# Appendix G

## Helicopter Noise Technical Report

# Folsom Ranch Medical Center Helicopter Noise Technical Report

**Prepared by:**

Crawford Murphy & Tilly, Inc.

Draft

March 4, 2021

This technical report describes the helicopter noise exposure associated with the planned Folsom Ranch Medical Center. The following describes the regulatory background, noise analysis methodology, noise model input data and noise exposure results.

## 1.1. Project Description / Location

The proposed Folsom Ranch Medical Center would provide primary and specialty care practices along with outpatient imaging, ambulatory surgery center, and other ancillary services, as well as a new hospital with expanded acute services. The proposed medical center is in Folsom, south of U.S. Highway 50 and north of White Rock Road, between Prairie City Road and the El Dorado County line. The 27.44-acre site is located at the northeast corner of East Bidwell Street and Alder Creek Parkway.

## 1.2. Regulatory Framework

The following describes the Federal, state, and local noise exposure standards used in this analysis.

### 1.2.1. Federal

Federal guidance concerning the evaluation of aircraft noise is contained in 14 CFR Part 150, "Airport Noise Compatibility Planning", December 1984, Federal Aviation Administration (FAA) Order 1050.1F, "Environmental Impacts: Policies and Procedures", July 2015, FAA Order 5050.4B, "National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions", April 2006, and FAA's "Environmental Desk Reference for Airport Actions", October 2007. These documents establish the aircraft noise analysis methodology and significance threshold for federal actions that have an aviation noise component. While this proposed heliport project is not a federal action, the guidance contained in these FAA documents is the industry standard for performing aircraft noise analyses.

The documents establish the 65 dB Day-Night Average Sound Level (DNL), and the 65 dB Community Noise Equivalent Level (CNEL) in California, as the threshold of significance for determining impacts on noise sensitive land uses (e.g., homes, schools, and churches) and a change of 1.5 dB in DNL or CNEL over noise sensitive uses is a trigger for a more detailed noise analysis.

### 1.2.2. State of California

*California Title 21 Division of Aeronautics, Noise Standards*, states the following (in accordance with Article 3, Chapter 4, Part 1, Division 9, Public Utilities Code, Regulation of Airports) to provide noise standards governing the operation of aircraft and aircraft engines for all airports operating under a valid permit issued by the Department of Transportation:

- The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dB for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses

are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction.

As in the Federal criteria, no compatibility criteria have been established for A-weighted single event noise metrics such as SENEL or Lmax.

### 1.2.3. City of Folsom

The Folsom 2035 General Plan includes goals and policies related to transportation (including aircraft) noise and are listed below.

- Goal SN 6.1
  Protect the citizens of Folsom from the harmful effects of exposure to excessive noise and to protect the economic base of Folsom by preventing the encroachment of incompatible land uses within areas affected by existing noise-producing uses.

- SN 6.1.2 Noise Mitigation Measures
  Require effective noise mitigation for new development of residential or other noise sensitive land uses to reduce noise levels as follows:
  1. For noise due to traffic on public roadways, railroad line operations, and aircraft: achieve compliance with the performance standards within Table SN-2.

- SN 6.1.4 Noise and Project Review
  Develop, maintain, and implement procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are implemented as part of the project review and building permit processes. The appropriate time for requiring an acoustical analysis would be as early in the project review process as possible so that noise mitigation may be an integral part of the project design.
- SN 6.1.6 Aircraft Noise

  Strive to reduce noise from aircraft travel over Folsom.

The General Plan identifies that the exterior noise level compatibility standard for outdoor activity areas for residential (Low Density Residential, Duplex, Mobile Homes) from transportation sources is the 60 dB DNL/CNEL.

## 1.3. Methodology

The Aviation Environmental Design Tool (AEDT) Version 3c has been used to quantify helicopter noise exposure in the vicinity of the proposed heliport location. The AEDT is the FAA-approved noise model for quantifying aircraft noise. The model input requires information specific to the heliport including the number of helicopter operations, the flight paths used to access the heliport, the specific helicopter types, and the time of day at which the operations are expected occur.

