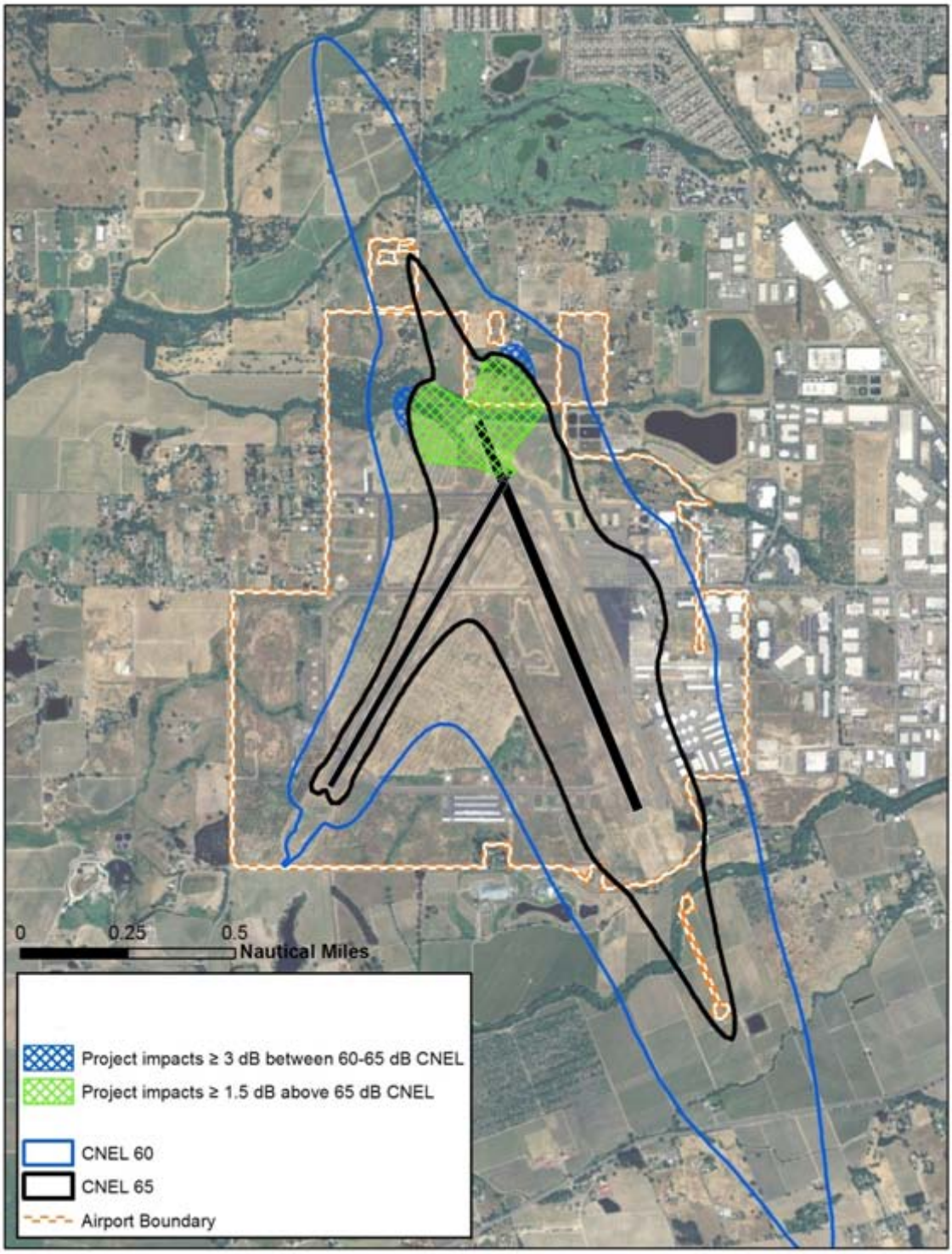
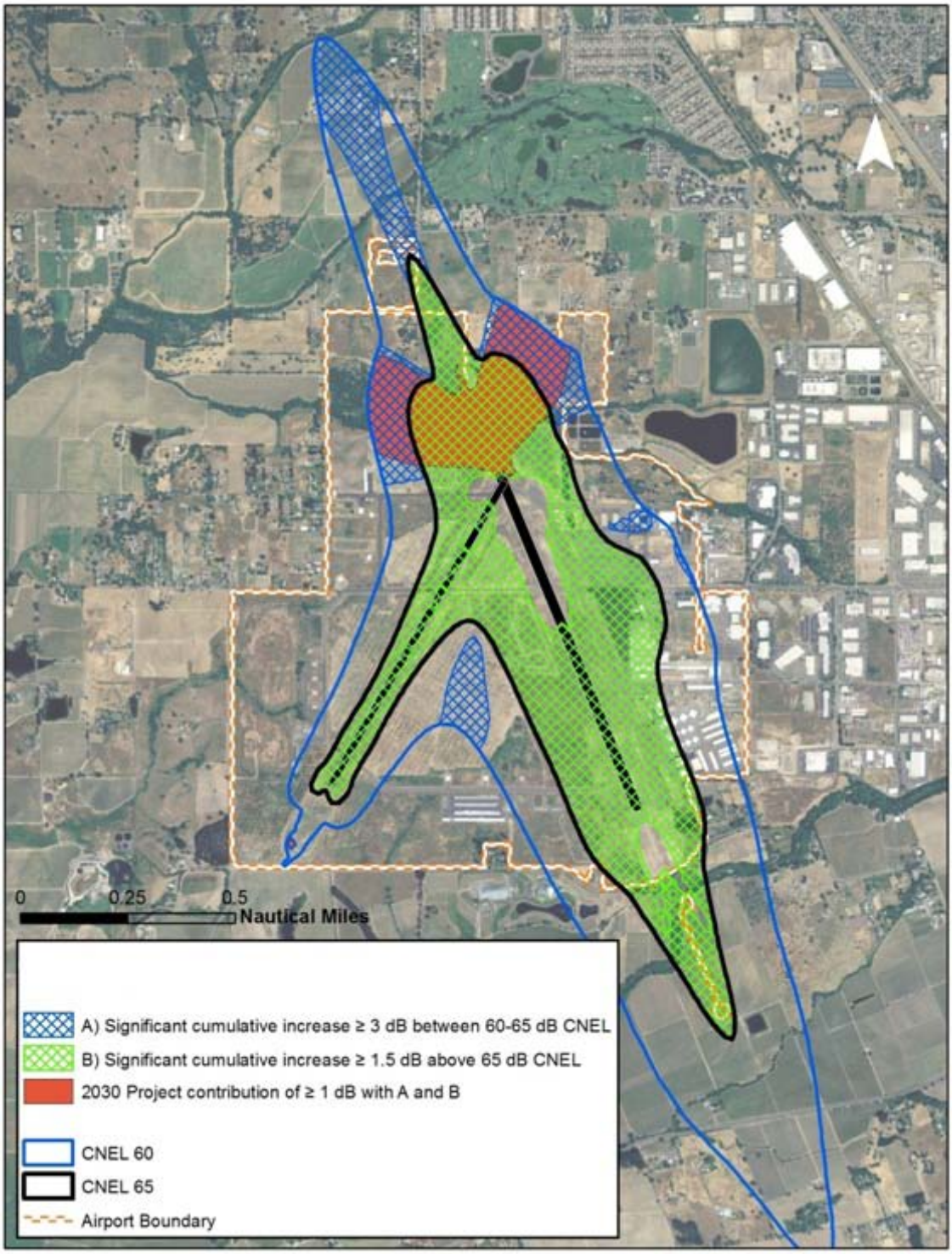
Figure 3.10-13
PROPOSED PROJECT – 2030 AIRCRAFT NOISE IMPACT AREAS



