

TO:	Stagecoach Project Files
FROM:	SE Group

Noise Impacts of Snowmaking

Snowmaking is an integral part of ski area operations to ensure a high quality snow surface even during times of low snow. Stagecoach Resort is planning to construct a brand-new snowmaking system to make snow on much of its terrain, to enhance the guest experience. In the earlier days of snowmaking, up until about maybe 20 years ago, snowmaking equipment was very loud - the noise was comparable to a chainsaw or a loud motorcycle. Snowmaking decibel levels from equipment of that age have been measured to far exceed modern OSHA 12-hour permissible exposure levels (PEL) of 82 dBA. A 2013 study found that all day and night shift snowmakers at a ski resort in Colorado were exposed to sound levels exceeding this PEL. Peak sound levels ranged from 102 dBA to 132 dBA.¹ Again, this was on older style snowmaking equipment.

However, snowmaking noise levels described above are more likely to be found at ski areas with older snowmaking infrastructure. Modern snowmaking equipment manufacturers are working to create quieter snow guns. For example, the TechnoAlpin TF1 Piano was designed to include sound insulation cladding on the turbine, a soundproof cover, and special air filters on the compressor. Furthermore, the gun can run at partial load, allowing for even lower volumes due to reduced motor speed. The Bachler NESSy can operate at lower pressures and features and improved nozzle shape. In general, modern equipment requires less air pressure to make snow and generates less noise.

Table 1 outlines decibel levels of different options for modern snowmaking equipment. Decibel levels are calculated based upon noise level at 20 m provided by the manufacturer. Table 2 outlines decibel sound equivalents for reference. Because Stagecoach will be constructing an entirely new system, sound levels will be significantly quieter than older systems. Also, even the closest houses to ski runs will likely be a minimum of 60 ft (20 m) from snowmaking equipment. Unless one is a snowmaker, most people will not hear anything louder than 60 dB which is equivalent to normal conversation.

¹ Radman, A. M., Sandfort, D. R., Lipsey, T. C., & Brazile, W. J. (2013). Case Study: Noise Characterization and Exposure at a Ski Resort. *Journal of Occupational and Environmental Hygiene*, 11(1), D10-D16. <https://doi.org/10.1080/15459624.2013.839877>

Table 1. Snow Gun Noise

Distance (M)	Bachler New Energy-efficient Snowgun System (NESSY) (dB)	TechnoAlpin TF1 Piano (dB)	SMI Silent Polecat (dB)
5	75	70	74
10	69	64	68
20	63	58	62
30	59	54	58
40	57	52	56
50	55	50	54
100	49	44	48
200	43	38	42

Table 2. Comparative Examples of Noise Levels

dB	Equivalent
10 dB	Breathing
20 dB	Leaves rustling, a ticking watch
30 dB	A whisper
40 dB	Refrigerator hum
50 dB	Moderate rainfall
60 dB	Normal conversation, dishwashers
70 dB	Vacuum cleaners, traffic

dB	Equivalent
80 dB	Garbage disposal, alarm clocks
90 dB	Lawnmower, blenders
100 dB	Motorcycles
110 dB	Rock concert, nightclub
120 dB	Chainsaw
130 dB	Jackhammer
140 dB	Fireworks, jet takeoff

It should be noted that the decibel scale is logarithmic rather than linear. 10 dB sounds are ten times as loud as 0 dB, and 20 dB sounds are 100 times as loud as 0 dB, and so on. Sounds above 85 decibels can damage human hearing if exposure exceeds 8 hours per day.