The AEDT works by defining a network of grid points at ground level. It then selects the shortest distance from each grid point to each flight track and computes the noise exposure generated by

each helicopter (or aircraft) operation, along each flight track. Corrections are applied for atmospheric acoustical attenuation, acoustical shielding of the engines by the helicopter itself, and speed variations. The noise exposure levels for each operation are then summed at each grid location. The cumulative noise exposure levels at all grid points are then used to develop DNL or CNEL contours for selected values (e.g., 65 dB CNEL). Using the results of the grid point analysis, noise contours of equal noise exposure can then be plotted.

Both DNL and CNEL contours have been prepared for this analysis. The DNL and CNEL metrics account for the noise levels of all individual aircraft events and the period of day/evening/night during which they occur. Both noise metrics logarithmically average aircraft sound levels at a location over a complete 24-hour period, with a 10 dB adjustment added to those noise events occurring during the nighttime hours from 10:00 p.m. to 7:00 a.m. The 10 dB adjustment has been added because of the increased sensitivity to noise during normal nighttime hours. While CNEL, like DNL, adds a 10 dB "penalty" to each helicopter operation at night, CNEL also adds a 4.77 dB penalty for each helicopter operation during evening hours (7:00 p.m. to 10:00 p.m.).

### 1.3.1. Helicopter Operations and Time of Day

A safety area has been prepared for the heliport was based on the most common helicopter expected to visit the hospital, which is the Airbus H-145 helicopter. While the AEDT does not include the Airbus H-145 helicopter, an appropriate substitute helicopter has been used in the modeling effort – the Eurocopter EC130-T2. To be conservative with the noise modeling, this helicopter is an older model and slightly louder than the newer Airbus H-145. Helicopter operations were estimated at 2 flights (four operations) per week. For modeling purposes, one flight equals two operations - an arrival and a departure. Based on this information, 208 helicopter operations would occur per year. The helicopter operations were modeled with 80 percent occurring during daytime hours, 15 percent during evening hours, and 5 percent during nighttime hours.

### 1.3.2. Modeled Aircraft Flight Tracks

The flight tracks used to access the helipad are an important factor in determining the geographic distribution of noise on the ground. The AEDT uses specific ground tracks and vertical flight profiles to compute three-dimensional flight paths for each modeled aircraft operation. The “default” AEDT vertical profiles, which consist of altitude, speed, and thrust settings, are compiled from data provided by aircraft manufacturers. Flight tracks modeled in AEDT were based on the information included in the FPASP Dignity Health Medical Center Environmental Review – Data Needs Memorandum dated December 8, 2020. Flight tracks for helicopter operations have been modeled departing to and arriving from west of the helipad.