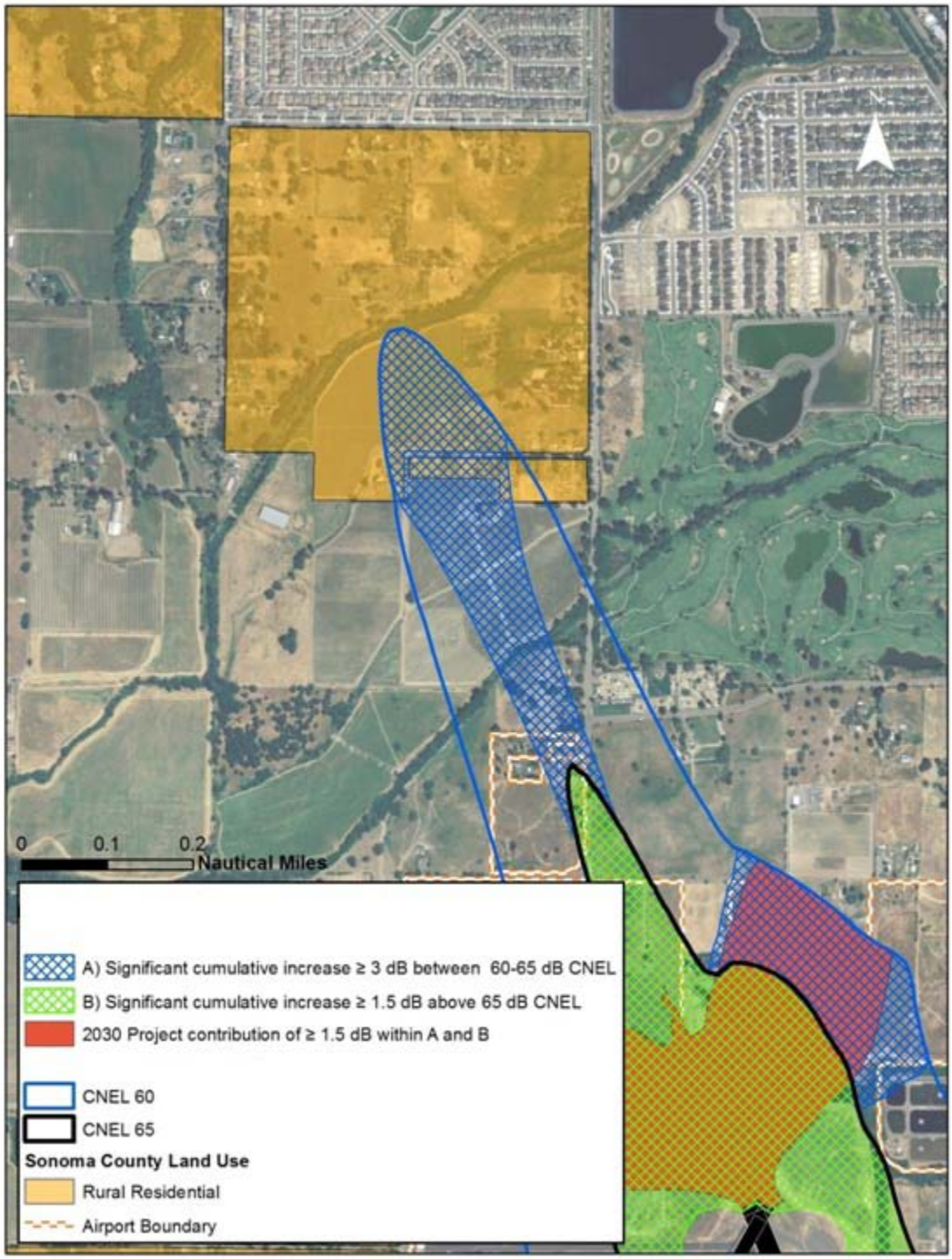
SOURCE: MGA/L&B, 2011
PREPARED BY: MGA/L&B, 2011

