4.6 NOISE

This section discusses Project-related impacts to the human noise environment in the vicinity of John Wayne Airport ("JWA" or "the Airport").[1] The noise analysis in this section is based on the *Noise Analysis Technical Report* prepared by Landrum & Brown and included in this EIR as Appendix C (Landrum & Brown 2014). The Technical Report includes definitions, acronyms, and large data tables that are not repeated in this section. The Technical Report also includes a discussion of the development a future air traffic control system ("NextGen"); however, that discussion is not relevant to the noise impact analysis in this section because this document conservatively assumes no change to the nature of the operations. At this point in time, it would be speculative to assume changes that have not been approved or fully reviewed by the Federal Aviation Administration ("FAA").

The Project does not propose any physical construction or change to the nature of the Airport's ground operations. Therefore, the Project would not: (1) generate temporary or periodic increases in ambient noise levels, or (2) generate excessive groundborne vibration or groundborne noise levels. Further, as there are no private airstrips in the vicinity of JWA, the Project would not expose persons to noise from private airstrips. Therefore, these topics are not discussed in this section (refer to the Notice of Preparation ["NOP"]/Initial Study in Appendix A).

4.6.1 BACKGROUND INFORMATION

Sound can be described in terms of the sound pressure (amplitude) and frequency (similar to pitch). Sound pressure is a direct measure of the magnitude of a sound without consideration for other factors that may influence its perception. The range of sound pressures that occur in the environment is so large that it is convenient to express these pressures on a logarithmic scale that compresses the wide range of sound pressures to a more usable range of numbers. The standard unit of measurement of sound is the decibel ("dB"), which describes the pressure of a sound relative to a reference pressure.

The frequency (pitch) of a sound is expressed as Hertz ("Hz") or cycles per second. The normal audible frequency for young adults is 20 Hz to 20,000 Hz. Community noise, including aircraft and motor vehicles, typically ranges between 50 Hz and 5,000 Hz. The human ear is not equally sensitive to all frequencies, with some frequencies judged to be louder for a given signal than others. As a result of this, the A-weighted decibel scale ("dBA") was developed to approximate the sensitivity of the human ear. In the A-weighted decibel, everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound environments, expressed in dBA, are presented in Exhibit 4.6-1.

Duration of Sound. Annoyance from a noise event increases with its duration. The "effective duration" of a sound is the time between when a sound rises above the background sound level until it drops back below the background level.

The relationship between duration and noise level is the basis of the equivalent energy principle of sound exposure. Reducing the acoustic energy of a sound by one half results in a 3 dB reduction in total energy. Doubling the duration of the sound increases the total energy of

[1] Noise impacts to wildlife are addressed in Section 4.2, Biological Resources.

the event by 3 dB. This equivalent energy principle is based upon the premise that the potential for a noise to impact a person is dependent on the total acoustical energy content of the noise.

Change in Noise. The human ear is a far better detector of relative differences in sound levels than absolute values of levels. Under controlled laboratory conditions, when listening to a steady unwavering pure tone sound that can be changed to slightly different sound levels, a person can just barely detect a sound level change of approximately one decibel for sounds in the mid-frequency region. When ordinary noises are heard, a young healthy ear can detect changes of two to three decibels. A 5 dB change is readily noticeable, while a 10 dB change is judged by most people as a doubling or a halving of the loudness of the sound. It is typical in environmental documents to consider a 3 dB change as potentially discernible.

SOUND RATING SCALES

Various rating scales approximate the human subjective assessment of the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters such as duration and the cumulative effect of multiple events. Single event metrics describe the noise from individual events, such as one aircraft flyover. Cumulative metrics describe the noise in terms of the total noise exposure throughout a defined period. The metrics used in this section are all based upon the dBA scale, which has shown good correlation with community response and is easily measured. Noise metrics used in this study are summarized below:

Single Event Metrics

Maximum Noise Level. The highest noise level reached during a noise event is called the Maximum Noise Level ("L_{max}"). For example, as an aircraft approaches, the sound of the aircraft begins to rise above ambient noise levels. The closer the aircraft gets, the louder it is until the aircraft is at its closest point directly overhead. Then, as the aircraft passes, the noise level decreases to ambient levels. Such a history of a flyover is plotted at the top of Exhibit 4.6-2. It is this metric to which people generally instantaneously respond when an aircraft flyover occurs.

Single Event Noise Exposure Level and Sound Exposure Level. Another metric that is reported for aircraft flyovers is the Single Event Noise Exposure Level ("SENEL"). This metric is essentially equivalent to the Sound Exposure Level ("SEL") metric. It is computed from dBA sound levels. Referring again to the top of Exhibit 4.6-2, the shaded area, or the area within 10 dB of the maximum noise level, is the area from which the SENEL is computed. The SENEL value is the integration of all the acoustic energy contained within the event.[2] Speech and sleep interference research can be assessed relative to SENEL.

The SENEL metric takes into account the maximum noise level of the event and the duration of the event. For aircraft flyovers, the SENEL value is typically about 10 dBA higher than the maximum noise level. This metric is useful in that airport noise models contain aircraft noise curve data based upon the SENEL metric.

[2] The SENEL value is not shown in Exhibit 4.6-2. The energy represented by the shaded area is "squeezed" into a one-second interval to determine the SENEL value.

SOUND LEVELS AND LOUDNESS OF ILLUSTRATIVE NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS

Numbers in Parentheses are the A-Scale Weighted Sound Levels for that Noise Event

dB(A)	OVER-ALL LEVEL	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
120		Military Jet Aircraft Take-Off With After-Burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
110	UNCOMFORTABLY LOUD	Concord Takeoff (113)*	Riveting Machine (110) Rock-N-Roll Band (108-114)	110 dB(A) 16 Times as Loud
100		Boeing 747-200 Takeoff (101)*		100 dB(A) 8 Times as Loud
90	VERY LOUD	Power Mower (96) DC-10-30 Takeoff (96)* Motorcycle @25 Ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 Ft. (89) Boeing 727 w/ Hushkit Takeoff (96)* Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. From Pavement Edge, 10:00 AM (76 +or- 6) Boeing 757 Takeoff (76)*	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Propeller Airplane Takeoff (67)* Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Electric Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60 dB(A) 1/2 as Loud
50	QUIET	Large Transformers @ 100 Ft. (50)		50 dB(A) 1/4 as Loud
40		Bird Calls (44) Lower Limit Urban Ambient Sound (40)		40 dB(A) 1/8 as Loud
20	JUST AUDIBLE	(dB[A] Scale Interrupted) Desert at Night		
10	THRESHOLD OF HEARING			

*Aircraft takeoff noise measured 6,500 meters from beginning of takeoff roll

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

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Typical A-Weighted Noise Levels — Exhibit 4.6-1

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

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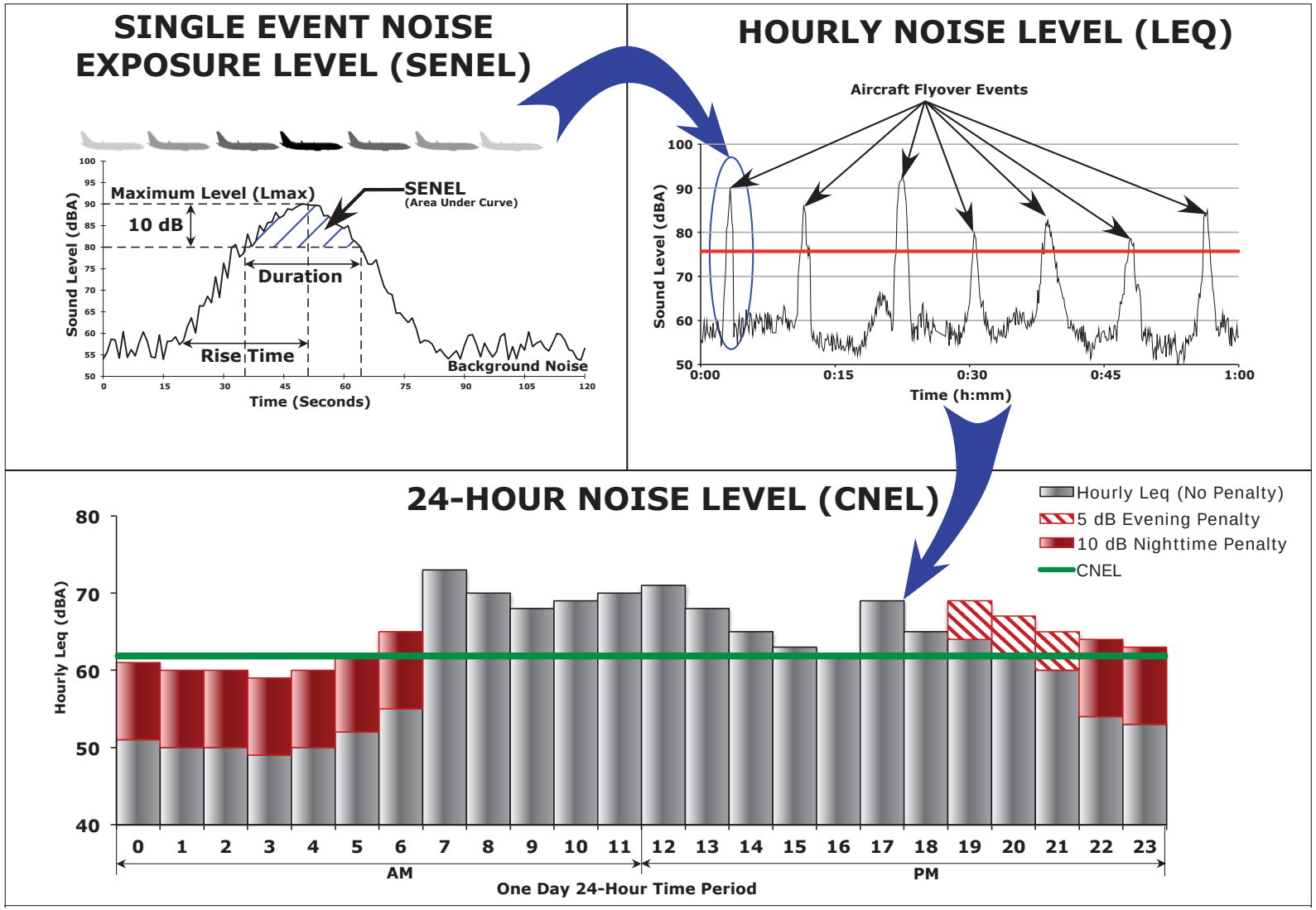

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Single & Cumulative Noise Metric Definitions

Exhibit 4.6-2

John Wayne Airport Settlement Agreement Amendment

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Cumulative Noise Metrics

Cumulative noise metrics assess community response to noise by including the loudness of the noise, the duration of the noise, the total number of noise events and the time of day these events occur in one single number rating scale.

Equivalent Noise Level. The Equivalent Noise Level ("L_{eq}") is the sound level corresponding to a steady-state, A-weighted sound level containing the same total energy as several SENEL events during a given sample period. L_{eq} is the "energy" average noise level during the time period of the sample. It is based on the observation that the potential for noise annoyance is dependent on the total acoustical energy content of the noise. This is graphically illustrated in the middle graph of Exhibit 4.6-2. L_{eq} can be measured for any time period, but is typically measured for 15 minutes, 1 hour, or 24 hours. L_{eq} for one hour is used to develop Community Noise Equivalent Level ("CNEL") values.

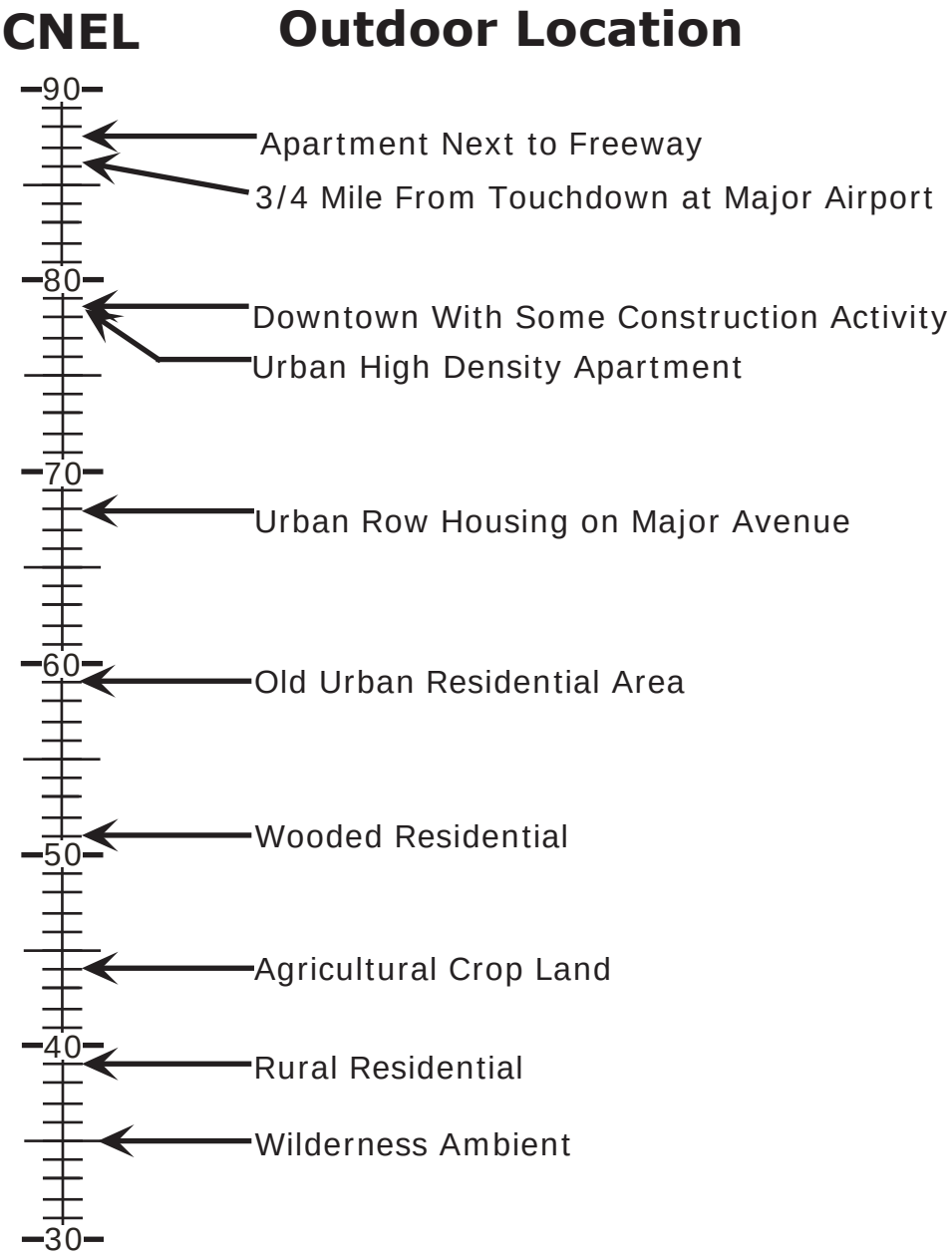
Community Noise Equivalent Level. CNEL is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The term "time-weighted" refers to the penalties attached to noise events occurring during certain sensitive time periods. On the CNEL scale, noise occurring between the hours of 7:00 PM and 10:00 PM is penalized by approximately 5 dB. This penalty accounts for the greater potential for noise to cause communication interference during these hours; it also accounts for the typically lower ambient noise levels during these hours. Noise that takes place during the night (10:00 PM to 7:00 AM) is penalized by 10 dB. This penalty was selected to attempt to account for the higher sensitivity to noise in the nighttime and the expected further decrease in background noise levels that typically occur in the nighttime. CNEL is graphically illustrated in the bottom of Exhibit 4.6-2. Examples of various noise environments in terms of CNEL are presented in Exhibit 4.6-3. CNEL is specified for use in the California Airport Noise Regulations and is used by local planning agencies in their General Plan Noise Element for land use compatibility planning.

Day Night Noise Level. The Day Night Noise Level ("DNL") is very similar to CNEL, but it does not include the evening (7:00 PM to 10:00 PM) penalty; it does include the nighttime (10:00 PM to 7:00 AM) penalty, however. Typically, DNL is about 1 dB lower than CNEL, although the difference may be greater if there is an abnormal concentration of noise events in the 7:00 PM to 10:00 PM time period. DNL is specified by the Federal Aviation Administration ("FAA") for airport noise assessments and by the U.S. Environmental Protection Agency ("USEPA") for community noise and airport noise assessment. The FAA guidelines allow for the use of CNEL as a substitute to DNL (FAA 2006).

Noise Contour. A noise contour is a line on a map that represents equal levels of noise exposure.

Supplementary Metrics

Time Above. The FAA developed the Time Above ("TA") metric as a secondary metric for assessing impacts of aircraft noise around airports. There are no existing, formal noise/land use compatibility standards defined in terms of TA; however, Orange County has presented a TA analysis in environmental assessments and studies of Airport projects since at least 1985.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Typical Outdoor Noise Levels

Exhibit 4.6-3

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The TA index refers to the total time in seconds or minutes that aircraft noise exceeds certain dBA noise levels in a 24-hour period. It is typically expressed as time above the 65 and 85 dBA sound levels. While this index is not widely used, it may be used by the FAA in environmental assessments of airport projects that show a significant increase in noise levels. The computer noise model developed by the FAA, the Integrated Noise Model, computes TA.

An analysis of this metric is provided in this Section as an additional description of the noise exposure because of its ready quantification of the amount of time that specific noise levels would be exceeded. This may be useful in terms of judging this exposure, as well as comparing alternatives or comparing the Project to existing conditions. It also provides some quantification of the potential for speech interference.

For purposes of this analysis, three noise level thresholds were used for the TA analysis based on known speech interference levels. In general, speech interference effects start when interfering noise exceeds 65 dBA for normal face-to-face conversation. The three thresholds correspond to outdoor exposure to aircraft noise; indoor exposure with windows open; and indoor exposure with windows closed. Given that outdoor to indoor noise reduction achieved by typical Southern California wood frame residences is 12 dBA with windows open and 20 dBA with windows closed, the three thresholds selected were 65 dBA, 77 dBA, and 85 dBA. These correspond directly to the beginning of speech interference outdoors, indoors with windows open, and indoors with windows closed, respectively. Residences constructed more recently could warrant the use of higher thresholds, but this analysis uses the more conservative values specified above.