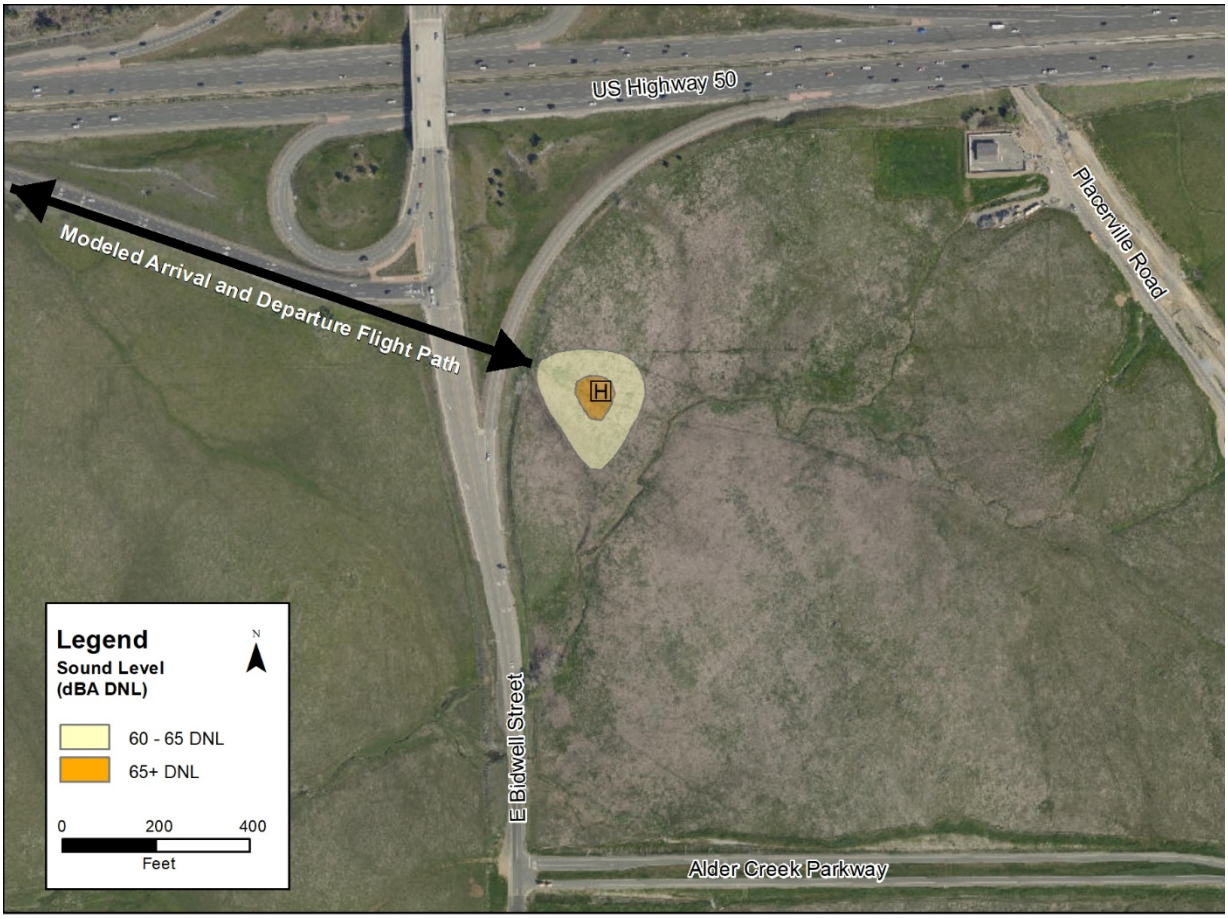
### 1.3.3. Noise Exposure Contours

The CNEL and DNL contours are shown on **Figures 1-1** and **1-2** respectively. The modeled arrival and departure flight paths to and from the heliport are also shown on the figures. The 60 CNEL is slightly larger than the DNL due to the additional noise weighting during the evening hours for CNEL. In both cases, the 60 contour limit extends out at a maximum of about 200 feet from the center of the helipad and primarily remains within the limits of the proposed medical center property.

**Figure 1-1: CNEL Contours**


Source: CMT, Inc.

**Figure 1-2: DNL Contours**




Source: CMT, Inc.

