

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of proposed Plan Change 13 to the Central Otago District Plan

**Date:** 29 May 2019

**Meetings held and other communications:** Meetings on 24 and 28 May 2019 and email correspondence

**Area of expertise:** Noise Effects

**Conferencing expert participants:**

<b>Name</b>	<b>Engaged by</b>
Jon Styles	River Terrace Developments Limited (RTDL)
Stephen Chiles	Public Health South
Aaron Staples	Highlands Motorsport Park, Central Speedway Club Cromwell Inc, 45 South Group of Companies, Sarita Orchards Ltd, DJ Jones Family Trust and Suncrest Orchards Ltd, Peter John Mead & Alastair David Stark as trustees of the Mckay Family Trust
William Reeve	Horticulture New Zealand

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## **JOINT WITNESS STATEMENT - ACOUSTICS**

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### **1. Introduction**

- 1.1. We have prepared this Joint Witness Statement (JWS) to record the matters agreed and disagreed between us.
- 1.2. In preparing this JWS, we have read and understood the requirements of the Code of Conduct for Expert Witnesses as included in the Environment Court Practice Note 2014.
- 1.3. Our qualifications and experience are set out in our individual statements of evidence dated 23 April (Styles) and 16 May (Chiles, Staples, Reeve).
- 1.4. This JWS has been prepared following meetings on the 24<sup>th</sup> and 28<sup>th</sup> May 2019 and email correspondence. Mr Styles joined the second meeting by teleconference.

- 1.5. Mr Reeve does not comment in this JWS on any issues related to motorsport noise from Highlands Motorsport Park (HMP) or the Speedway.
- 1.6. The Plan Change 13 (PC13) land is referred to as the 'Site' in this JWS.
- 1.7. In this JWS we address:
  - a) Noise exposure of the Site from surrounding activities (Sections 2, 3, 4, 5)
  - b) Noise effects and mitigation of noise effects (Sections 6, 7, 8, 9)

## 2. Motorsport

### HMP Tier 1 days

- 2.1. Mr Staples and Mr Styles agree that noise levels across the Site during a Tier 1 day at HMP will be no greater than 56dB  $L_{Aeq}$ , with the majority of the site exposed to noise levels no greater than 55dB  $L_{Aeq}$ . This is based on the current nature of Tier 1 days.
- 2.2. Mr Staples and Mr Styles agree that the noise levels from current Tier 1 days will be greater than 50dB  $L_{Aeq}$  across approximately half the Site, and less than 50dB  $L_{Aeq}$  across the western half.
- 2.3. Dr Chiles considers that the modelling under-represents the range of activity that could currently occur on Tier 1 days.
- 2.4. We agree the HMP resource consent (RC 150225) allows for activities that have not been modelled and that could generate noise levels higher than that modelled by Mr Staples and Mr Styles. This could include activities in the southern portion of HMP, which would still comply with the noise limits in the resource consent (55dB  $L_{Aeq}$ ) at the existing compliance points. This could generate noise levels higher than 50-55dB  $L_{Aeq}$  across a larger area of the southern portion of the Site than shown in the noise modelling of Mr Staples and Mr Styles.
- 2.5. We note that the HMP resource consent requires compliance with noise limits at locations shown in red on the plan at page 111 of the s42A Report, (referenced in condition 47 of the HMP resource consent). The part of the Site north of the terrace is shaded in red, and is therefore a compliance point. The southern portion of the Site is not a compliance point for the HMP noise limits.
- 2.6. We agree that Tier 1 days will currently comply with a limit of 55dB  $L_{Aeq}$  at the portion of the site shaded red in the plan referenced above.

### HMP Tier 2 days and Speedway

- 2.7. We agree that the noise modelling undertaken by Mr Staples for Speedway and HMP Tier 2 days represents the noise levels generated by the typical current usage of the facilities. The modelling undertaken by Mr Styles shows louder noise levels across the Site which we agree would be likely to represent the loudest of the HMP Tier 2 and Speedway events.
- 2.8. We agree noise levels across the Site are likely to be 60dB  $L_{Aeq}$  to 70dB  $L_{Aeq}$  for typical HMP Tier 2 and Speedway events, but they may be up to approximately 5-10dB higher during the loudest events.