Effects of Noise on Humans

Noise, often described as unwanted sound, is known to have several adverse effects on humans. From these known adverse effects of noise, criteria have been established to help protect the public health and safety and to prevent disruption of certain human activities. These criteria are based on effects of noise on people, such as hearing loss, communication interference, sleep interference, physiological responses and annoyance.

Hearing Loss is generally not a concern, even very near a major airport or a major freeway. The potential for noise-induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long term exposure, or certain very loud recreational activities (e.g., target shooting, motorcycle or car racing). The Occupational Safety and Health Administration ("OSHA") identifies a noise exposure limit of 90 dBA for 8 hours per day to protect from hearing loss; higher limits are allowed for shorter duration exposures. Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud to cause hearing loss.

Communication Interference is one of the primary concerns. Communication interference includes speech interference and interference with activities, such as watching television. Normal conversational speech is in the range of 60 to 65 dBA, and any noise in this range or louder may interfere with speech.

Sleep Interference is a major noise concern and, of course, is most critical during nighttime hours. Noise can make it difficult to fall asleep; create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages; and cause awakening. Noise may even cause awakening which a person may, or may not, be able to recall.

Extensive research has been conducted on the effect of noise on sleep disturbance. Recommended values for desired sound levels in residential bedroom spaces range from 25 to 45 dBA, with 35 to 40 dBA being the norm. The *Noise Analysis Technical Report* (Appendix C Section 2.3, Factors Influencing Human Response to Sound), describes data and studies developed since the 1970s.

In 2008, the American National Standards Institute ("ANSI") published a standard method of estimating sleep disturbance, and this method was adopted by the Federal Interagency Committee on Aviation Noise ("FICAN"). The ANSI standard divided the population into two groups, based on their habituation to the noise source. For a population that has not been habituated to nighttime noise, the FICAN curve shown in Exhibit 4.6-4 is recommended for estimating awakenings due to noise. For communities habituated to nighttime noise, the rate of awakening is considerably lower as shown in Exhibit 4.6-4. The Exhibit shows that, for a habituated population, the rate of awakening for a given indoor noise level is substantially lower than for a population newly exposed to nighttime noise. (This is of importance for Alternative C of this EIR, where Phases 2 and 3 consider the removal of the nighttime curfew at JWA.[3])

Physiological Responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, or other physical responses. While such effects can be induced and observed, the extent to which these physiological responses cause harm or are a sign of harm is not known. Generally, physiological responses are a reaction to a loud short-term noise, such as a rifle shot or a very loud jet overflight.

Health effects from noise have been studied around the world for nearly 30 years. Apart from auditory damage—which is amply understood—scientists have attempted to determine whether high noise levels can adversely affect other aspects of human health. These research efforts have covered a broad range of potential impacts from cardiovascular response to fetal weight and mortality. Yet, while a relationship between noise and health effects seems plausible, it has remained a difficult effect to quantify (that is, shown in a manner that can be repeated by other researchers while yielding similar results).

In addition to noise, health effects are also associated with a wide variety of other environmental stressors, including air pollution. Isolating the effects of aircraft noise as a source of long-term physiological change has proven to be almost impossible as many of the effects that may be associated with noise are also the same as well-known effects of air pollution. As discussed in the *Noise Analysis Technical Report* (Appendix C Section 2.4.4, Effects of Noise on Humans), in 2008, the Airport Cooperative Research Board ("ACRP"), a part of the National Academies, published a synthesis on the effects of aircraft noise and concluded, "Despite decades of research, including review of old data and new research efforts, health effects of aviation noise continues to be an enigma. Most, if not all, current research concludes that it is yet impossible to determine causal relations between health disorders and noise exposure, despite well-founded hypotheses."

[3] Should the County desire to modify the General Aviation Noise Ordinance **(**"GANO") after December 31, 2020, it would be considered a project pursuant to CEQA, and separate environmental documentation would be required to address the potential impacts associated with that action.

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Sleep Disturbance vs. Noise Level FICAN vs. ANSI

Exhibit 4.6-4

John Wayne Airport Settlement Agreement Amendment

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In October 2013, two studies on cardiovascular disease associated with aircraft noise were published in the British Medical Journal. The first was done in the United Kingdom ("UK") around Heathrow Airport in London, and the second was done in the U.S. as part of a multi-airport retrospective study lead by researchers from Boston University and the Harvard School of Public Health as part of the Partnership for Air Transportation Noise and Emissions Reduction ("PARTNER") program sponsored by the FAA. The U.S. study focused on Medicare patients, and the British study was based on the total population living around Heathrow.

The British study concluded, in part:

> Our results suggest that high levels of aircraft noise are associated with an increased risk of stroke, coronary heart disease, and cardiovascular disease. As well as the possibility of causal associations, alternative explanations should be considered. These include the potential for incompletely controlled confounding and ecological bias, as we did not have access to individual level confounder data such as ethnicity and smoking. Further work to understand better the possible health effects of aircraft noise is needed, including studies clarifying the relative importance of nighttime compared with daytime noise, as this may affect policy response. (See the *Noise Analysis Technical Report*, Appendix C, Pages 19 and 20.)

The U.S. study concluded:

> **Conclusions and future research.** We found that aircraft noise, particularly characterized by the 90th percentile of noise exposure among census blocks within zip codes, is statistically significantly associated with higher relative rate of hospitalization for cardiovascular disease among older people residing near airports. This relation remained after controlling for individual data, zip code level socioeconomic status and demographics, air pollution, and roadway proximity variables. Our results provide evidence of a statistically significant association between exposure to aircraft noise and cardiovascular health, particularly at higher exposure levels. Further research should refine these associations and strengthen causal interpretation by investigating modifying factors at the airport or individual level.
>
> **Limitations of this study.** Our analysis has limitations. Although Medicare data covers nearly the entire US older population, this database was developed for administrative purposes and has been shown to be subject to misclassification and geographic variability in evaluation and management. We only used primary diagnosis, which should reduce misclassification of outcomes, and our analyses of combined cardiovascular disease outcomes are unlikely to have significant misclassification. Other limitations of the Medicare data include limited individual data on risk factors. For example, we were not able to control for smoking and diet, strong risk factors for cardiovascular disease. These variables would only confound the association between aircraft noise and hospitalization for cardiovascular disease if there were significant correlations between aircraft noise exposures and these risk factors. Noise contours display fairly sharp gradients and skew as a function of prevailing wind directions, given runway orientation, and arrival and departure patterns, which may limit

> spatial confounding. (See the *Noise Analysis Technical Report*, Appendix C, Pages 20 and 21.)

These very recent British and U.S. studies provide more correlation linking noise to cardiovascular disease, but still fall short of providing the definitive noise dose and the response relationship that defines at what noise level these effects start and what is the rate of increase in response as noise level increases. As such, no applicable regulatory agency has established standards specific to physiological response for the purpose of the California Environmental Quality Act ("CEQA"), the National Environmental Policy Act ("NEPA"), or any other environmental compliance/assessment law. The absence of such regulations can be attributed, at least in part, to the uncertainty of the science.

Further, the current noise standards used in California ("65 CNEL") and by the FAA ("65 DNL") were adopted with full knowledge that noise effects include physiological responses that include cardiovascular effects. However, as of yet, there is insufficient data on the dose/response relationship to determine whether any revision to the adopted noise standards is warranted. Further, it is not yet clear that the effects that are being attributed to noise are not, in fact, the effects of air pollution. A great deal more research is necessary to fully understand the relationship between noise and cardiovascular health.

Section 15145 of the State CEQA Guidelines directs Lead Agencies who find a particular impact too speculative after a thorough investigation to note this conclusion and terminate discussion of the impact. The discussion above shows that, at this time, the effects of noise on cardiovascular health at noise levels below 65 CNEL are too speculative for further evaluation in this CEQA document.

However, one of the authors of the U.S. Study, Jonathan Levy, suggested what could be done in the interim to protect human health.

> "Our study emphasizes that interventions that reduce noise exposures could reduce cardiovascular risks among people living near airports. This can be done through improved aircraft technology and optimized flight paths, by using runways strategically to avoid when possible residential areas when people are sleeping, and by soundproofing of homes and other buildings."

All of the interventions specifically mentioned by the study author either are already underway at JWA or included as part of mitigation measures under this EIR. Despite the lack of standards or thresholds, the County has taken action to minimize and/or reduce the physiological effects of noise on the surrounding population.

Annoyance is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability. The level of annoyance, of course, depends on the characteristics of the noise (i.e., loudness, frequency, time, and duration), and how much activity interference (e.g., speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2 to 10 percent of the population is highly susceptible to annoyance from any noise not of their own making, while approximately 20 percent are unaffected by noise. Attitudes are affected by the relationship

between the person and the noise source. Whether we believe that someone is trying to abate the noise would also affect the level of annoyance.

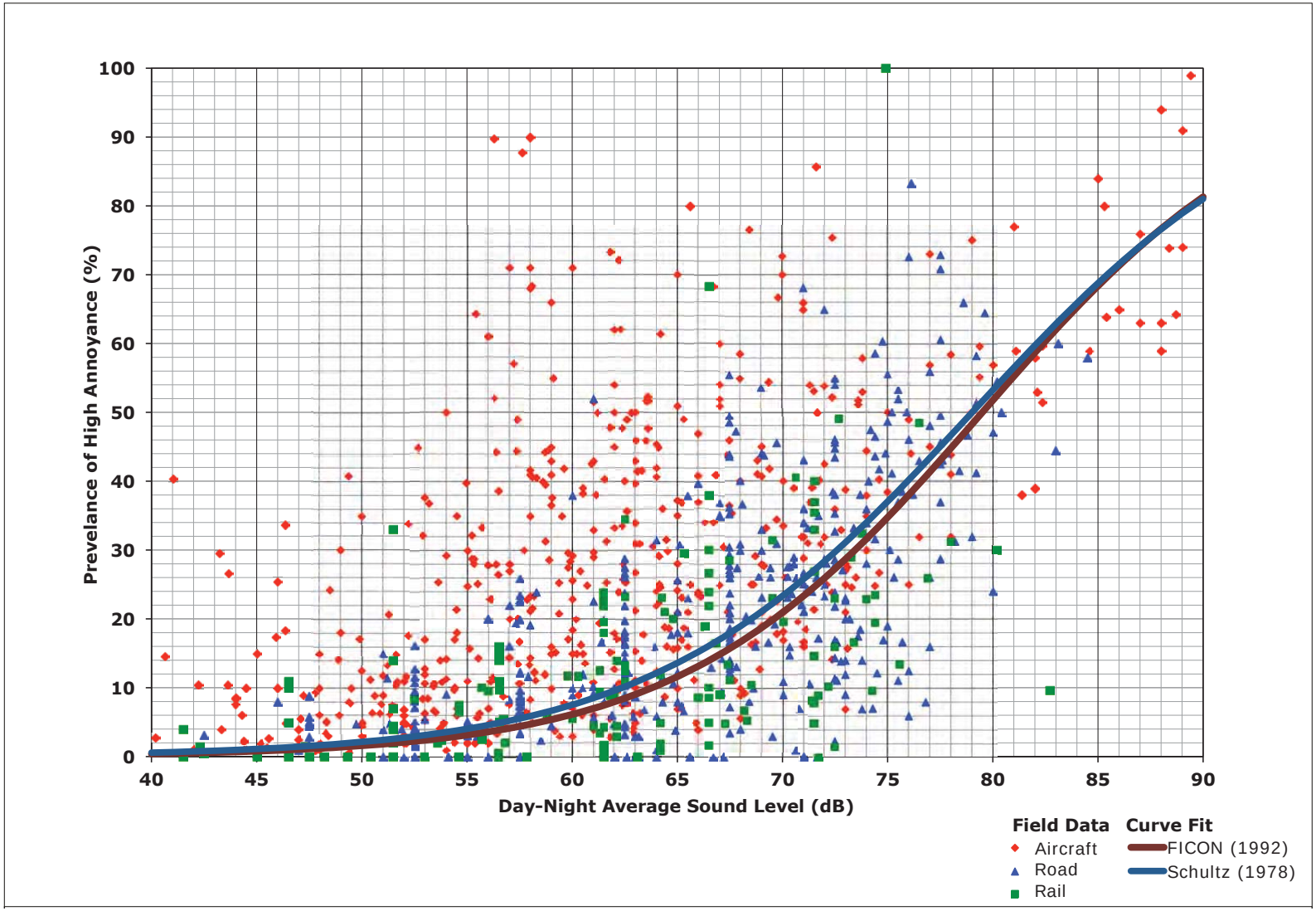
Annoyance levels have been correlated to CNEL levels. Exhibit 4.6-5 relates DNL noise levels to community response from two of these surveys. The curves display the percent of a population that can be expected to be annoyed by various DNL (CNEL in California) values for residential land use with outdoor activity areas. One of the survey curves presented in Exhibit 4.6-5 is the well-known Schultz curve that was developed from a survey of several types of transportation noises such as road traffic, railroad, and aircraft noises. At 65 dB DNL, the Schultz curve predicts that approximately 14 percent of the exposed population will be "highly annoyed". At 60 dB DNL, this decreases to approximately 8 percent of the population.

The curves in Exhibit 4.6-5 include data having a very wide range of scatter, with communities near some airports reporting much higher percentages of annoyance than others. While the precise reasons for this increased noise sensitivity were not identified, it is possible that non-acoustic factors may have played a role in increasing the sensitivity of this community during the period of the survey. Annoyance levels have never been correlated statistically to SENEL exposure levels in airport-related studies.

In recent years, researchers have suggested that the noise dose and response curve for annoyance from aircraft noise is different for aviation noise than it is for road and rail noise. In these studies, it has been suggested that the percentage of the population highly annoyed at 65 DNL is closer to 30 percent of the population and not the 14 percent as suggested by the Schultz curve. Some studies go on further to describe that communities form unique attitudes about noise and that differing communities show a wide range of annoyance response for the same noise exposure that can be attributed to non-acoustic factors.

School Room Effects. Interference with classroom activities and learning from aircraft noise is an important consideration and the subject of much recent research. Studies from around the world indicate that vehicle traffic, railroad, and aircraft noise can have adverse effects on reading ability, concentration, motivation, and long-term learning retention. A complicating factor in this research is the extent of background noise from within the classroom itself. The studies finding the most adverse effects examine cumulative noise levels equivalent to 65 CNEL or higher and single event maximum noise levels ranging from 85 to 95 dBA. In other studies, the level of noise is unstated or ambiguous. According to these studies, a variety of adverse schoolroom effects can be expected from interior noise levels equal to or exceeding 65 CNEL and/or 85 dBA SENEL.

Some interference with classroom activities can be expected with noise events that interfere with speech. High level single events are of concern because speech interference can disrupt a presentation and other classroom activities and learning.. As previously discussed, speech interference typically begins at 65 dBA, which is the level of normal conversation. Typical construction attenuates outdoor noise by 20 dBA with windows closed and 12 dBA with windows open. Thus, some interference of classroom activities can be expected at outdoor levels of 77 to 85 dBA, which are the criteria used for the TA analysis presented in this section.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Percent of Population Highly Annoyed as a Function of DNL

Exhibit 4.6-5

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

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4.6.2 REGULATORY SETTING

FEDERAL

Federal Aviation Regulations, Part 36

Federal Aviation Regulations ("FAR"), Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification" prescribes noise standards for issuance of new aircraft type certificates. Aircraft may be certificated as Stage 1, Stage 2, or Stage 3 aircraft based on their noise level, weight, number of engines, and, in some cases, number of passengers. Stage 1 aircraft, which are the noisiest aircraft, are no longer permitted to operate in the U.S., and Stage 2 aircraft have been phased out of the U.S. fleet (with an exception for Hawaii and Alaska and limited applicability to certain lighter aircrafts, discussed below). Although aircraft meeting Part 36 standards are noticeably quieter than many of the older aircraft, the regulations make no determination that such aircraft are acceptably quiet for operation at any given airport.

Federal Aviation Noise Abatement Policy

This policy, adopted in 1976 by the U.S. Department of Transportation and FAA, sets forth the noise abatement authorities and responsibilities of the federal government, airport proprietors, State and local governments, air carriers, air travelers and shippers, and airport area residents and prospective residents. The basic thrust of the policy is that the FAA's role is primarily one of regulating noise at its source (the aircraft), plus supporting local efforts to develop airport noise abatement plans. The FAA gives high priority in the allocation of Airport Development Aid Program ("ADAP") funds to projects designed to ensure compatible use of land near airports, but it is the role of State and local governments and airport proprietors to undertake the land use and operational actions necessary to promote compatibility.

Aviation Safety and Noise Abatement Act of 1979

Further weight was given to the FAA's supporting role in noise compatibility planning by congressional adoption of this legislation. Among the stated purposes of this act is "To provide assistance to airport operators to prepare and carry out noise compatibility programs". The law establishes funding for noise compatibility planning and sets the requirements by which airport operators can apply for funding. This is also the law by which Congress mandated that the FAA develop an airport community noise metric to be used by all federal agencies assessing or regulating aircraft noise. The result was DNL. Because California already had a well-established airport community noise metric in CNEL, and because CNEL and DNL are so similar, FAA expressly allows CNEL to be used in lieu of DNL in noise assessments performed for California airports (FAA 2006). The law does not require any airport to develop a noise compatibility program.

Federal Aviation Regulations, Part 150

As a means of implementing the Aviation Safety and Noise Abatement Act, the FAA adopted Regulations on Airport Noise Compatibility Planning Programs. These regulations are spelled out in FAR Part 150. FAR Part 150 includes noise and land use compatibility charts to be used for land use planning with respect to aircraft noise. Table 4.6-1 includes relevant data from the FAR Part 150, Appendix A guidelines (See the *Noise Analysis Technical Report*, Appendix C,, Section 5.2.1, page 26).