## 2.1. Supplemental Sleep Disturbance

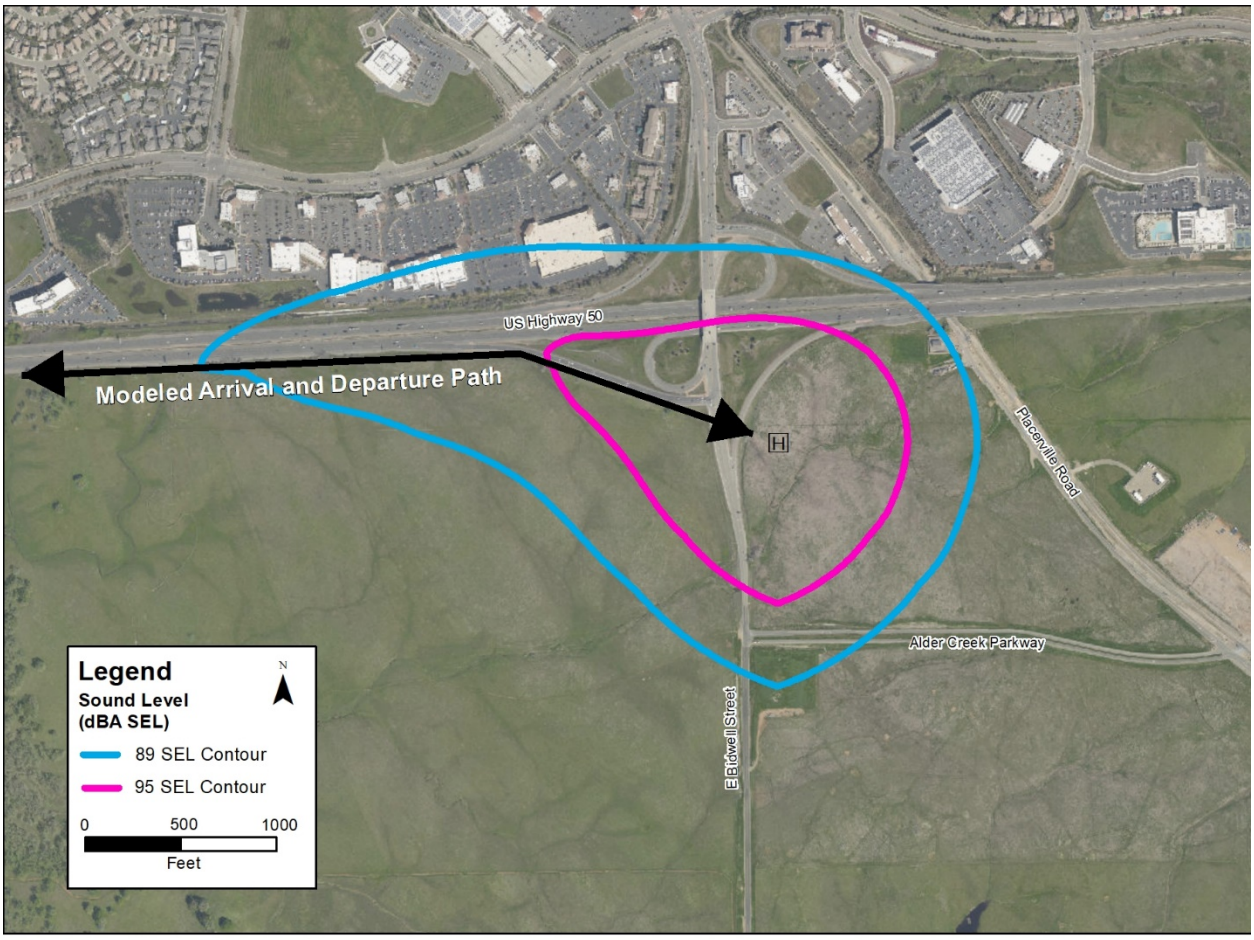
Many studies have been completed on sleep disturbance in both laboratories and in the field over time. The definitions of "sleep disturbance" and "sleep interruption" are commonly understood terms with results that vary widely from person to person and situation to situation. In 1993, the Federal Interagency Committee on Aviation Noise (FICAN) was formed to provide a forum for debates on future research needed to better understand, predict, and control the effects of aviation noise, and to encourage new technical developments in these areas. In 1997, FICAN published a document summarizing the current state of knowledge concerning the effects of aviation noise on awakenings. The "FICAN 1997" curve provides a conservative estimate of the "maximum percent of the exposed population expected to be behaviorally awakened," or the "maximum % awakened."

The FICAN 1997 curve represents a reasonable method to associate the Sound Exposure Level (SEL) of an overflight event with the potential for sleep disturbance. The FICAN SEL values are indicative of an indoor SEL value.

SEL is the same measurement as Single Event Noise Exposure Level (SENEL) used in California to describe single event noise levels, and in this case to best represent noise exposure related to helicopter operations and sleep.

According to the FICAN report, an interior SENEL of about 80 dB would correspond to a maximum awakening rate of about 10 percent with an interior of 65 dB would result in just less than five percent awakenings (using a window open sound level reduction (SLR) of 15 dB and a windows closed SLR of 24 dB). Therefore, this assessment included modeling helicopter SENEL contours of 95 dB and 89 dB (exterior) that would correspond to a 10 and 5 percent maximum awakenings. The SEL contours are shown on **Figure 2-1**.

**Figure 2-1: SEL Contours**




Source: CMT, Inc.