

the reader may use to better understand the anticipated effect aircraft operations and the proposed replacement airport would have on noise levels in the Zion National Park.

The Equivalent Noise Level for 24 hours, $Leq_{(24)}$, and for daytime hours, $Leq_{(day)}$, were provided to disclose the average noise level. $Leq_{(24)}$ provides the 24-hour average without penalty for night time operations. $Leq_{(day)}$ when employed, reports the average noise exposure present during the hours between 7:00 a.m. and 10:00 p.m. on the average annual day and serves as a surrogate to describe aircraft noise during daytime park activities.

The time of exposure above the existing ambient level is provided to disclose the total amount of time during the average annual day that a location is exposed to aircraft noise above an ambient threshold that represents the median noise level and includes measured noise from all sources, including human and mechanical activity. The time of exposure above the natural ambient level is provided to disclose the total minutes of an average annual day that a location is exposed to aircraft noise above the naturally occurring median background noise at the location.

The L_{Amax} of every operation at every location is computed as an means to determine the number of events during the average annual day that various noise levels are exceeded. For this evaluation, the Number of Events Above 20, 25, 35, 45, 55, and 60 dBA were summed for each location and disclosed for informational purposes in maps and tables presented in the DEIS.

The effects of aircraft noise on other noise-sensitive 4(f)/303(c) facilities within the region surrounding St. George, Utah is evaluated in terms of its project specific effects from all St. George airport related aircraft sources in subsequent parts of **Section 6.6.**, and for all aircraft noise sources in **Chapter Seven, Cumulative Impacts.**

6.6.1.1 INM Input Data

The INM input data used to compare the potential effect of the proposed replacement airport on Zion National Park with the effect of the existing airport was evaluated for conditions in 2010 and 2020. The INM model input used to determine effects at Zion National Park is the same as was used to develop airport area noise information described in **Section 6.2, Airport Noise.** The area of interest and assessment, however, is Zion National Park.

Ambient Noise Level Development – Noise Measurements

One of the requirements imposed by the Federal court for the reassessment of the potential noise effects of the proposed replacement airport at St. George was the consideration of noise measurements collected at Zion National Park in 1995 and 1998. Information regarding these measurement programs was assessed by Volpe National Transportation Center staff to determine their utility in describing the

ambient noise conditions in the park.⁵⁵ Volpe found that the relatively short data collection periods (typically a few hours) were not of sufficient length to provide an adequate basis for description of long-term ambient noise levels, particularly for all frequency ranges.

In May of 2002, the NPS published a third and more comprehensive noise measurement report to describe noise conditions at 13 locations in Zion National Park. The noise measurements for this report, which were performed in 2001 by Wyle Laboratories, were conducted over four week-long periods during four seasons of the year.⁵⁶ **The measurement locations may be found on Exhibit 6.18 and Exhibit 6.19 in the Draft EIS.** Third octave band data was compiled at several of the sites, and substantial observer logs of the data were available.

Again, acoustic staff at the Volpe National Transportation Systems Center evaluated the noise measurement information and found it adequate to prepare an acoustic map of L50_(existing) ambient levels throughout the park. The L50_(existing) ambient level is that level of noise that is exceeded 50 percent of the time of the measurement – or the median noise level. The report documenting the evaluation of the data and process applied to the development of the map is attached as a supplement to **Appendix B.**

After coordination between the FAA and the NPS, it was determined that an additional ambient metric would be computed to allow the determination of the time above and number of events above the L50_(natural) ambient levels within Zion National Park. The L50_(natural) ambient level is a computed noise level based on the L50_(existing) level, but has all human-induced sounds (voices, mechanical equipment, aircraft, etc.) removed from consideration before the median level is determined. Within the park, the L50_(natural) levels are generally a few dBA less than the L50_(existing) levels.

L50_(existing) and L50_(natural) levels derived from the 2002 measurement report data set were used to develop ambient sound level maps for use in the noise modeling process. The following two sections briefly describe that process, described in more detail in **Appendix B.**

⁵⁵ The Volpe National Transportation Center and its Acoustic Lab are a part of the study team. They provide acoustic measurement and analytical services throughout the U.S. Department of Transportation; assist FAA with aircraft noise certification, noise measurements, model development, and technical support for the Air Tour Management Plan Program and other park noise studies.

⁵⁶ At six locations, winter measurements were not collected owing to the difficulty of reaching the site during high snow conditions.