TABLE 4.6-1
FEDERAL AVIATION REGULATION PART 150 LAND USE GUIDELINES

Land Use	Yearly Day-Night Average Sound Level (L_{dn} dBA)					
	<65	65–70	70–75	75–80	80–85	>85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
Public Use						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Ldn: day night average sound level; dBA: A-weighted noise level

TABLE 4.6-1
FEDERAL AVIATION REGULATION PART 150 LAND USE GUIDELINES

Land Use	Yearly Day-Night Average Sound Level (L_{dn} dBA)					
	<65	65–70	70–75	75–80	80–85	>85
Table Key						
Y (Yes) =Land Use and related structures compatible without restrictions.						
N (No) =Land Use and related structures are not compatible and should be prohibited.						
NLR =Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.						
25, 30, or 35 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.						

Notes

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

(4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low.

(5) Land use compatible provided special sound reinforcement systems are installed.

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30.

(8) Residential buildings not permitted.

Disclaimer: The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, State, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Source: *Noise Analysis Technical Report,* Table 2, Landrum & Brown 2014.

These guidelines represent recommendations to local authorities for determining acceptability and permissibility of land uses and recommend a maximum amount of noise exposure in terms of the DNL that might be considered acceptable or compatible to people in living and working areas. These noise levels are derived from case histories involving aircraft noise problems at civilian and military airports and the resultant community response. Note that residential land use is deemed acceptable for noise exposures up to 65 dB DNL. Recreational areas are also considered acceptable for noise levels above 65 dB DNL (with certain exceptions for amphitheaters). However, the FAA guidelines indicate that ultimately "the responsibility for determining the acceptability and permissible land uses remains with the local authorities".

Federal Aviation Orders 1050.1E and 5050.4

FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, addresses compliance with NEPA and regulations issued by the Council on Environmental Quality ("CEQ")(40 CFR 1500 et seq.). FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects, supplements Order 1050.1E, and provides information to FAA airport personnel and others interested in fulfilling NEPA requirements for airport actions under FAA's authority. Although this Project is not subject to NEPA or CEQ requirements, the FAA standards and guidance are an appropriate point of reference for this CEQA analysis.

Specific policies and procedures for evaluating environmental impacts are described in Order 1050.1E, which includes the following significant impact definitions:

> A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. For example, an increase from 63.5 dB to 65 dB is considered a significant impact.

For potential impacts to receptors with noise exposures between 60 and 65 DNL:

> In accordance with the 1992 FICON (Federal Interagency Committee on Noise) recommendations, examination of noise levels between DNL 65 and 60 dB should be done if determined to be appropriate after application of the FICON screening procedure. If screening shows that noise sensitive areas at or above DNL 65 dB will have an increase of DNL 1.5 dB or more, further analysis should be conducted to identify noise-sensitive areas between DNL 60-65 dB having an increase of DNL 3 dB or more due to the proposed action. The potential for mitigating noise in those areas should be considered, including consideration of the same range of mitigation options available at DNL 65 dB and higher and eligibility for federal funding. This is not to be interpreted as a commitment to fund or otherwise implement mitigation measures in any particular area.

Airport Noise and Capacity Act of 1990

Subsequent to the 1985 Settlement Agreement, the U.S. Congress enacted the Airport Noise and Capacity Act of 1990 ("ANCA" or "the Noise Act") (49 U.S.C. 47521 et seq.). As a general matter, ANCA precludes the local imposition of noise and access restrictions that are not otherwise in accordance with the national noise policy unless the restrictions are "grandfathered" under ANCA in which case the restrictions are free from the restrictions that ANCA otherwise would impose. Specifically, ANCA established two broad directives to the FAA: (1) establish a method to review aircraft noise, airport use, or airport access restrictions proposed by airport proprietors; and (2) institute a program to phase-out Stage 2 aircraft over 75,000 pounds by December 31, 1999. Stage 2 aircraft are older, noisier aircraft (B-737-200, B-727 and DC-9); Stage 3 aircraft are newer, quieter aircraft (B-737-300, B-757, MD80/90). To implement ANCA, the FAA amended Part 91 and issued a new Part 161 of the FAR. Part 91 addresses the phase-out of large Stage 2 aircraft and the phase-in of Stage 3 aircraft. Part 161 establishes a stringent review and approval process for implementing use or access restrictions by airport proprietors.

The amended Part 91 required that all Stage 2 commercial aircraft, over 75,000 pounds, be out of the domestic fleet by December 31, 1999. The State of Hawaii and Alaska are not affected by this regulation. Since 2000, the domestic commercial airline fleet has been all Stage 3 aircraft.

Part 161 sets out the requirements and procedures for implementing new airport use and access restrictions by airport proprietors. Proprietors must use the DNL metric to measure noise effects and the Part 150 land use guideline table, including 65 dB DNL as the threshold contour to determine compatibility, unless there is a locally adopted standard that is more stringent. CNEL would be an acceptable surrogate for DNL.

The regulation identifies three types of use restrictions and treats each one differently: (1) negotiated restrictions, (2) Stage 2 aircraft restrictions, and (3) Stage 3 aircraft restrictions. Generally speaking, any use restriction affecting the number or times of aircraft operations will be considered an access restriction. Even though the Part 91 phase-out does not apply to aircraft under 75,000 pounds, the FAA has determined that Part 161 limitations on proprietors' authority applies as well to the smaller aircraft.

Negotiated restrictions are more favorable from the FAA's standpoint, but still require unwieldy procedures for approval and implementation. In order to be effective, the agreements normally must be agreed to by all airlines using the airport.

Stage 2 restrictions are more difficult because one of the major reasons for ANCA was to discourage local restrictions more stringent than the 1999 phase-out already contained in ANCA. To comply with the regulation and institute a new Stage 2 restriction, the proprietor must generally do two things: It must prepare a cost/benefit analysis of the proposed restriction and give proper notice. The cost/benefit analysis is extensive and entails considerable evaluation. Stage 2 restrictions do not require approval by the FAA.

Stage 3 restrictions are even more difficult to implement. A Stage 3 restriction involves considerable additional analysis, justification, evaluation, and financial discussion. In addition, a Stage 3 restriction must result in a decrease in noise exposure of the 65 dB DNL to noise-sensitive land uses (residences, schools, places of worship, parks). The regulation requires both public notice and FAA approval.

ANCA applies to all new local noise restrictions and amendments to existing restrictions proposed after October 1990. Here, ANCA's limitations do not apply to the existing noise regulations and access restrictions established by the County of Orange at JWA because the 1985 Settlement Agreement is "an intergovernmental agreement including an airport noise or access restriction in effect on November 5, 1990." (49 U.S.C. 47524(d)(3)). ANCA also provides that a "subsequent amendment" to the 1985 Settlement Agreement is not subject to ANCA provided that amendment does not reduce or limit aircraft operations or affect aircraft safety." (49 U.S.C. 47524(d)(4)). In the event that the Settlement Agreement expires, other interested entities – including, but not limited to, the FAA and commercial air carriers – could initiate legal action challenging the maintenance of any noise and access restriction at JWA on the basis that such restrictions violate ANCA.

STATE/REGIONAL

California Airport Noise Regulations

California Airport Noise Regulations promulgated in accordance with the State Aeronautics Act and set forth in Section 5000 et seq. of the California Code of Regulations (Title 21, Deivision 2.5, Chapter 6) are enforced by the Aeronautics Division of the California State Department of Transportation ("Caltrans") (State of California 1970). These regulations establish 65 dB CNEL as a noise impact boundary within which there shall be no incompatible land uses. This requirement is based, in part, upon the determination in the Caltrans regulations that 65 dB CNEL is the level of noise which should be acceptable to "...a reasonable man residing in the vicinity of an airport". Airports are responsible for achieving compliance with these regulations. Compliance can be achieved through noise-abatement measures, land acquisition, land use conversion, land use restrictions, or sound insulation of structures. Airports not in compliance can operate under variance procedures established within the regulations.

California Noise Insulation Standards

California Code of Regulations, Title 24 – known as the California Building Code – contains standards for allowable interior noise levels associated with exterior noise sources. These Regulations include the California Noise Insulation Standards which apply to all multi-family dwellings built in the state (State of California 2010). Single-family residences are exempt from these regulations. With respect to community noise sources, the regulations require that all multi-family dwellings with exterior noise exposures greater than 60 dB CNEL must be sound insulated such that the interior noise level will not exceed 45 dB CNEL. These requirements apply to all roadway, rail, and airport noise sources. Although the building code does not apply the CNEL 45 dB interior noise level standard to detached single-family residences, the Division of Aeronautics encourages communities to adopt this standard for these uses. The County and City of Newport Beach have done so as part of their general plan noise element policies.

General Plan Noise Elements

The State of California requires that all municipal General Plans contain a Noise Element. The requirements for the Noise Element of the General Plan include describing the noise environment quantitatively using a cumulative noise metric such as CNEL or DNL, establishing noise/land use compatibility criteria, and establishing programs for achieving and/or maintaining compatibility. Noise elements shall address all major noise sources in the community including mobile and stationary sources.

Airport Land Use Commissions

Airport Land Use Commissions were created by State Law for the purpose of establishing a regional level of land use compatibility between airports and their surrounding environs. The Orange County Airport Land Use Commission has adopted Airport Environs Land Use Plans ("AELUPs") for Orange County airports, including JWA, Los Alamitos Joint Forces Training Base, and Fullerton Municipal Airport. The AELUPs establish noise/land use acceptability criteria for sensitive land uses at 65 dB CNEL for outdoor areas and 45 dB CNEL for indoor areas of residential land uses. These criteria are compatible with the criteria used by the County of Orange.

COUNTY OF ORANGE

General Plan

The General Plan Noise Element of the County of Orange establishes noise/land use planning criteria for the unincorporated areas of the County. These noise guidelines and standards cover roadway noise, rail noise, and airport noise, including military and civilian airports. The County has adopted noise standards for various land uses in terms of CNEL and L_{eq}. These standards, Tables VIII-2 and VIII-3 of the Noise Element are combined and reproduced here as Table 4.6-2. For residential land uses, the County has established a maximum exterior noise level standard of 65 dB CNEL for private outdoor living areas and an interior standard of 45 dB CNEL.

TABLE 4.6-2
COUNTY OF ORANGE COMPATIBILITY MATRIX FOR LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS

Type of Use	65+ decibels CNEL	60 to 65 decibels CNEL
Residential	3a, b, e	2a, e
Commercial	2c	2c
Employment	2c	2c
Open Space		
Local	2c	2c
Community	2c	2c
Regional	2c	2c
Educational Facilities		
Schools (K through 12)	2c, d, e	2c, d, e
Preschool, college, other	2c, d, e	2c, d, e
Places of Worship	2c, d, e	2c, d, e
Hospitals		
General	2a, c, d, e	2a, c, d, e
Convalescent	2a, c, d, e	2a, c, d, e
Group Quarters	1a, b, c, e	1a, b, e
Hotel/Motels	2a, c	2a, c
Accessory Uses		
Executive Apartments	1a, b, e	2a, e
Caretakers	1a, b, c, e	2a, c, e

dB: decibels; CNEL: Community Noise Equivalent Level; L_{eq}: average noise level.

EXPLANATION AND DEFINITIONS

Action Required to Ensure Compatibility Between Land Use and Noise From External Sources:

1: Allowed if interior and exterior community noise levels can be mitigated.
2: Allowed if interior levels can be mitigated.
3: New residential uses are prohibited in areas within the 65 dB CNEL contour from any airport or air station and are allowed in other areas if interior and exterior community noise levels can be mitigated. The prohibition against new residential development excludes limited "infill" development within an established neighborhood.

Standards Required for Compatibility of Land Use and Noise:

a **Interior Standard:** CNEL of less than 45 decibels (habitable rooms only).
b **Exterior Standard:** CNEL of less than 65 decibels in outdoor living areas.

TABLE 4.6-2
COUNTY OF ORANGE COMPATIBILITY MATRIX FOR LAND USE AND COMMUNITY NOISE EQUIVALENT LEVELS

Type of Use	65+ decibels CNEL	60 to 65 decibels CNEL

c **Interior Standard:** $L_{eq(h)}$ = 45 to 65 decibels interior noise level, depending on interior use.
d **Exterior Standard:** $L_{eq(h)}$ of less than 65 decibels in outdoor living areas.
e **Interior Standard:** As approved by the Board of Supervisors for sound events of short duration such as aircraft flyovers or individual passing railroad trains.

Key Definitions:

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

Interior: Spaces that are covered and largely enclosed by walls.

$L_{eq(h)}$: The A-weighted equivalent sound level averaged over a period of "h" hours. An example would be $L_{eq(12)}$ where the equivalent sound level is the average over a specified 12-hour period (such as 7:00 AM to 7:00 PM). Typically, time period "h" is defined to match the hours of operation of a given type of use.

Outdoor Living Area: Outdoor living area is a term used by the County of Orange to define spaces that are associated with residential land uses typically used for passive private recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, Jacuzzi areas, and other outdoor areas associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are front yard areas, driveways, greenbelts, maintenance areas, and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Source: *Noise Analysis Technical Report,* Tables 3 and 4, Landrum & Brown 2014.

Additionally, the County of Orange requires that the 45 dB CNEL interior noise limit for habitable rooms of residences be met with windows open or windows closed (not necessarily both). Residences with windows closed will provide at least a 20 dB outdoor to indoor noise reduction (based on typical pre-1981 construction practice and Uniform Building Code requirements; newer residences provide additional noise reduction). Residences with windows open will provide a 12 dB outdoor to indoor noise reduction (largely independent of date of construction). The County, therefore, requires that new residences with exterior noise exposure greater than 57 dB CNEL (45 dB plus 12 dB) provide some means of mechanical ventilation in order to ensure that residents are able to close windows and obtain fresh air at a rate specified in the Uniform Building Code. New residences subject to this requirement are typically air-conditioned or supplied with a fresh air switch as part of the forced air heating unit.

The County of Orange has historically restricted nighttime operations at the Airport. Air carriers are not permitted to depart JWA before 7:00 AM on Monday through Saturday, 8:00 AM on Sundays, or after 10:00 PM on any day. Air carriers are not permitted to arrive at JWA before 7:00 AM on Monday through Saturday, 8:00 AM on Sundays, or after 11:00 PM on any day. General aviation aircraft are permitted to operate at night provided that they meet strict nighttime noise limits. These nighttime restrictions predate the 1985 Settlement Agreement and the Phase 2 Commercial Airline Access Plan and Regulation and are exempt under ANCA.

The Phase 2 Commercial Airline Access Plan and Regulation at JWA was adopted in response to a court-stipulated settlement agreement and contains the rules for airline and cargo aircraft operations at the Airport.

The General Aviation Noise Ordinance ("GANO") adopted by the County of Orange establishes noise limits and other restrictions for aircraft operating at JWA. Generally, general aviation operations are permitted 24 hours a day subject to daytime and nighttime noise limits.

CITY OF NEWPORT BEACH

The City of Newport Beach adopted their current General Plan on July 25, 2006 and is in the process of updating the Land Use Element. The City has established 65 and 45 CNEL as the outdoor and indoor noise compatibility criteria for residential land uses. The Noise Element, Chapter 12 of the General Plan includes noise land use compatibility guidelines and noise standards for a variety of land use types.

Policy N 1.8 establishes criteria for significant noise impacts to existing sensitive uses (listed below), and the CNEL increase described in this policy is shown in Table 4.6-3 below.

> **Policy N 1.8: Significant Noise Impacts:** Require the employment of noise mitigation measures for existing sensitive uses when a significant noise impact is identified. A significant noise impact occurs when there is an increase in the ambient CNEL produced by new development impacting existing sensitive uses.

TABLE 4.6-3
NEWPORT BEACH GENERAL PLAN POLICY N1.8
SIGNIFICANT NOISE IMPACT CRITERIA FOR NEW DEVELOPMENT IMPACTING EXISTING SENSITIVE USES

CNEL (dBA)	dBA Increase
55–60	3
60–65	2
65–70	1
70–75	1
Over 75	Any increase is considered significant

CNEL: community noise equivalent level; dBA: A-weighted decibel.
Source: *Noise Analysis Technical Report,* Section 2.6.2, Landrum & Brown 2014.

Goal N 3 of the City's Noise Element is, "Protection of Newport Beach residents from the adverse noise impacts of commercial air carrier operations at JWA as provided in the City Council Airport Policy." Goal N 3 includes ten policies that are addressed in Section 4.5, Land Use and Planning.

Additional Newport Beach General Plan Noise Element policies are addressed in Section 4.5, Land Use, Table 4.5-10.

CITY OF COSTA MESA

The Noise Element of the 2000 General Plan establishes 65 and 45 CNEL as the outdoor and interior noise compatibility for residential uses. The Noise Element also includes two policies related to JWA, which are addressed in Section 4.5, Land Use and Planning.

CITY OF IRVINE

The General Plan Noise Element of the City of Irvine contains noise/land use compatibility guidelines consistent with those in use by the County of Orange (i.e., 65 dB CNEL for noise-sensitive outdoor areas and 45 dB CNEL for indoor areas of residential uses). The City of Irvine has also adopted a single event noise standard that applies to the interior of residences located within a 60 dB CNEL contour. That requirement is that the Maximum Noise Level for the 10th percentile of the noise events shall not exceed 55 dBA (i.e., only the loudest 10 percent may exceed 55 dBA).

The City also adopted The City of Irvine CEQA Manual, which provides guidance in preparing CEQA documents for the City, including guidance on significance thresholds. The manual's guidance for determining the significance of traffic noise increases is as follows (Irvine 2012):

> Consequently, the noise threshold for increase in traffic noise levels is based on the potential for traffic noise to become considerably louder than the ambient noise level. In general, noise levels must increase by 10 dBA in order to double ambient noise levels. An increase of 5 dBA is readily perceptible to the public and a 3 dBA increase is barely perceivable to the average healthy human ear.

CITY OF LAGUNA BEACH

The City of Laguna Beach noise/land use compatibility guidelines presented in the City's General Plan Noise Element are consistent with those in use by the County of Orange (i.e., 65 dB CNEL for noise sensitive outdoor areas and 45 dB CNEL for indoor areas of residential uses). The Noise Element identifies aircraft overflights from JWA as one of the noise sources impacting the City, along with banner and other aircraft traveling along the coast. There are no goals, policies or actions related to aircraft noise presented in the Noise Element.