- 2.9. We understand that Speedway events typically have racing from around 6pm and are scheduled to finish at 10pm (although sometimes finish as late as 11pm). Mr Staples understands that currently there are 12 evenings of racing per season. Mr Styles and Dr Chiles have based their assessments on up to 20 evenings of racing per season.
- 2.10. We note that the HMP resource consent precludes Tier 2 days from being scheduled when the Speedway is operating, as far as practicable. The HMP resource consent allows for sixteen Tier 2 days per year.

### **3. HMP Helicopters**

- 3.1. We note that the HMP resource consent allows 3 helicopter movements in and 3 movements out of the HMP site each Tier 1 day, but only 5 in and 5 out per week. Up to 30 movements (15 in and 15 out) are permitted on Tier 2 days.
- 3.2. The helicopter landing area is at the pit lane approximately 600m east of the Site. There are two flight paths – one that goes north from the landing area to Wanaka, and one that runs west over the Site to Queenstown. These flight paths are appended to the HMP resource consent.
- 3.3. We agree that noise from any helicopter movements using the Queenstown flight path (over the Site) would be clearly audible on the Site. However, the noise levels are expected to fall below the guideline levels in NZS6807:1994 *Noise management and land use planning for helicopter landing areas* at the Site.

### **4. Horticultural activity**

#### Noise barrier

- 4.1. We understand that since our evidence was filed, RTDL are proposing that a 3m high noise barrier is constructed along the boundary of the Site and the orchard to the west.
- 4.2. We agree this noise barrier should be designed and constructed to meet the following minimum specifications:
- a) It must be 3m high above the ground based on the final contours along its length;
  - b) The surface density must be no less than 10kg/m<sup>2</sup>;
  - c) There must be no gaps, and if palings are used they should be overlapped or the joints battened over to prevent gaps appearing;
  - d) There must be no gap along the bottom between the barrier and the ground; and
  - e) It must be maintained to be an acoustically effective noise barrier.
- 4.3. We also understand that there will only be single-storey buildings (no greater than 5m in height) within 25m of the boundary with the orchard to the west.

- 4.4. The following sections of the JWS are based on the noise barrier being constructed prior to any noise sensitive activities being occupied on the Site, and there only being single-storey buildings within 25m of the boundary.

Helicopters (frost fighting and crop drying)

- 4.5. We understand that helicopters on the adjoining orchards are used mostly for crop drying between the months of November to February, and occasionally for frost fighting at night in the winter months. We understand that the use of helicopters for frost fighting is infrequent. Mr Reeve understands that a helicopter has been used for crop drying for 28 hours on the orchard to the west of the Site in the 2018/19 season. This covers the area of orchard from the western boundary of the Site to the intersection of SH6 and Pearson Road.
- 4.6. From the modelling results shown in Appendix B of Mr Staples' evidence the noise levels across the Site would be approximately 55dB  $L_{Aeq}$  to 70dB  $L_{Aeq}$  when a helicopter is used for crop drying or frost fighting on the orchard to the west.
- 4.7. The evidence of Mr Reeve also contains a helicopter noise level prediction. Mr Reeve considers Mr Staples' modelling to most accurately represent the likely noise levels since it is based on on-site helicopter noise measurements.

Wind machines ('frost fans')

- 4.8. We agree that the noise modelling results of frost fan noise prepared by Mr Styles and Mr Staples are consistent, and represent the noise levels of the frost fans existing at the current time and operating under moderate temperature inversion conditions.
- 4.9. We agree that if all of the fans are operating at the same time, the noise levels on the Site will range from approximately 60dB  $L_{Aeq}$  to 70dB  $L_{Aeq}$ .
- 4.10. We agree that for strong temperature inversions the noise levels would be slightly louder at the houses closest to the fans, and noticeably louder than the modeled levels at houses further away.
- 4.11. We have only assessed the noise levels from the frost fan layout as shown in Appendix B to Mr Staples' evidence. This includes one frost fan directly north of the Site (across State Highway 6 (SH6)) that is consented but not built.
- 4.12. We also understand that frost fans could be located closer (than has been modeled) to the Site under the operative District Plan rules.

