prediction of noise levels.[57] Accordingly, the ERD Court's conclusion in paragraph [79] is properly explained.

Ground 7

89 The appellant complains that the ERD Court finding that Dr Hansen's experience did not include undertaking noise predictions was mistaken.

90 In paragraph [70] of its reasons the ERD Court explained that although Dr Hansen had expertise in mechanical engineering, she had not undertaken 'any comprehensive noise predictions of the kind undertaken many times by Mr Turnbull'.

91 The appellant's submissions mistake the point made by the ERD Court in paragraph [70]. The ERD Court did not ignore Dr Hansen's experience in taking measurements. On the contrary, her expertise to give opinions on noise assessments is expressly recognised. The second sentence of paragraph [70] explains that notwithstanding Dr Hansen's expertise, Mr Turnbull's evidence was preferred, and acted on, because of his greater experience in making 'comprehensive noise predictions of the *kind* undertaken many times by [him]'.

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[56] See *McLachlan* [2018] SAERDC 15 at [65]-[66].
[57] See *McLachlan* [2018] SAERDC 15 at [78].

Conclusion

92 I would dismiss the appeal.

93 **KELLY J:** I agree that the appeal should be dismissed for the reasons given by the Chief Justice.

94 **HINTON J:** I agree with the Chief Justice that the appeal should be dismissed for the reasons he has given.