CITY OF TUSTIN

The City of Tustin's Noise Element contains noise/land use compatibility guidelines that are consistent with those in use by the County of Orange (i.e., 65 dB CNEL for noise-sensitive outdoor areas and 45 dB CNEL for indoor areas of residential uses). Aircraft noise is identified as a noise-related issue with three bullet points:

- Noise from JWA, while generally below accepted CNEL guidelines for residential uses, produces annoyance among Tustin residents due to repetitive occurrence.
- The activities and opportunities at JWA should be monitored as needed to protect the planning area from unwanted aircraft noise.
- Citizen involvement in committees that will influence future aircraft operations at JWA needs to be encouraged.

The Noise Element contains four policies and two implementation action items related to aircraft noise under Goal 1, "Use noise control measures to reduce the impact from transportation noise sources". These policies and implementation action items are addressed in Section 4.5, Land Use and Planning.

4.6.3 METHODOLOGY

AIRCRAFT NOISE

Aircraft noise modeling is a key element of this noise analysis. Generating accurate noise contours (i.e., lines of equal noise levels) is largely dependent on the use of a reliable, validated, and updated noise model. It is imperative that these contours be accurate for the meaningful analysis of airport noise impacts.

The FAA's Integrated Noise Model ("INM") Version 7.0d, released in May 2013, was used to model aircraft operations. The INM is a large computer program developed to plot noise contours for airports. The program is provided with standard aircraft noise and performance data for over 100 civilian aircraft types that can be tailored to the characteristics of the airport in question, as well as a database of military aircraft types. Version 7.0d includes an updated database that includes some newer aircraft; the ability to include run-ups in the computations; the ability to include topography in the computations; and the ability to vary aircraft altitude profiles in an automated fashion. Noise contour files from the INM were loaded into the ArcView™ Geographic Information System ("GIS") software for plotting and land use analysis.

One of the most important factors in generating accurate noise contours is the collection of accurate operational data. INM requires the input of the physical and operational characteristics of the Airport. Physical characteristics include runway coordinates, Airport altitude, and temperature and, optionally, topographical data. Operational characteristics include various types of aircraft data. This includes not only the aircraft types and flight tracks, but also departure procedures, arrival procedures, and stage lengths (flight distance) that are specific to the operations at the Airport. Aircraft data needed to generate noise contours included the following:

- Number of aircraft operations by type
- Types of aircraft
- Day/Evening/Night time distribution by type
- Flight tracks
- Flight track utilization by type
- Flight profiles
- Typical operational procedures
- Average meteorological conditions

The INM model was calibrated by comparing the results of the existing conditions model to the measurements from ten JWA noise monitoring stations ("NMS"). Note that the INM computes the

noise level to tenths of a decibel, but that the overall absolute accuracy of the model is more in the range of plus or minus 1.5 to 2 dB.

Noise impacts for the Proposed Project, Alternatives A, B, and C, and the No Project Alternative were calculated using the INM modeling. It was assumed that the day/evening/night mix for existing operations would not change for any of the phases of the Proposed Project or alternatives, except for Phases 2 and 3 of Alternative C. Under Phases 2 and 3 of Alternative C, it was assumed for the INM modeling that the curfew at the Airport would be removed. Note however that adoption of Alternative C, Phases 2 and 3, and the removal of the current curfew would require further discretionary action by the County's Board of Supervisors and additional environmental documentation.

In order to evaluate the reasonably foreseeable ramifications of the curfew's elimination on operations at the Airport, a survey of airports similar to JWA was conducted to estimate what the day/evening/night mix for the Airport would be if the curfew were not in place. Details of the survey are discussed in the *Noise Analysis Technical Report*, (Appendix C, Section 6.1.1). Based on the survey data, a mix of 75 percent day, 14 percent evening, and 11 percent night operations was determined to be realistic for Alternative C, Phases 2 and 3.

The flight tracks and runway use developed for the existing condition (2013) case were used for all future scenarios. Runway use at the Airport is based on aircraft size, with commercial aircraft and large jets using Runway 19R and smaller general aviation aircraft using runway 19L. There is no reason to believe that this will change in the future as it is primarily driven by the relative size of the two runways. Flight tracks into and out of JWA are well established, particularly with the Airport's noise-abatement procedures. There also is no reason to believe that the flight paths will change substantially in the future.

TRAFFIC NOISE

The analysis of traffic noise impacts is evaluated based on two criteria:

1. the change in traffic noise (increase or decrease) attributable to traffic generated by the Project; and,
2. the absolute traffic noise level that results with inclusion of traffic from the Project being evaluated in combination with other vehicle traffic.

Both criteria must be exceeded for a significant impact to occur. With respect to Criterion 1, changes in traffic noise levels were calculated based on the changes in traffic volumes.[4] Traffic volumes used to calculate traffic noise level changes for the Project are included in the Project's traffic study described in Section 4.8 of this EIR and in Appendix C, Section 3.2.

The calculation of relative noise levels contains an inherent assumption that the mix of traffic (i.e., autos and trucks) is the same in the without-Project and with-Project scenarios being compared. Here, there is no reason to believe that future changes in the traffic mix would considerably affect the calculated traffic noise level changes in the Project area. This is because automobiles dominate the traffic noise along arterials when calculated using the standard

[4] Changes in traffic noise are calculated by taking ten times the base 10 logarithm of the ratio of the two traffic volumes of interest. These may be the future and existing traffic volumes or the future traffic volumes with and without the Project/Alternative.

vehicle mix developed by the County (which is based on traffic surveys at 22 arterial intersections). Relative truck volumes would need to change by more than a factor of 2 for the noise level change to vary by 0.4 dB over the assumption that they remain constant. There is no evidence that relative truck volumes would change by even this amount within the project area and even with the addition of truck deliveries.

As discussed below, the calculations of noise level changes determined that there are no road segments that would have noise level increases with the Proposed Project or any of its alternatives that would exceed the applicable thresholds. Therefore, there was no requirement to address criterion (2) and calculate absolute traffic noise levels.

4.6.4 EXISTING CONDITIONS

AIRCRAFT OPERATIONS

2013 Aircraft Operations

JWA serves both general aviation and scheduled commercial passenger airline and cargo operations. The 2013 level of service at JWA, which is based on operations through September of 2013, was estimated at 9.17 Million Annual Passengers ("MAP").[5] Under the Phase 2 Commercial Airline Access Plan, the Airport is authorized to serve up to 10.8 MAP. In 2013, there were 263,490 aircraft operations at JWA. Of this, 85,010 were jet air carriers, 5,300 were commercial propeller aircraft, and 22,040 were general aviation jets. The remaining 151,150 were propeller driven general aviation aircraft.

The number of Average Daily Departures ("ADDs") (i.e., the number of daily departures averaged over an entire year) has been the long-standing manner of tabulating jet air carrier operations at JWA. The number of ADDs is the number of annual departures divided by 365 (366 in a leap year). The total number of annual operations (i.e., arrivals and departures) is the ADD multiplied by 2 operations per departure and 365 days per year. The number of air carrier ADDs for 2013 was just over 116. The number of business jet departures was just over 30, and the number of propeller aircraft departures was just over 221 with 214 of these being general aviation aircraft ADDs.

The 116 ADDs include 80 Class A (regulated) and 36 Class E ADDs. The 80 Class A ADDs are 5 fewer than the 85 ADDs allowed by the Settlement Agreement. The average daily departures by airline and aircraft type (fleet mix) using JWA during 2013 is provided in Appendix C (Chapter 4, Existing Noise Environment).

Runway and Flight Track Utilization

The flight tracks at JWA are well established to take advantage of the runway configuration and prevailing wind conditions. Runway 19R/01L is approximately 5,700 feet long and is the only runway suitable for larger aircraft. With winds predominantly coming from the ocean, aircraft depart to the south and arrive from the north about 95 percent of the time with slight variations from year to year. Only during Santa Ana wind conditions does the flow reverse with departures

[5] The estimate of 9.17 MAP was developed as part of the Technical Report: Aviation Forecasts (Appendix B) prepared for this Project. This projection used actual passenger data through August as the basis for projecting passenger levels through the end of 2013. The 9.17 MAP was used as the basis for the technical studies in this EIR since they were initiated prior to the end of 2013. The actual number of passengers served in 2013 was 9.2 MAP.

to the north. During the first 9 months of 2013, the Airport operated in south flow 95.7 percent of the time.

Departures to the south proceed 1 nautical mile and turn left approximately 15 degrees to generally follow Newport Bay. Arrivals use a straight-in approach from the north to Runway 19R, generally lining up with the runway centerline over Anaheim Hills. Additionally, aircraft arriving from the north arrive from the ocean over Huntington Beach on a path that is parallel to JWA, after which a right turn to Runway 19R is commenced. This turn can begin anywhere over a wide area starting at an area near South Coast Plaza all the way to State Route 91 (the Riverside Freeway).

Exhibit 4.6-6 shows the flight tracks used approximately 95 percent of the time by air carrier and other jet aircraft at JWA. Exhibit 4.6-7 shows the combined flight tracks for general aviation and air carrier aircraft.

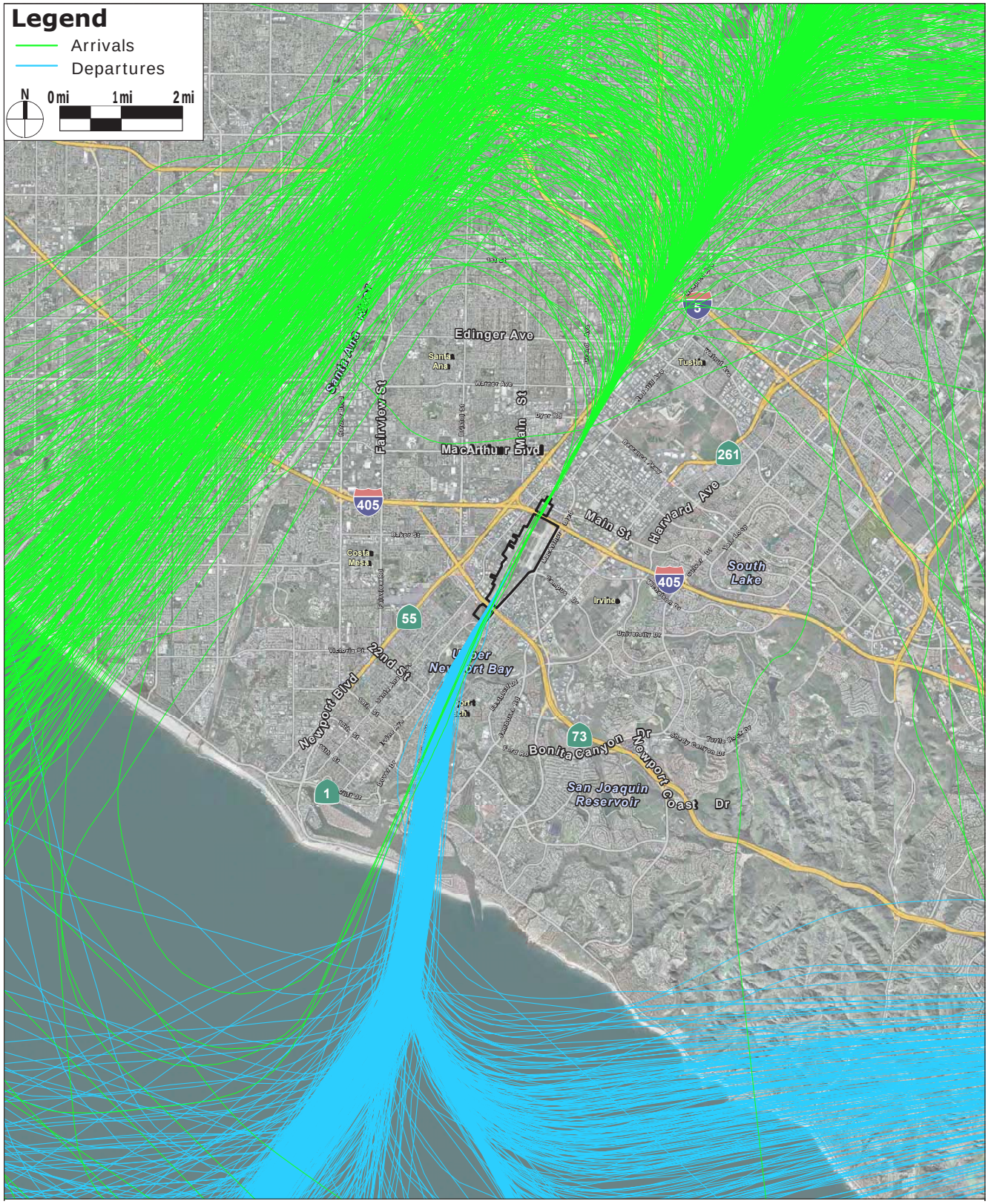
Exhibit 4.6-8 shows the radar altitude profiles for both departures and arrivals. The range in altitudes is due to varying aircraft weights, wind, temperature, and aircraft types.

Time of Day of Operations

The Airport operates under a nighttime restriction. That restriction prohibits air carrier operations before 7:00 AM Monday through Saturday and before 8:00 AM on Sundays. The restrictions also prohibit air carrier departures after 10:00 PM and air carrier arrivals after 11:00 PM (subject to exceptions permitted by the Airport Director). General aviation aircraft may operate at night provided that they meet an 86 dB SENEL noise limit at the noise monitors.

The Airport Director or senior operations staff may authorize a departure or arrival outside of the permitted operations hours only under certain conditions and limitations, including that the flight was scheduled to arrive or depart during the permitted operations hours and was delayed by not more than one-half hour beyond the permitted operations hours by emergency, mechanical, air traffic control, or weather delays substantially beyond the control of the air carrier. (See Access Plan Sections 2.34 and 8.5.2).

Operations data for the year 2013 were examined to determine the number of air carrier operations that occur during the day, evening, and night periods (see Appendix C, Table 8 for the detail on the number of operations by aircraft type in each of the time periods). It should be noted that the air carrier night departures are greater than zero due to aircraft departing just prior to 7:00 AM or just after 10:00 PM. An examination of the database shows that most occurred between 10:00 and 10:01 PM. The rules at JWA use the time of the noise event measured at the NMS to determine compliance with the nighttime prohibitions, not the time of the runway departure. For example, an aircraft may depart the Airport a few seconds before 10:00 PM and generate a noise event after 10:00 PM. That is a violation of the Airport's nighttime restriction and the airline would be subject to sanctions if the operation had not been previously authorized by the Airport.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Typical Air Carrier Flight Tracks

Exhibit 4.6-6

John Wayne Airport Settlement Agreement Amendment

N
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Map not to scale

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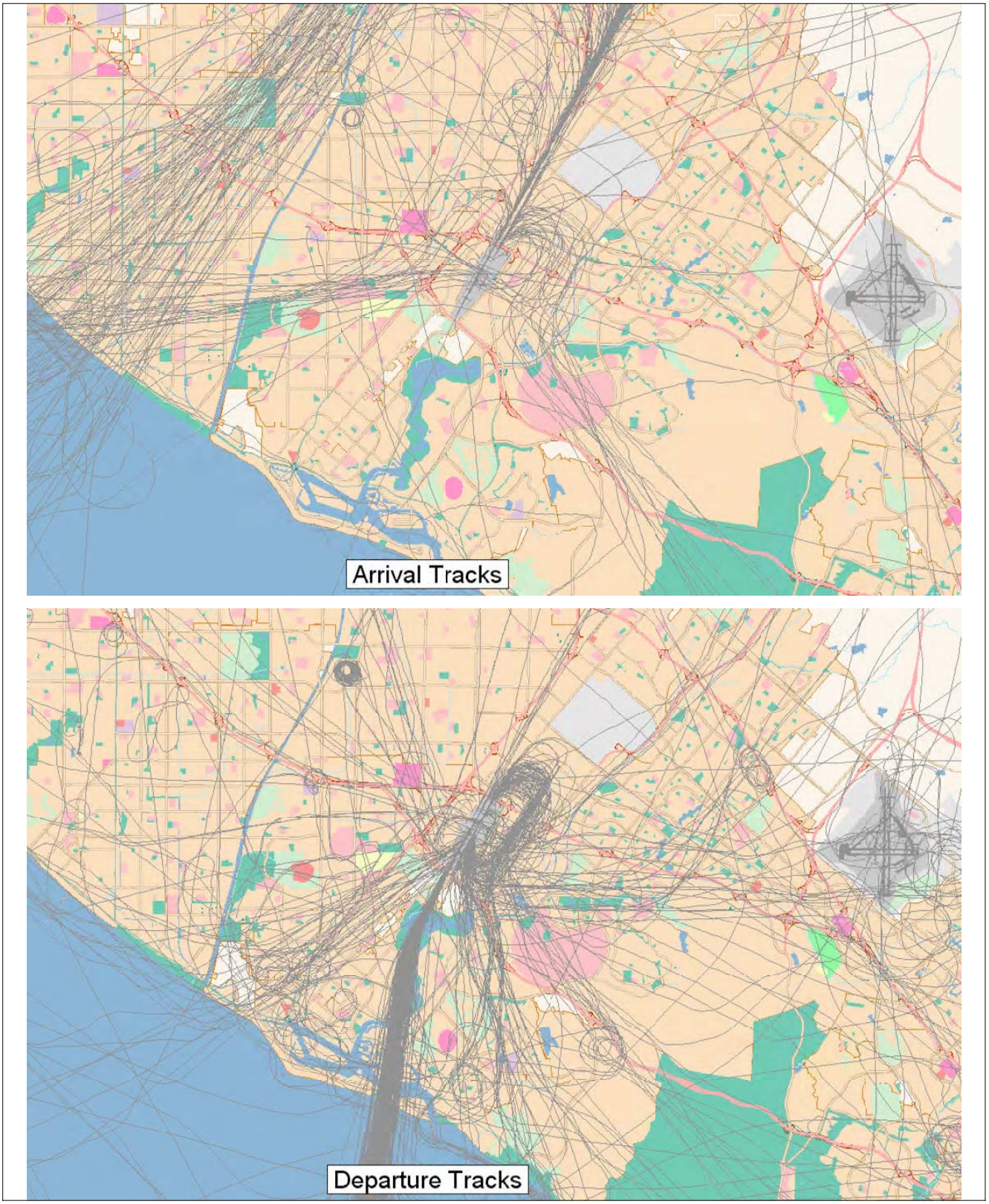