Bird scaring

- 4.13. From the evidence of Mr Staples and Mr Reeve, the noise from bird scaring can be variable depending on the methods used. These typically include the use of shot guns and gas guns. Mr Reeve has been advised that this can also include the use of quad bikes moving about the orchard using horns.
- 4.14. For gas guns, the evidence of Mr Staples sets out that the current use of gas guns on the orchard to the west would result in a noise level of greater than 100dB  $L_{AFmax}$  at the nearest part of the Site without a noise barrier on the boundary.

- 4.15. If a dwelling was to be built on the Site under the current zoning (25m setback) the noise from gas guns on the nearest part of the Site would be approximately 77dB  $L_{AFmax}$  in order to comply with Rule 4.7.6E(c) of the District Plan. This would require the noise of the guns to be significantly reduced, (e.g. by moving the existing gas guns so that they are in the order of 850 metres from the boundary of the Site).
- 4.16. We understand that bird scaring devices can operate up to half an hour before sunrise and half an hour after sunset (Rule 4.7.6E(b)).

General activities (e.g. mowing, mulching, spraying and pruning)

- 4.17. We agree that with the noise barrier now proposed, the noise levels from general daytime horticultural activities such as mowing and mulching should be less than 55dB  $L_{Aeq}$  on the Site, including at the second storey of any buildings (more than 25m away).
- 4.18. The known exception to this will be the daytime noise from the use of chainsaws during pruning season from May to August. These are used at a height that would overlook the noise barrier. The noise level will be over 55dB  $L_{Aeq}$  for several days at any one house during the pruning season.
- 4.19. Mr Reeve understands that spraying activities occur at times including the early hours of the morning (the 'night time' period in the District Plan). The noise levels would be over 40dB  $L_{Aeq}$  at the closest houses, including the reduction from the noise barrier.

**5. State Highway 6**

- 5.1. Based on the current traffic flows and road surface, the noise from traffic on SH6 is predicted to generate a noise level of approximately 60dB  $L_{Aeq(24h)}$  at 50m from SH6, and 57dB  $L_{Aeq(24h)}$  at 100m from SH6.

**6. No-complaints covenants**

- 6.1. We agree that the presence of a no-complaints covenant will have no effect on the degree of noise exposure on the Site.
- 6.2. Mr Styles considers that that the presence of a no-complaints covenant assists in setting expectations and could potentially significantly reduce the proportion of noise-sensitive people occupying the RTRA. He considers that the effectiveness of the covenant could be increased by including additional information to explain the nature and extent of the noise effects likely to be experienced.
- 6.3. Mr Staples, Mr Reeve and Dr Chiles agree that the while a no-complaints covenant could provide a degree of forewarning, it cannot adequately convey the degree and nature of adverse noise effects that residents would be exposed to.

**7. Outdoor noise effects**

- 7.1. We agree that noise from motorsport activities is more subjectively annoying to most people than other typical environmental noise.
- 7.2. We agree that for the level of noise expected across the Site, the noise of gas guns, firearms and helicopters also has characteristics that would be more annoying subjectively than other typical environmental noise.

- 7.3. We agree that the mitigation afforded by the noise barrier and the single-storey 25m set back will be sufficient to ensure that the noise associated with horticultural activities such as mowing and mulching is at a reasonable level in the outdoor areas.
- 7.4. We agree that the noise associated with bird scarers and helicopter use during the day will impact significantly on outdoor amenity for residential dwellings built on the portions of the Site close to the orchard to the west.
- 7.5. For the reasons set out in their individual statements of evidence, Mr Staples and Dr Chiles consider that outdoor noise exposure on the Site is incompatible with noise-sensitive activities, such as residential use.
- 7.6. Mr Styles partially agrees, but he considers that the degree of incompatibility or sensitivity of the residents in this case is quite different to a typical situation (such as where a noise maker 'comes to' a residential area where the expectation is for a low noise environment) because it will be mitigated by the covenant having affected expectations and by the seasonal and intermittent nature of the noises along with the acoustic insulation of the dwellings which will provide respite if desired.

## 8. Indoor noise effects

- 8.1. We agree that with sufficient acoustic insulation of dwellings, and adequate ventilation and temperature control so that windows can be kept closed, the indoor noise effects on residents would be acceptable. This would result in reasonable protection of sleep.
- 8.2. Where the noise levels require windows and doors to be closed during the day, we agree this requirement will impact on the style of living in the warmer months.