Figure 3.10-14
PROPOSED PROJECT – 2030 CUMULATIVE IMPACT



SOURCE: MGA/L&B, 2011
PREPARED BY: MGA/L&B, 2011

Figure 3.10-15
PROPOSED PROJECT – DETAILED VIEW OF 2030 CUMULATIVE IMPACT



SOURCE: MGA/L&B, 2011
PREPARED BY: MGA/L&B, 2011

Mitigation Measure 3.10.5

In accordance with Policy AT-3f of the Air Transportation Element of the Sonoma County General Plan, the County shall develop a Runway Approach Protection Plan. The Approach Protection Plan shall provide for noise monitoring where appropriate and identify appropriate mitigations to be undertaken in the event noise standards are exceeded. These mitigations may include purchase assurance, acoustical treatment, and purchase of easements. With implementation of appropriate noise attenuation, the impact would be reduced to a less-than-significant level.

Impact 3.10.6: Single-Event Noise Impacts

This section describes single-event noise impacts of 4 representative aircraft that operate at the Airport in terms of Sound Exposure Level (SEL). The noise exposure is illustrated in terms of SEL contours that are compared to noise disturbance criteria for the purpose of assessing potential sleep disturbance.

Currently, there is conflicting research on how, why, and how often people awaken during the night. One predictor of awakening is the "meaning of sound" to the individual, such as a child crying, an alarm clock, or birds chirping. The Federal Interagency Committee on Aviation Noise (FICAN) sleep disturbance curve is based on interior rather than exterior noise levels. The difference between exterior and residential interior noise levels may vary due to the Noise Level Reduction (NLR) characteristics of building structural design (i,e. windows, doors, vents, walls). Typically, the NLR for a residence with acoustical treatment with closed windows will be about 30 dB, with closed standard windows and doors will be about 20 to 25 dB, and with windows open will be about 12 to 15 dB. To associate exterior noise levels and different residential structural characteristics to sleep disturbance, the FICAN recommended sleep disturbance curve (refer to **Section 2.5, Figure 2-7 of Appendix M**) is used to calculate the percentage of awakenings at different noise levels relative to sound exposure of 85 and 90 dB SEL.

Table 3.10-24 lists the maximum percentage of awakenings expected per exterior noise levels and residential characteristics. For example, for standard home construction and an outdoor SEL of 90 dB, you can expect 5.1% of the population to awaken due to that noise event. If the outdoor SEL is 85 dB, the percentage of population to awaken drops to 3.8%.

Table 3.10-24
MAXIMUM PERCENTAGE OF AWAKENINGS PER EXTERIOR SEL

Residential Characteristic	Noise Level Redudction (dB)	Exterior SEL of 90 dB	Exterior SEL of 85 dB
Acoustical Treatment	30	3.8%	2.8%
Standard Construction	25	5.1%	3.8%
Windows Open	15	7.9%	6.4%

SOURCE: FICAN (1997), MGA/L&B (2011), Port of Oakland SEIR (2003)
PREPARED BY: MGA/L&B, 2011

The SEL contours of four aircraft that typically operate at the Airport were modeled by using INM Version 7.0b to analyze impact on sleep disturbance. These aircraft are not necessarily the loudest, but represent different aircraft types and sizes that use the Airport frequently. **Figures 3.10-16** through **3.10-24** illustrate the 85 and 90 dB SEL contours of the Alaska Airlines Q400, the MU3001 (Beechjet 400, represents medium-size business jets) and the G-IV (Gulfstream IV represents large business jets), and the C172 (a common general aviation propeller aircraft) without the Proposed Project and with the Proposed Project (see **Appendix M** for aircraft photos). The noise contours from operations on Runways 1 and 32 do not change between the No Project Alternative and Proposed Projects because the points associated with the arrival touchdown and the start of the takeoff roll on these runways would not change as a result of the Proposed Project. Because these points associated with the ends of Runways 14 and 19 would change as a result of the Proposed Project, the SEL contours would shift accordingly as shown in **Figures 3.10-16** through **3.10-25**.

Sleep disturbance is a function of the exposure to single-event noise levels in terms of SEL during the nighttime hours. By using FAA radar data for Airport operations during 2008 and also in consultation with air traffic control tower personnel, it is estimated that an average of 5 percent of propeller aircraft and 2 percent of jet aircraft operations occur during the nighttime hours (10 p.m. and 7 a.m.) and less than 0.5 percent of jet aircraft operations occur between 12 midnight and 6 a.m. (see **Appendix M** for number of annual aircraft operations). **Figures 3.10-16** and **3.10-17**, which correspond to the Q400, and **Figures 3.10-18** and **3.10-19**, which correspond to the C172, respectively, show that SEL noise contours do not affect residential areas, and therefore, these aircraft types likely would not cause sleep disturbance. **Figures 3.10-20** through **3.10-25** show that the SEL contours of the MU3001 and G-IV aircraft extend into residential areas and could cause sleep disturbance if the aircraft operation occurs during nighttime hours.

Figures 3.10-16 through **3.10-25** show a potential shift in the location of the SEL contours for aircraft that arrive on Runways 14 and 19 due to the proposed runway extensions. At the areas of greatest shift in contour location, the shift in noise may amount to approximately one dB SEL, which is not discernible by the human ear. Therefore, no significant impacts on sleep disturbance would occur as a result of the implementation of the Proposed Project.

Mitigation Measure 3.10.6

No mitigation is warranted.