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Radar Tracks for Air Carrier & General Aviation Aircraft

Exhibit 4.6-7

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

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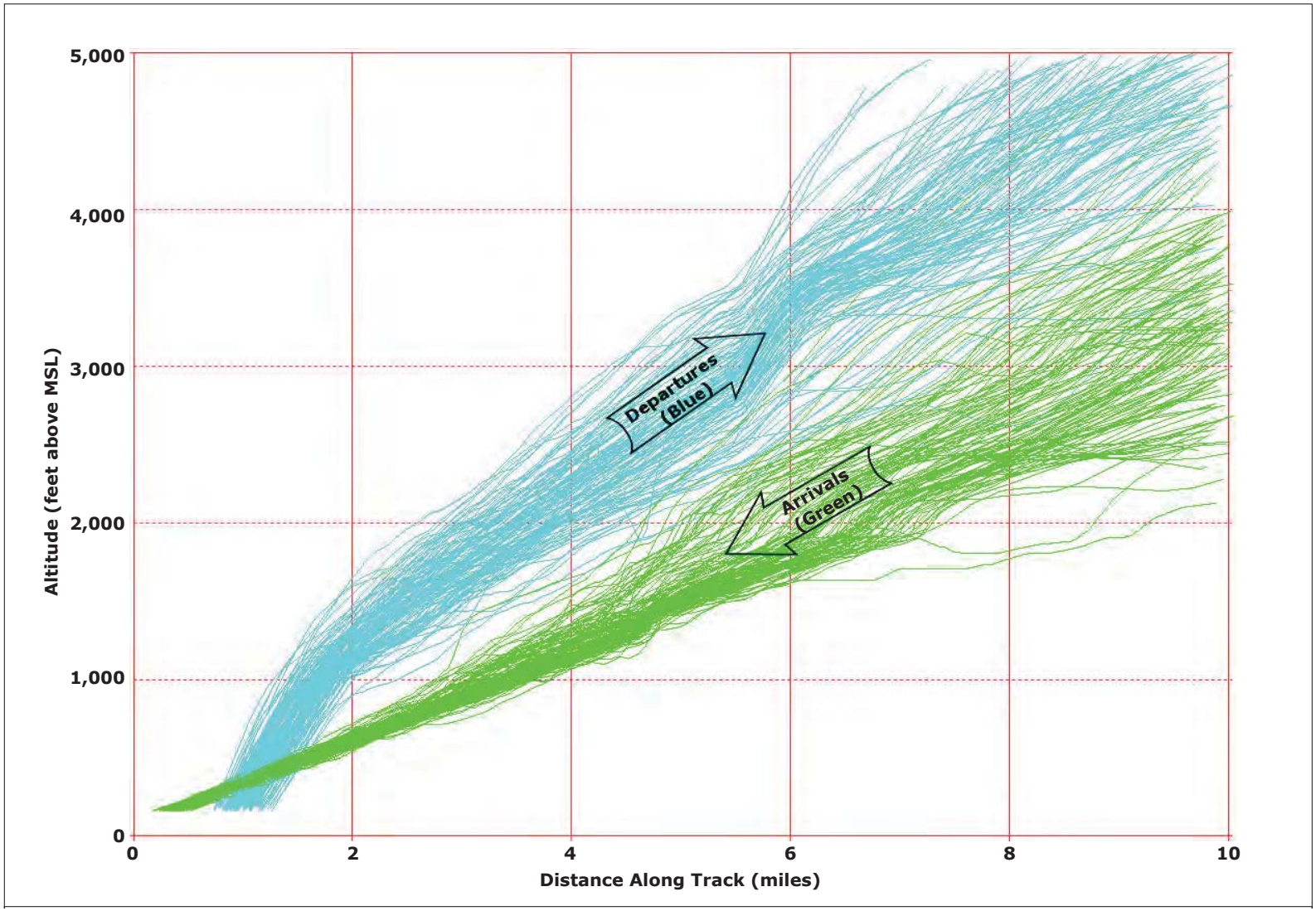

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Typical Aircraft Arrival and Departure Altitudes

Exhibit 4.6-8

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

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AIRCRAFT NOISE

Noise Monitoring Stations

The noise levels of all commercial aircraft operations and many general aviation operations are recorded at ten permanent noise monitoring stations ("NMS") around the Airport. Both CNEL and SENEL are monitored and calculated for each day and each aircraft. In accordance with State of California airport noise standards, a detailed report is compiled every three months summarizing this information, and each year an annual CNEL contour is computer modeled and included in the quarterly report. Noise complaint data is also recorded and analyzed. All of the data for the past three decades is contained in the Noise Abatement Quarterly Reports, which are obtainable from the JWA Access and Noise Office.

The locations of the ten permanent NMS locations are shown in Exhibit 4.6-9. This exhibit also shows the boundaries of the local jurisdictions. Three of the NMS are located in Santa Ana Heights (1S, 2S, and 3S), which has been annexed by the City of Newport Beach; four are located in the City of Newport Beach (4S, 5S, 6S, and 7S); one is in Irvine (8N); one is in Santa Ana (9N); and one is in Tustin (10N).

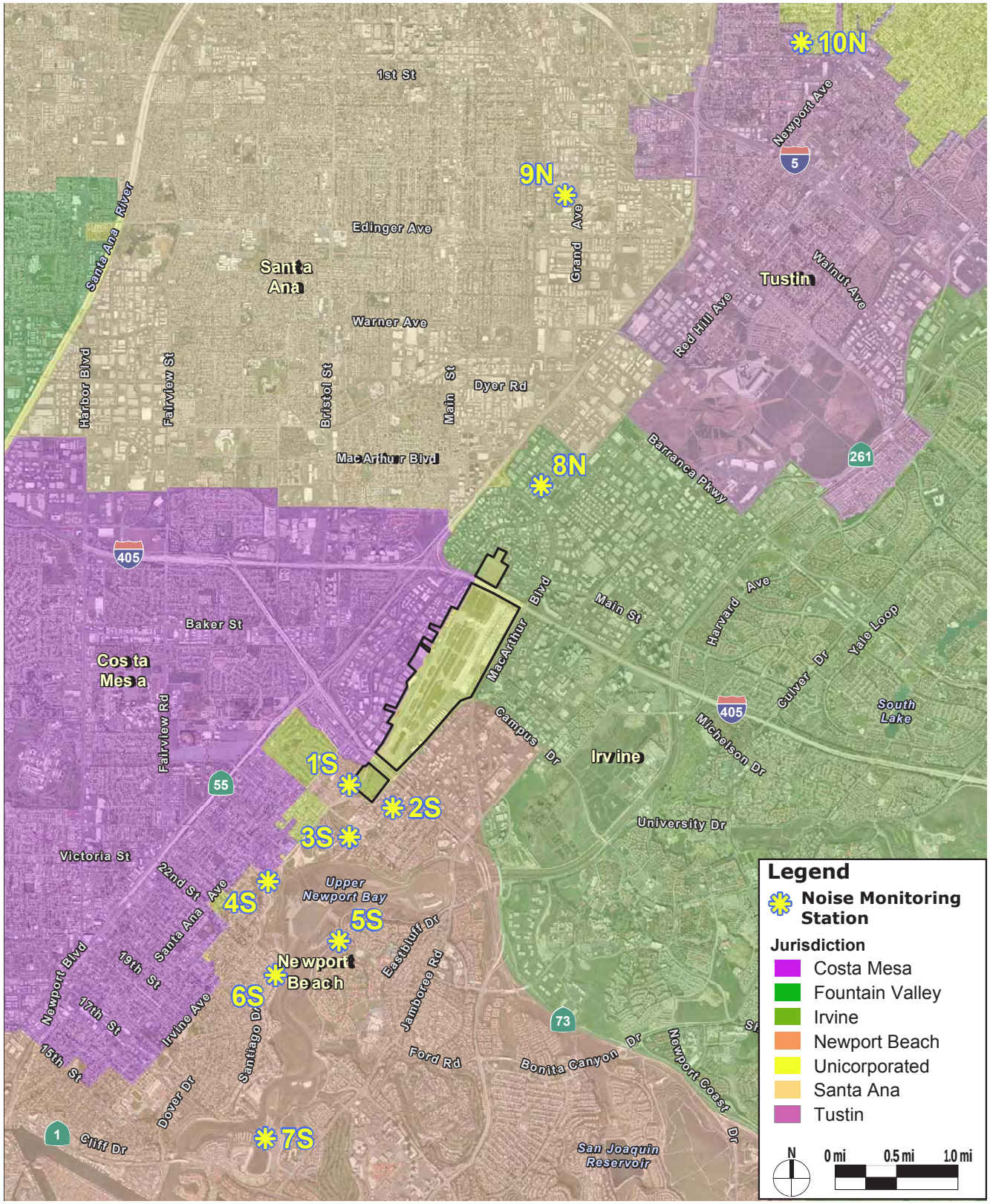
Community Noise Equivalent Level Contours and Land Use Impacts

2013 Baseline

The CNEL contours used to depict existing noise exposure at JWA are derived from the 2013 baseline conditions. They are depicted on Exhibit 4.6-10. The contours were developed by calibrating the results of noise modeling to the measurements from the ten permanent NMS. A description of the geographic parameters of the 2013 baseline contours, as well as their inclusion of any noise sensitive land uses, follows:

- **70 CNEL contour:** 379 acres/0.59 square mile; it includes 1 place of worship, but no other noise-sensitive land uses.
- **65 to 70 CNEL contour:** 561 acres/0.88 square mile; it includes 86 residential dwellings with approximately 215 residents and 2 places of worship, but no other noise-sensitive land uses.
- **60 to 65 CNEL contour:** 1,313 acres/2.05 square miles; it includes 907 residences with approximately 2,628 residents, 6 places of worship, and 6 schools.

In addition to the CNEL contours, specific CNEL values are calculated for each permanent NMS. Table 4.6-4 displays CNEL values at each of the NMS from the noise modeling of existing conditions.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Permanent Noise Monitoring Stations

Exhibit 4.6-9

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

JOHN WAYNE AIRPORT ORANGE COUNTY

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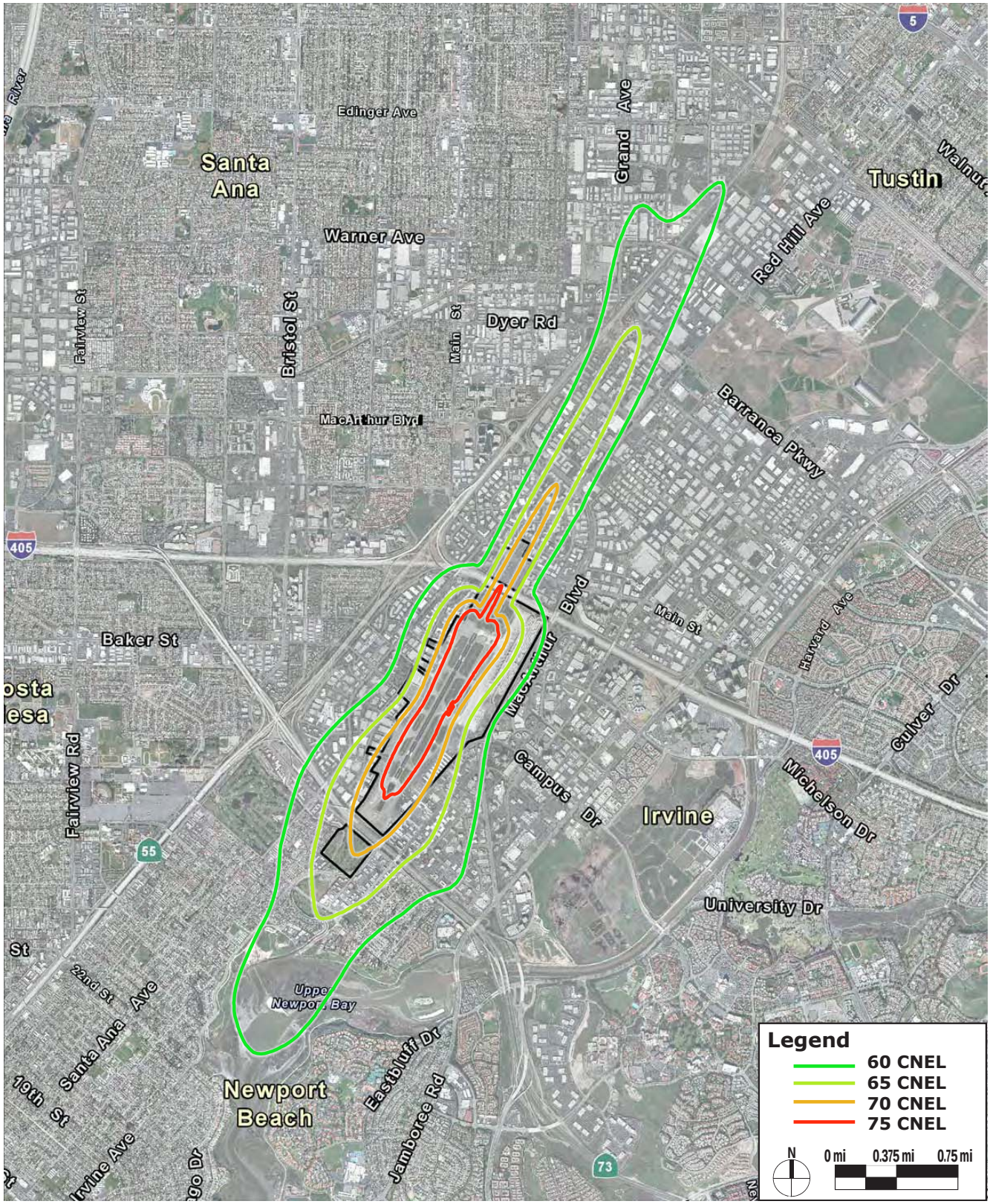

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Existing Conditions

Exhibit 4.6-10

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

(02/18/14 KFD) R:\Projects\JWA\J003\Graphics\EIR\Ex4.6-10_CNELContours.pdf

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TABLE 4.6-4
2013 CNEL AT NOISE MONITORING STATIONS

NMS*	1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
CNEL:	66.2	65.4	64.7	57.5	57.3	58.2	55.8	68.8	51.5	54.1

NMS: Noise Monitoring Stations; CNEL: Community Noise Equivalent Level.

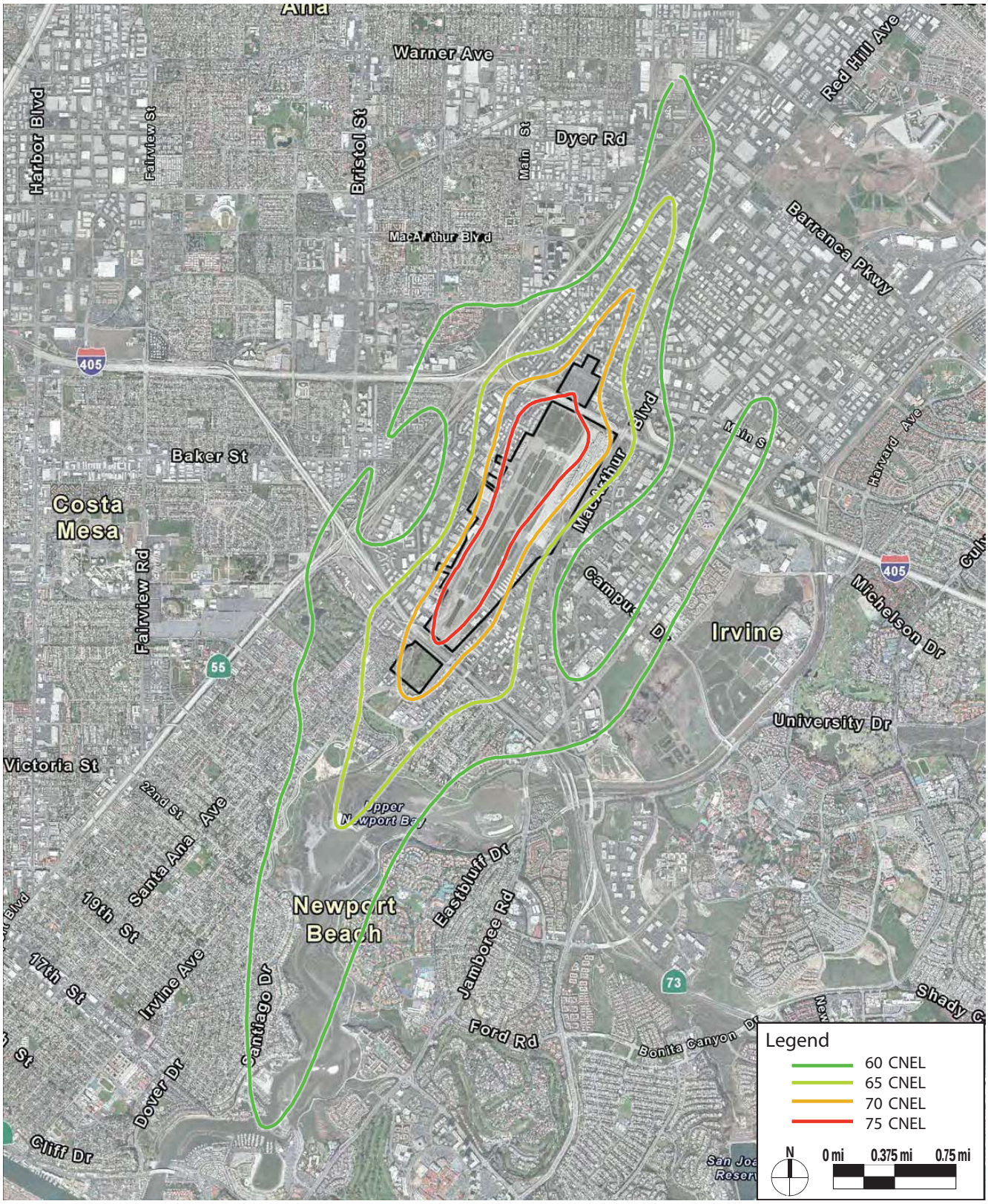
* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Source: *Noise Analysis Technical Report,* Table 6, Landrum & Brown 2014.