### Sound insulation

- 8.3. We agree that for controlling motorsport and horticultural activity noise the acoustic insulation of buildings should be specified in the District Plan Rules in terms of a sound insulation requirement of the building construction, rather than the resulting internal noise level. By specifying the sound insulation of the building fabric there is certainty and clarity of the requirements for all buildings in all locations. If the alternative approach of specifying internal noise levels were adopted there could be ambiguity and discrepancy in relation to external noise exposure assumptions that would need to be made for each building.
- 8.4. We agree that a sound insulation requirement should be determined now, based on achieving a certain internal noise level. We accept there will be variability in the internal sound levels actually achieved in different buildings depending on the specific locations and orientations within the Site. There will also be variability corresponding to variations in the external motorsport and horticultural activity. For these reasons we agree sound insulation requirements should include an allowance for reasonable variability.
- 8.5. Mr Styles considers that sound insulation requirements should be based on achieving an internal noise level of 40dB L<sub>Aeq</sub> indoors for HMP Tier 2 days and the Speedway given that the noise is generated almost entirely during the day and that sleep disturbance is not a primary concern.

- 8.6. Mr Staples and Dr Chiles consider that sound insulation requirements should be based on achieving an internal noise level of 30dB  $L_{Aeq}$  for all motorsport noise, given the character of this source.
- 8.7. Mr Styles considers that sound insulation requirements should be based on achieving an internal noise level of 35dB  $L_{Aeq}$  for horticultural noise at night given its seasonal and intermittent nature (which is not covered by the WHO guidelines). This would also provide appropriate protection for the noise from daytime horticultural activities.
- 8.8. Mr Staples, Dr Chiles and Mr Reeve consider that sound insulation requirements should be based on achieving an internal noise level of 30dB  $L_{Aeq}$  for horticultural noise at night in accordance with the World Health Organisation guidance. This would also provide appropriate protection for daytime horticultural activities.
- 8.9. We agree that sound insulation requirements should be specified in terms of the relevant 'ISO' Standards. In our conferencing we have not confirmed an appropriate form/wording for such a requirement. We would be able to work together and draft a requirement.
- 8.10. For road traffic noise on SH6 we agree that an alternative approach of specifying an internal noise level of 40dB  $L_{Aeq(24h)}$  is appropriate. This is consistent with NZS 6806 and the approach promoted by the NZ Transport Agency across the State Highway network. In this instance there is less scope for discrepancy in assumptions of external noise levels given the known characteristics of the road and traffic.

#### Ventilation

- 8.11. We agree that a system should be required to provide adequate fresh air ventilation and cooling/heating so that occupants can keep doors and windows closed when outdoor noise levels are high.
- 8.12. We agree that the ventilation system itself should not generate more than 30dB  $L_{Aeq}$  on a low flow setting.

### **9. Reverse Sensitivity Effects**

- 9.1. We agree that additional density of receivers under PC13 will limit the existing horticultural activities to a greater extent than the development of houses under the operative District Plan rules.
- 9.2. We agree that the Site will be exposed to noise levels that will have a significant adverse effect on residents. In our conferencing we have not discussed the degree to which this would result in reverse sensitivity effects on the surrounding land uses.

### **10. Summary**

- 10.1. We generally agree on the noise exposure of the Site from all sources. Any residual differences between us are not material to our opinions on noise effects. (Sections 2-5)
- 10.2. We disagree on the effectiveness of a no-complaints covenant. (Section 6)

- 10.3. We agree there will be adverse noise effects outdoors. We disagree on the degree of these effects and whether residential activity can be compatible with this environment. This is the primary issue of contention between us. (Section 7)
- 10.4. We agree that although living style will be compromised at times, indoor noise effects could be mitigated with an appropriate sound insulation and ventilation requirement. We disagree on what is an appropriate indoor noise level and consequently the degree of sound insulation required. (Section 8)
- 10.5. We have not discussed consequential effects on surrounding activities resulting from noise exposure on the Site. (Section 9)

**Dated** the 29<sup>th</sup> May 2019



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Jon Styles



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Stephen Chiles



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William Reeve



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Aaron Staples