1985 Master Plan

The current plan for use of the Airport is the 1985 Master Plan and Compatible Land Use Plan. The Compatible Land Use Plan set forth zoning controls and other mechanisms to make the land uses south of the Airport compatible with the 65 CNEL contour for the Master Plan Project. The CNEL contours contained in EIR 508 and which reflect the impact from the Master Plan Project are displayed on Exhibit 4.6-11a.

The Master Plan noise contours are considerably larger than the existing noise contours presented previously in Exhibit 4.6-10. This is due to a quieter fleet of existing commercial aircraft and a dramatic reduction in the number of general aviation operations. The existing condition contours are contained wholly within the Master Plan contours except for the 65 and 60 CNEL contours to the north, below the primary approach corridor, as shown in Exhibit 4.6-11b. The reason the approach noise contours did not shrink as much as the departure noise (shown in Exhibit 4.6-11c) is due to new technology aircraft engines being much quieter and departure noise dominated by engine noise. Approach noise is a combination of engine noise and airframe aerodynamic noise. The airframe noise (i.e., the noise of air flowing over the body of the aircraft and extended flaps, landing gear, and speed brakes) has not been reduced as much as engine noise.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Airport Master Plan (EIR 508)

Exhibit 4.6-11a

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

(02/18/14 KFD) R:\Projects\JWA\J003\Graphics\EIR\Ex4.6-11a_CNELAMP.pdf

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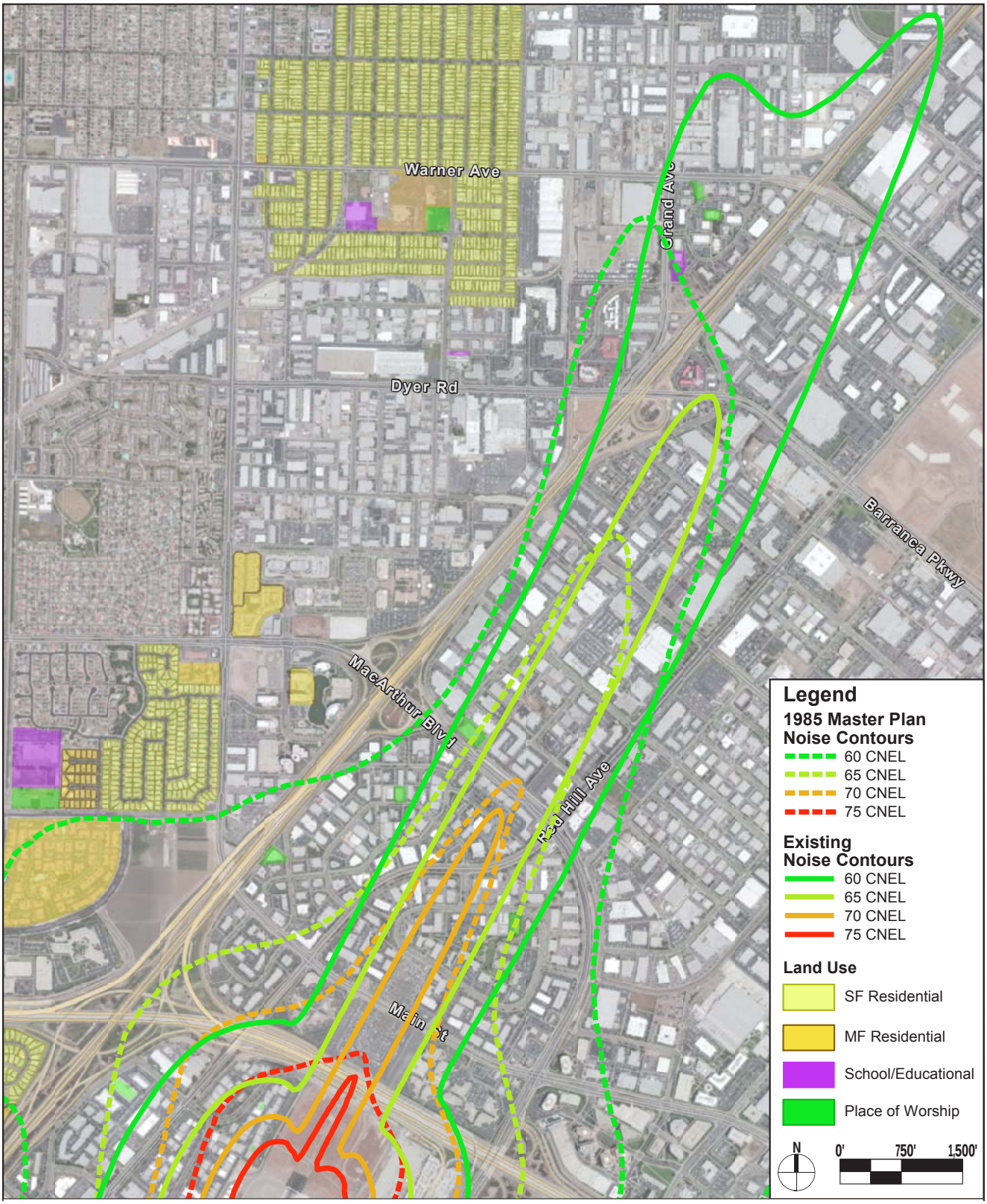

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Comparison of 1985 Master Plan and Existing Approach Noise Contours

Exhibit 4.6-11b

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

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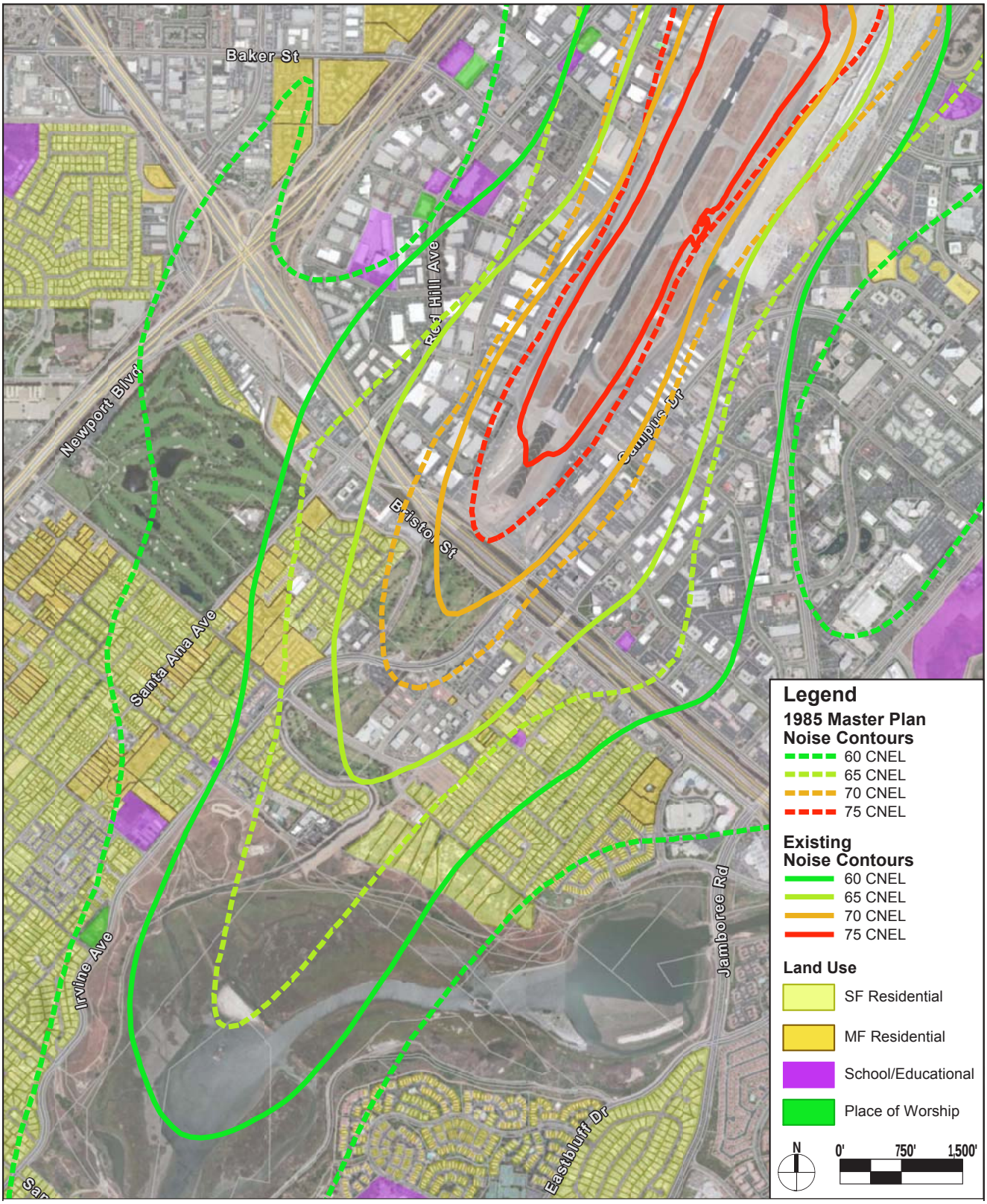

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Comparison of 1985 Master Plan and Existing Departure Noise Contours

Exhibit 4.6-11c

John Wayne Airport Settlement Agreement Amendment

Map not to scale

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For purposes of comparison, the Master Plan and Existing Condition contours compare as follows:

- **60 and 65 CNEL contour:** Master Plan contours are 114 percent larger than the Existing Condition contours. As allowed by the Master Plan, the area outside the Airport boundaries that would be exposed to noise levels in the 60 to 65 dB CNEL range is 125 percent larger than the currently exposed area.

- **65 and 70 CNEL contour:** Master Plan contours are almost 50 percent larger than the Existing Condition contours. As allowed by the Master Plan, the area outside the Airport boundaries that would be exposed to the 65 to 70 dB CNEL noise levels is 80 percent larger than the currently exposed area.

- **70+ CNEL contour:** Master Plan contours are 80 percent larger than the Existing Condition contours. As allowed by the Master Plan, the area outside the Airport boundaries that would be exposed to noise levels that exceed 70 dB CNEL is 311 percent larger than the currently exposed area.

Measured Noise Levels 2001-2012

Table 4.6-5 shows measured noise levels at noise monitoring stations for each year from 2001 through 2012. Noise levels over the period generally were unchanged or showed a slight decreasing trend.

TABLE 4.6-5
LONG TERM MEASURED AIRCRAFT NOISE LEVELS 2001-2012
VALUES IN dB CNEL AT EACH STATION

Q-1 thru Q-4	Noise Monitoring Stations									
	1S	**2S**	**3S**	**4S**	**5S**	**6S**	**7S**	**8N**	**9N**	**10N**
2012	66.2	65.4	64.6	57.7	57.0	58.6	54.6	67.0	44.7	55.3
2011	66.5	65.3	64.1	57.2	56.8	58.4	54.0	67.2	44.0	55.3
2010	66.6	65.4	64.3	57.1	57.4	58.3	54.1	67.4	43.0	55.8
2009	66.4	65.1	64.2	57.3	56.5	58.3	52.6	67.2	42.7	55.7
2008	67.0	65.5	65.0	57.9	57.1	59.2	55.1	68.0	43.8	56.5
2007	67.6	66.0	65.6	58.4	57.7	59.8	55.6	68.7	45.0	57.1
2006	67.5	66.0	65.6	58.4	57.7	59.7	55.9	68.7	45.8	57.1
2005	67.8	66.8	66.0	59.1	58.9	60.6	57.9	68.7	49.9	57.3
2004	67.9	66.8	66.0	59.5	59.9	60.5	57.7	68.4	51.8	57.1
2003	66.9	65.8	64.9	58.7	58.7	59.8	57.8	68.4	52.6	57.1
2002	66.7	66.0	64.7	58.9	58.3	59.3	58.0	68.4	53.2	57.1
2001	66.5	66.5	64.7	59.2	58.2	59.3	58.0	68.4	51.4	57.0

Source: Access & Noise, Noise Levels 2001-2012, JWA 2013

Single Event Noise

SENEL data for JWA varies by aircraft type and noise class (i.e., Class A or Class E). Within each class, airlines operate at different weights depending on destination and load factor. The Airport collects SENEL data for each operation and these data are stored in the noise monitoring system. Table 4.6-6 presents the average number of daily air carrier noise events in 2013 with SENEL levels greater than 85 dBA. This equates to a maximum noise level of approximately 75 dBA. The table shows that the NMS closest to the Airport, 1S, 2S, 3S, and 8N experience considerably more of these events than at the more distant monitoring stations.

TABLE 4.6-6
DAILY AIR CARRIER EVENTS WITH SENEL GREATER THAN 85 dBA

NMS*	1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Events:	111	109	111	43	36	55	13	114	0	3

SENEL: Single Event Noise Exposure Level; dBA: A-weighted decibel; NMS: noise monitoring station

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Source: *Noise Analysis Technical Report,* Table 7,Landrum & Brown 2014.

Additional SENEL data in Appendix A of Appendix C includes: (1) average SENEL for each year from 2003 to 2013 for each airline and aircraft type, and (2) histograms of SENEL data for the ten NMS that were developed to show the distribution of noise levels at each station.

Exhibit 4.6-12 displays typical 85 dB SENEL departure contours for the 6 aircraft most common to JWA: Airbus A300-600 (FedEx), Boeing 737-700, Boeing 737-800, Boeing 757, Airbus A320, and CRJ9 (the largest regional jet). Exhibit 4.6-13 shows the 85 dB SENEL contours for arrivals of these same aircraft.

Time Above Values

TA values were computed for year 2013 at each of the NMS as shown in Table 4.6-7. The values of 65 dBA, 77 dBA, and 85 dBA correlate respectively to speech interference outdoors, indoors with windows open, and indoors with windows closed.

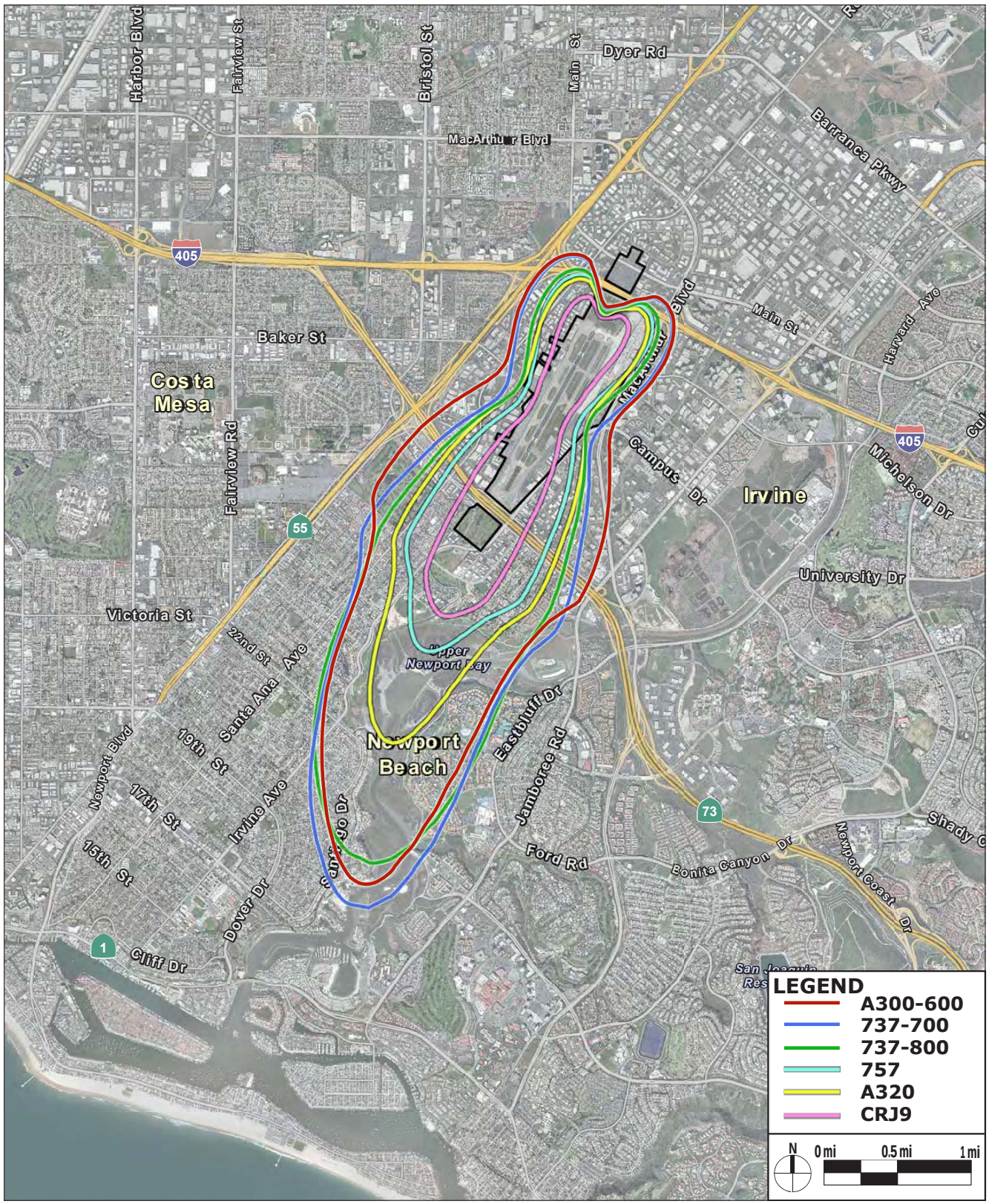
TABLE 4.6-7
TIME ABOVE VALUES FOR EXISTING YEAR 2013 JWA AIRCRAFT OPERATIONS IN AVERAGE MINUTES PER DAY

NMS*	1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
>65 dBA	91.2	87.3	78.5	42.4	44.6	41.7	37.7	58.3	7.6	17.1
>77 dBA	22.5	19.9	17.5	0.0	0.0	0.7	0.1	19.4	0.0	0.0
>85 dBA	2.1	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

JWA: John Wayne Airport; NMS: Noise Monitoring Station; dBA: A-weighted decibel

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Source: *Noise Analysis Technical Report,* Table 9, Landrum & Brown 2014.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Typical 85 dB SENEL Departure Contour

Exhibit 4.6-12

John Wayne Airport Settlement Agreement Amendment

Map not to scale

(02/18/14 KFD) R:\Projects\JWA\J003\Graphics\EIR\Ex4.6-12_Typ85dB.pdf

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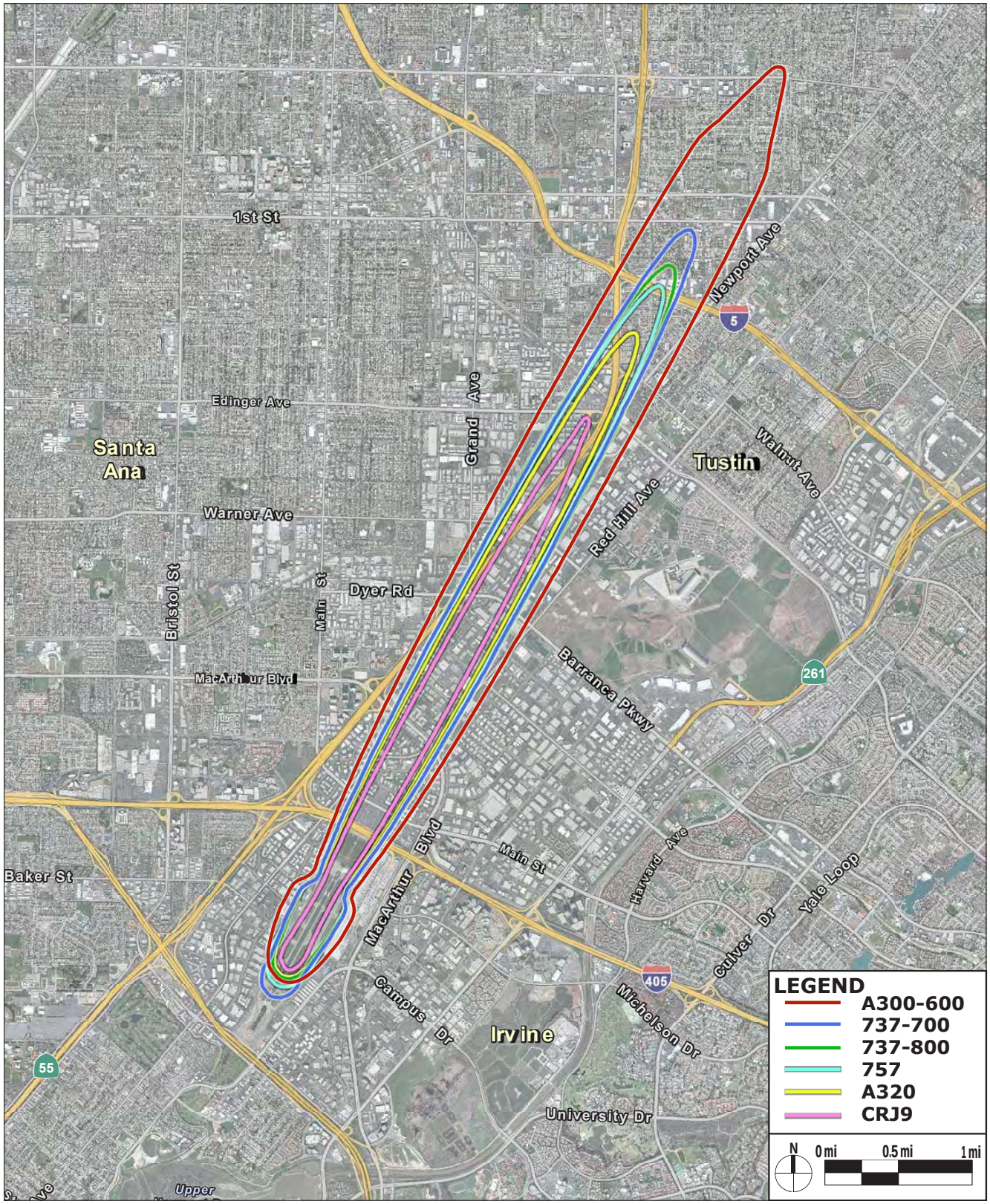

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

Typical 85 dB SENEL Arrival Contours

Exhibit 4.6-13

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

(02/18/14 KFD) R:\Projects\JWA\J003\Graphics\EIR\Ex4.6-13_Typ85dBArrival.pdf

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Table 4.6-7 shows that the NMS nearest the departure end of the runway (NMS 1, 2, and 3) are exposed to the highest noise levels for the longest periods of time. These are the only NMS where 85 dBA is exceeded and where aircraft noise could interfere with indoor speech communication in a building with closed windows. The table shows that this occurs for 36 seconds each day at NMS 2 and 3 and for 2.1 minutes each day at NMS 1.

The table also shows that aircraft noise does not exceed 77 dBA at NMS 4, 5, 9, or 10. Aircraft noise exceeds 77 dBA for less than a minute at NMS 6 and 7 and between 17 and 23 minutes per day at NMS 1, 2 and 3, and 8. This is the amount of time that aircraft noise could interfere with indoor speech communication in a building with open windows. Note that NMS 8 is located in a commercial/light industrial area with buildings that typically do not include operable windows.

Aircraft noise exceeding 65 dBA potentially interferes with outdoor speech communication. Table 4.6-7 shows that this occurs for between 78 and 91 minutes per day at NMS 1, 2 and 3; 58 minutes per day at NMS 8; between 37 and 45 minutes at NMS 4, 5, 6, and 7; and between 7 and 17 minutes per day at NMS 9 and 10.

4.6.5 THRESHOLDS OF SIGNIFICANCE

The NOP (provided in Appendix A) identified three checklist questions pertaining to noise that needed to be addressed in the EIR. The questions as set forth in CEQA Appendix G, does not identify specific quantitative values for determining an impact. Therefore, to facilitate the evaluation of the impact, the thresholds have been supplemented with applicable quantitative policies used to define when an impact would be considered to be significant.

Based on that effort, the Proposed Project or Alternative would result in a significant noise impact if it would:

Threshold 4.6-1 Generate aircraft noise that would cause any one of the following noise increases:

- A noise increase of 1.5 CNEL or more at a sensitive receptor where the existing exposure is 65 CNEL or above.
- A noise increase of 3.0 CNEL or more at a sensitive receptor where the existing exposure is between 60 and 65 CNEL.
- A noise increase of 5.0 CNEL or more at a sensitive receptor where the existing exposure is between 45 and 60 CNEL.
- A noise increase at a sensitive receptor in the City of Newport Beach exceeding the values in Newport Beach General Plan Policy N1.8 (see Table 4.6-3).

Threshold 4.6-2 Generate aircraft noise that would increase noise levels at exterior use areas of residences, schools, or places of worship to noise levels of 65 CNEL or above or interior areas of residences, schools, or places of worship to noise levels of 45 CNEL or above.

Threshold 4.6-3 Generate traffic noise that would cause any one of the following noise increases:

- A noise increase of 1.5 CNEL or more at a sensitive receptor where the existing exposure is 65 CNEL or above.
- A noise increase of 3.0 CNEL or more at a sensitive receptor where the existing exposure is between 60 and 65 CNEL.
- A noise increase of 5.0 CNEL or more at a sensitive receptor where the existing exposure is between 45 and 60 CNEL.
- A noise increase of any magnitude at a sensitive receptor in the City of Newport Beach if the noise level is 75 CNEL or greater.
- A noise increase at a sensitive receptor in the City of Newport Beach of 1.0 dB or greater where the noise level is less than 75 CNEL, which is the most restrictive noise increase threshold applied by the City of Newport Beach (see Table 4.6-3).

Threshold 4.6-4 Expose persons to or generate excessive groundborne vibration or groundborne noise levels.

4.6.6 IMPACT ANALYSIS

As indicated in Section 1.7, Areas of Controversy, the analyses in this EIR assume the continuation of the existing fleet mix. Given the length of the planning timeframe for the proposed Settlement Agreement extension (through 2030), it is reasonable to assume that there will be interest in introducing newer and next generation aircraft. These newer aircraft may generate less noise than the current fleet at JWA. In addition, since these aircraft accommodate more passengers than aircraft in the current fleet, it may be possible to serve more passengers (within the MAP cap) with fewer operations. Nonetheless, to evaluate the maximum environmental impact, the assumption of no improvement in fleet noise characteristics has been made for this study.

THRESHOLD EVALUATION

Threshold 4.6-1 Would the project generate aircraft noise that would result in:

- **A noise increase of 1.5 CNEL or more at a sensitive receptor where the existing exposure is 65 CNEL or above, or**
- **A noise increase of 3.0 CNEL or more at a sensitive receptor where the existing exposure is between 60 and 65 CNEL, or**
- **A noise increase of 5.0 CNEL or more at a sensitive receptor where the existing exposure is between 45 and 60 CNEL, or**
- **A noise increase at a sensitive receptor in the City of Newport Beach existing exceeding the values in Newport Beach General Plan Policy N1.8?[6]**

[6] As shown in Table 4.6-3, the City of Newport Beach policy establishes the following threshold for determining the significance of noise increases: a 3 dBA increase within the 55-60 CNEL contour; a 2 dBA increase within the 60-65 CNEL contour; a 1 dBA increase within the 65-75 CNEL contour; and any increase over 75 CNEL.

Note that both the County of Orange and the City of Newport Beach standards are applicable to the assessment of impacts within the City of Newport Beach. However, the City of Newport Beach standards are more restrictive and therefore determine the significance of the noise impact.

Proposed Project

Noise impacts for the Proposed Project were calculated using the INM modeling as described in Section 4.6.3, Methods. The numbers of Class A and Class E ADDs for each phase are shown in Table 4.6-8. The departures by aircraft type (fleet mix) are tabulated in Appendix C (Section 6.1.1, Operations, Fleet Mix, Stage Length and Load Factors). The results of the modeling are shown in Table 4.6-9. In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns of the table, a **bold** entry indicates an noise level increase exceeding a significance threshold.

TABLE 4.6-8
PROPOSED PROJECT MILLION ANNUAL PASSENGERS
AND AVERAGE DAILY DEPARTURES

		Proposed Project Phase		
	Existing	**1**	**2**	**3**
MAP	9.17	10.8	11.8	12.5
Average Daily Departures				
Class A	80	85	95	95
Class E	36	60.8	63	72.8
Total	**116**	**145.8**	**158**	**167.8**

MAP: Million Annual Passengers.
Source: *Noise Analysis Technical Report,* Table 19, Landrum & Brown 2014.

TABLE 4.6-9
PROPOSED PROJECT COMMUNITY NOISE EQUIVALENT LEVELS
AND CHANGES IN COMMUNITY NOISE EQUIVALENT LEVELS

CNEL Levels					Change in CNEL Over Existing Conditions			
		Proposed Project Phase				Proposed Project Phase		
NMS*	Existing	1	2	3	NMS*	1	2	3
1S	66.2	**66.6**	**66.9**	**67.1**	1S	0.4	0.7	0.9
2S	65.4	**65.8**	**66.1**	**66.4**	2S	0.4	0.7	**1.0**
3S	64.7	64.7	**65.0**	**65.1**	3S	0	0.3	0.4
4S	57.5	57.8	58.1	58.4	4S	0.3	0.6	0.9
5S	57.3	57.4	57.7	57.9	5S	0.1	0.4	0.6
6S	58.2	58.2	58.5	58.6	6S	0	0.3	0.4
7S	55.8	55.9	56.2	56.4	7S	0.1	0.4	0.6
8N	68.8	**69.5**	**69.9**	**70.1**	8N	0.7	1.1	1.3
9N	51.5	52.3	52.6	52.9	9N	0.8	1.1	1.4
10N	54.1	54.8	55.1	55.3	10N	0.7	1	1.2

CNEL: Community noise Equivalent Level; NMS: Noise monitoring stations.

Bold: In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns, **bold** indicates an increase exceeding a significance threshold.

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

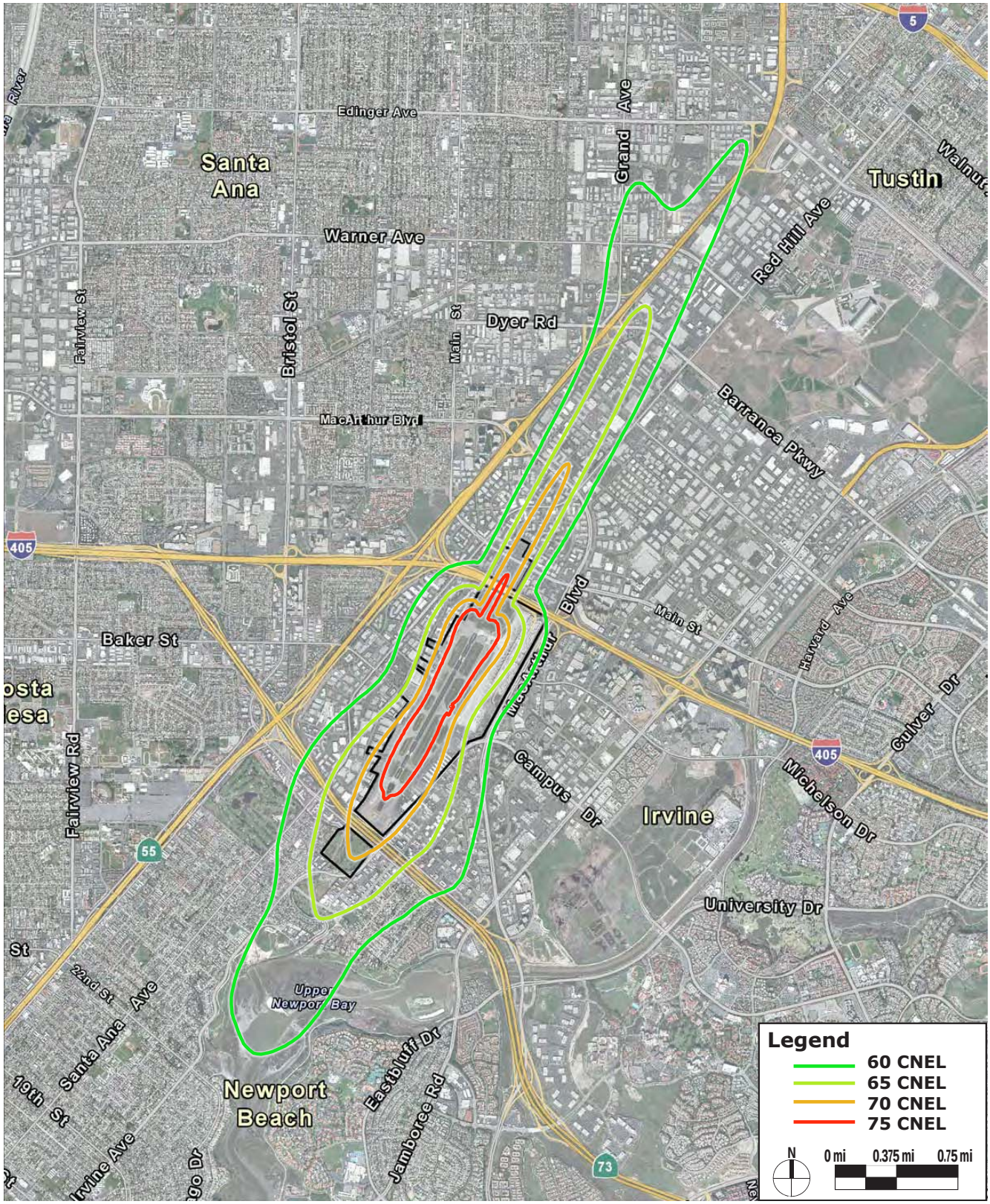
Source: *Noise Analysis Technical Report,* Tables 20 and 21, Landrum & Brown 2014.

Phase 1

The calculated CNEL levels for Phase 1 of the Proposed Project and the change in CNEL compared to the existing conditions are shown in Table 4.6-9. The CNEL contours for Phase 1 are shown in Exhibit 4.6-14. Under Phase 1 conditions, all noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.

Phase 2

The calculated CNEL levels for Phase 2 of the Proposed Project and the change in CNEL compared to the existing conditions are shown in Table 4.6-9. The CNEL contours for Phase 2 are shown on Exhibit 4.6-15. Under Phase 2 conditions, all noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Proposed Project Phase 1

Exhibit 4.6-14

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

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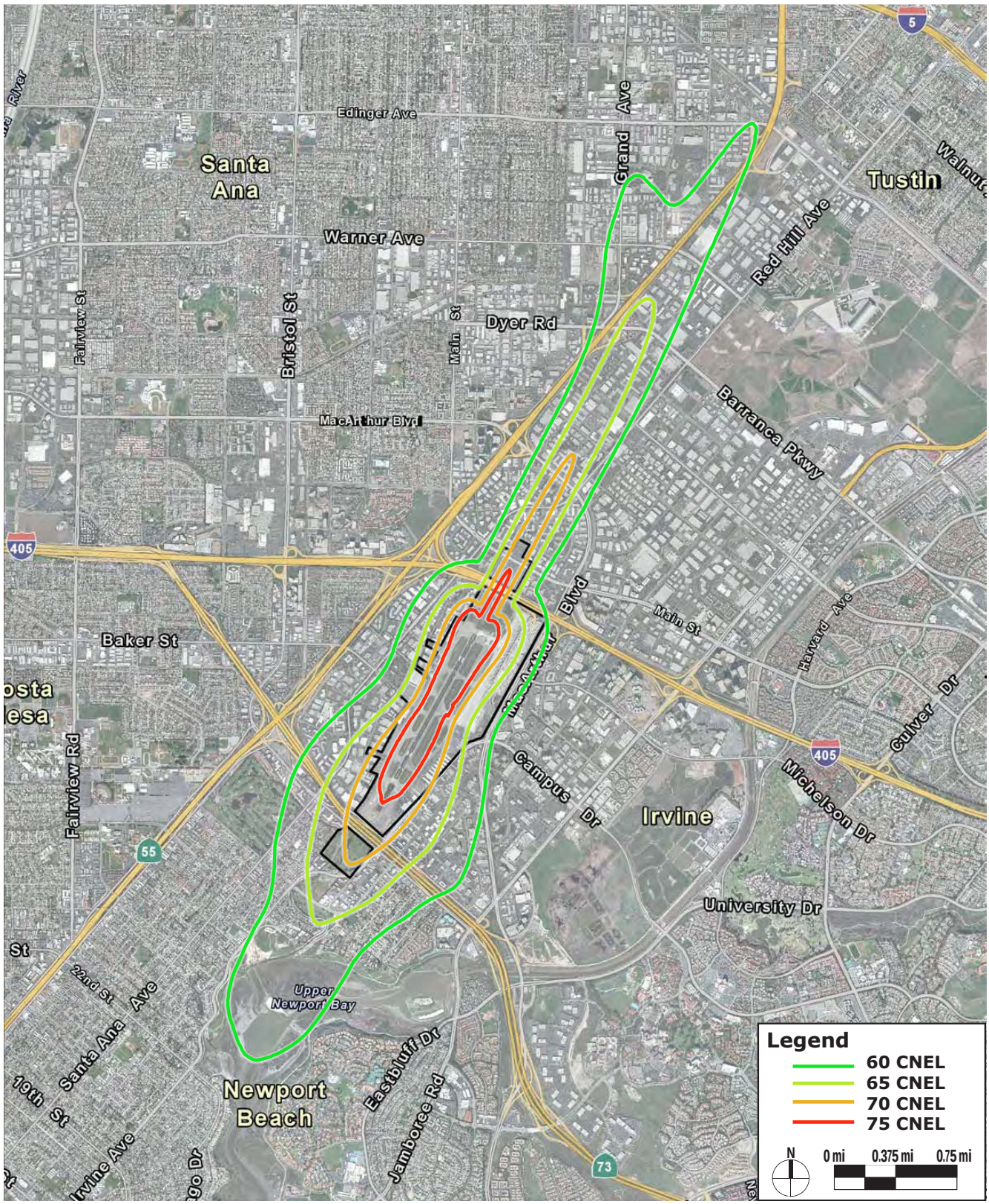

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Proposed Project Phase 2

Exhibit 4.6-15

John Wayne Airport Settlement Agreement Amendment

Map not to scale

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Phase 3

The calculated CNEL levels for Phase 3 of the Proposed Project and the change in CNEL compared to the existing conditions are shown in Table 4.6-9. The CNEL contours for Phase 3 are shown on Exhibit 4.6-16. Under Phase 3 conditions, all noise level increases would be less than 1.5 CNEL. Therefore, there would be no exceedance of the FAA or County of Orange standards. There would be an increase of 1.0 CNEL at NMS 2S in the Santa Ana Heights community of Newport Beach where the forecasted noise level is 66.4 CNEL. This increase equals the City of Newport Beach significance threshold and would be a significant impact.

Impact Conclusion: *The Proposed Project would have a less than significant impact for all phases for noise increases determined by FAA and County of Orange standards. In accordance with Newport Beach Standards, Phase 3 of the Proposed Project would result in a significant noise impact at NMS 2S in the City of Newport Beach.*

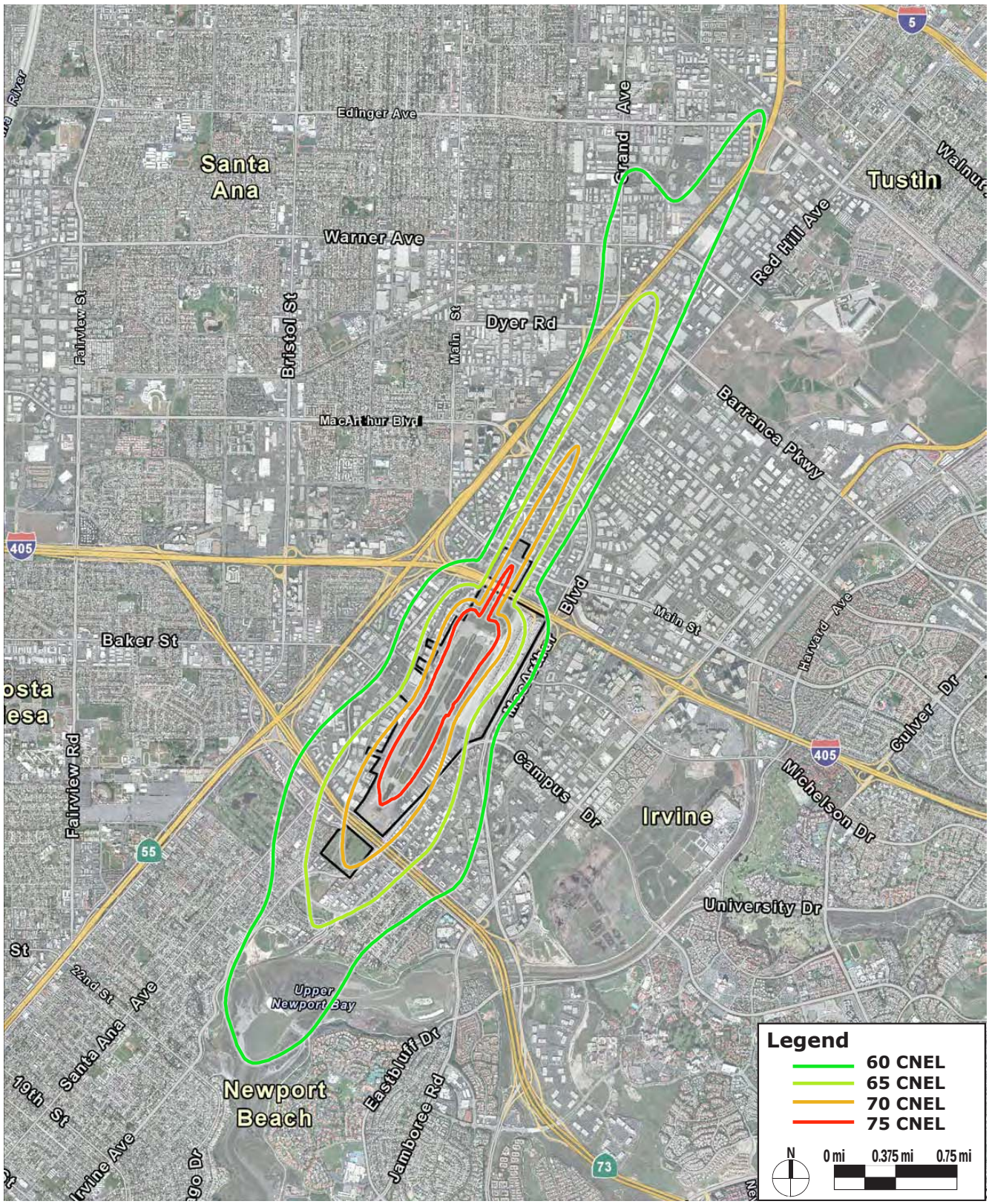
Alternative A

Noise impacts for Alternative A were calculated using the INM modeling as described in Section 4.6.3, Methods. The numbers of Class A and Class E ADDs for each phase are shown in Table 4.6-10. The departures by aircraft type (fleet mix) are tabulated in Appendix C, Table 16. The results of the modeling are shown in Table 4.6-11.

TABLE 4.6-10
ALTERNATIVE A MILLION ANNUAL PASSENGERS
AND AVERAGE DAILY DEPARTURES

	Existing	Alternative A Phase		
		1	2	3
MAP	9.17	10.8	11.4	12.8
Average Daily Departures				
Class A	80	107	120	135
Class E	36	34.9	28.1	30
Total	**116**	**141.9**	**148.1**	**165**

MAP: Million annual passengers.
Source: *Noise Analysis Technical Report,* Table 19, Landrum & Brown 2014.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Proposed Project Phase 3

Exhibit 4.6-16

John Wayne Airport Settlement Agreement Amendment

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TABLE 4.6-11
ALTERNATIVE A COMMUNITY NOISE EQUIVALENT LEVELS
AND CHANGES IN COMMUNITY NOISE EQUIVALENT LEVELS

CNEL Levels					Change in CNEL Over Existing Conditions			
NMS*	Existing	Alternative A Phase			NMS*	Alternative A Phase		
		1	2	3		1	2	3
1S	66.2	**66.5**	**66.7**	**67.2**	1S	0.3	0.5	**1**
2S	65.4	**65.7**	**65.9**	**66.4**	2S	0.3	0.5	**1**
3S	64.7	64.8	**65.1**	**65.4**	3S	0.1	0.4	0.7
4S	57.5	57.6	57.8	58.2	4S	0.1	0.3	0.7
5S	57.3	57.4	57.6	58	5S	0.1	0.3	0.7
6S	58.2	58.6	58.9	59.2	6S	0.4	0.7	1
7S	55.8	56.1	56.3	56.7	7S	0.3	0.5	0.9
8N	68.8	**69.4**	**69.5**	**70**	8N	0.6	0.7	1.2
9N	51.5	52.1	52.3	52.7	9N	0.6	0.8	1.2
10N	54.1	54.7	54.9	55.3	10N	0.6	0.8	1.2

CNEL: Community Noise Equivalent Levels; NMS: Noise monitoring stations.

Bold: : In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns, **bold** indicates an increase exceeding a significance threshold.

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

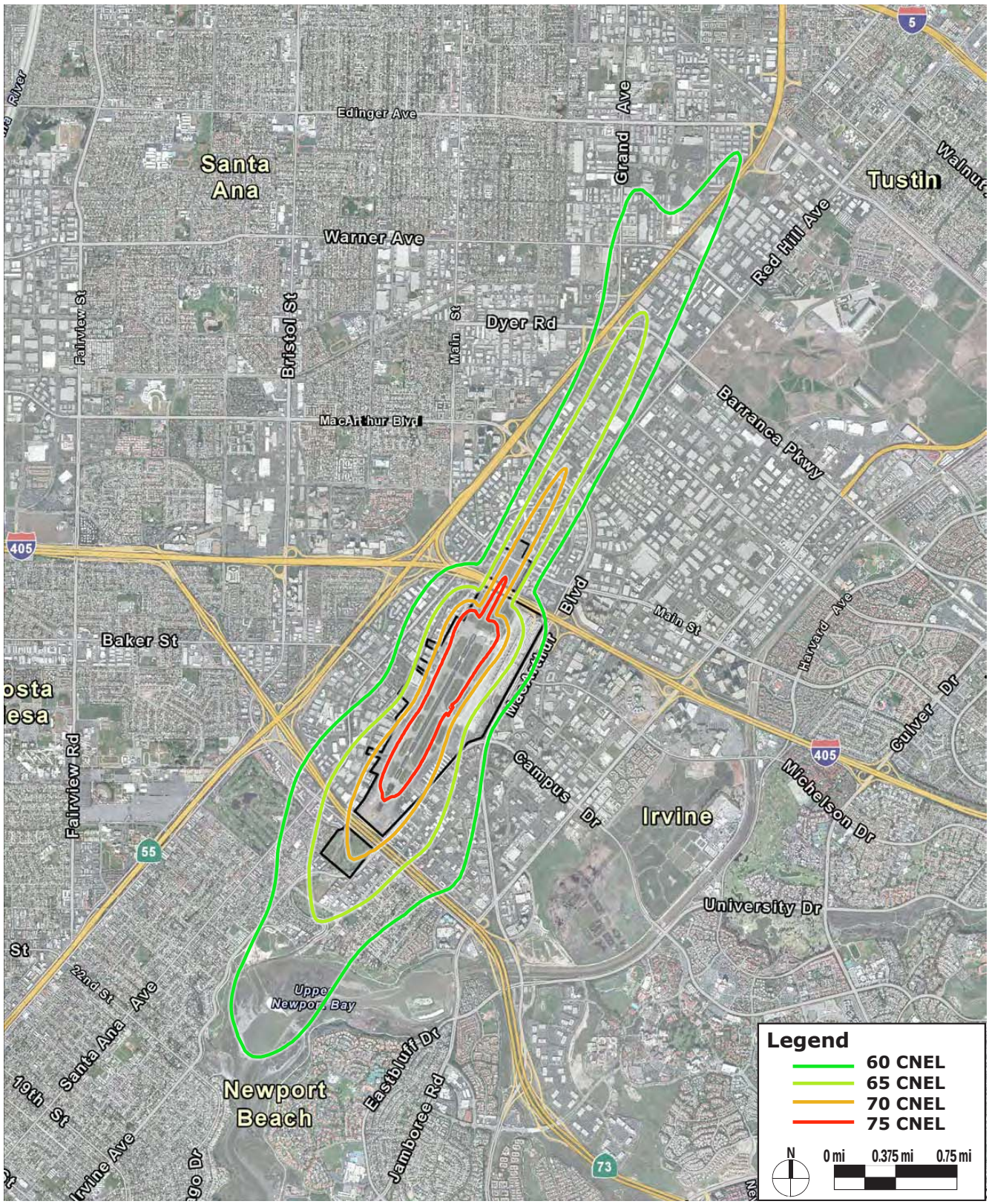
Source: *Noise Analysis Technical Report,* Tables 20 and 21, Landrum & Brown 2014.

Phase 1

The calculated CNEL levels for Alternative A, Phase 1 and the change in CNEL compared to the existing conditions are shown in Table 4.6-11. The CNEL contours for Alternative A, Phase 1 are shown in Exhibit 4.6-17. Under Phase 1 conditions, all noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.

Phase 2

The calculated CNEL levels for Alternative A, Phase 2 and the change in CNEL compared to the existing conditions are shown in Table 4.6-11. The CNEL contours for Alternative A, Phase 2 are shown in Exhibit 4.6-18. Under Phase 2 conditions, all noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative A Phase 1

Exhibit 4.6-17

John Wayne Airport Settlement Agreement Amendment

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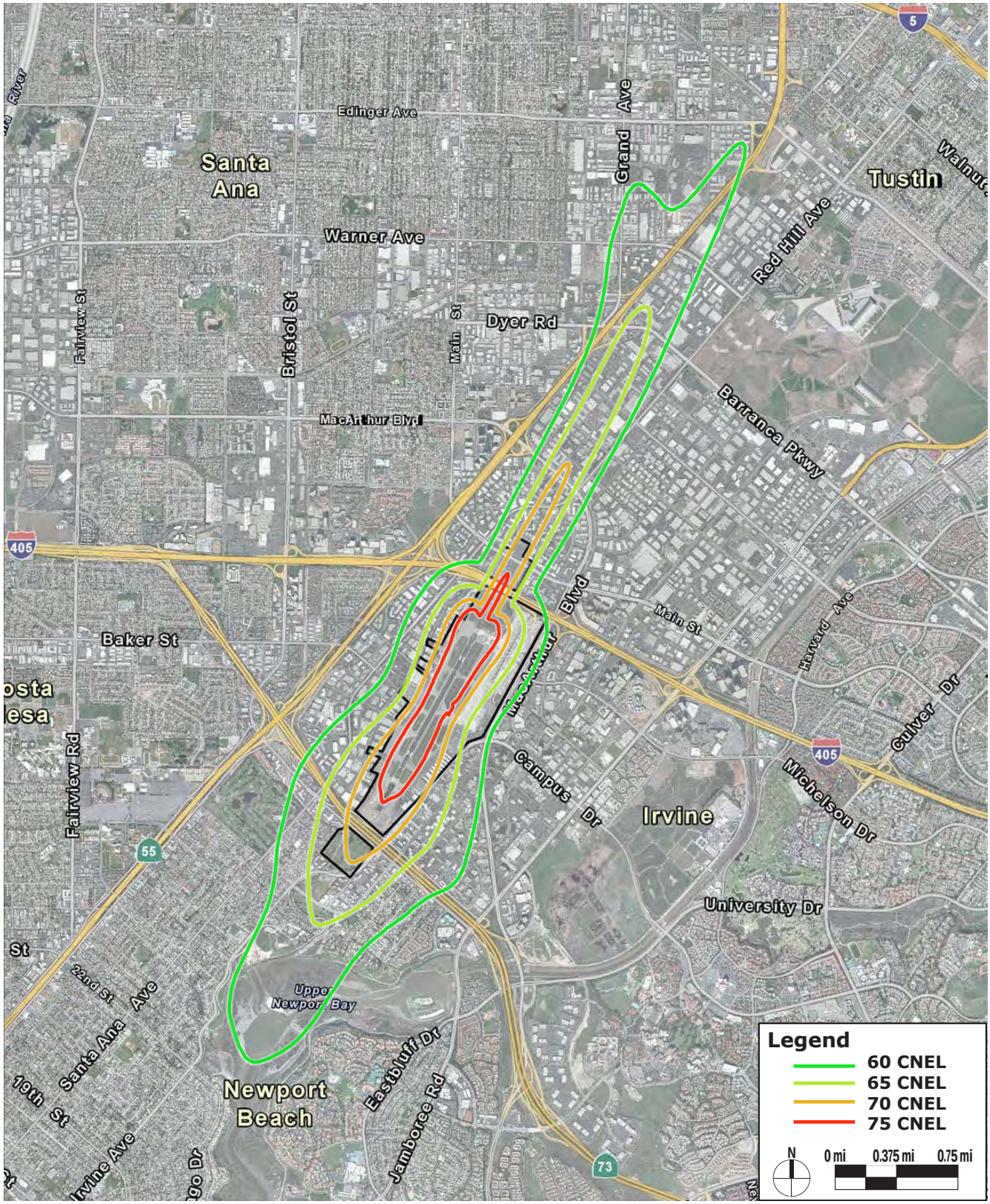

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative A Phase 2

Exhibit 4.6-18

John Wayne Airport Settlement Agreement Amendment

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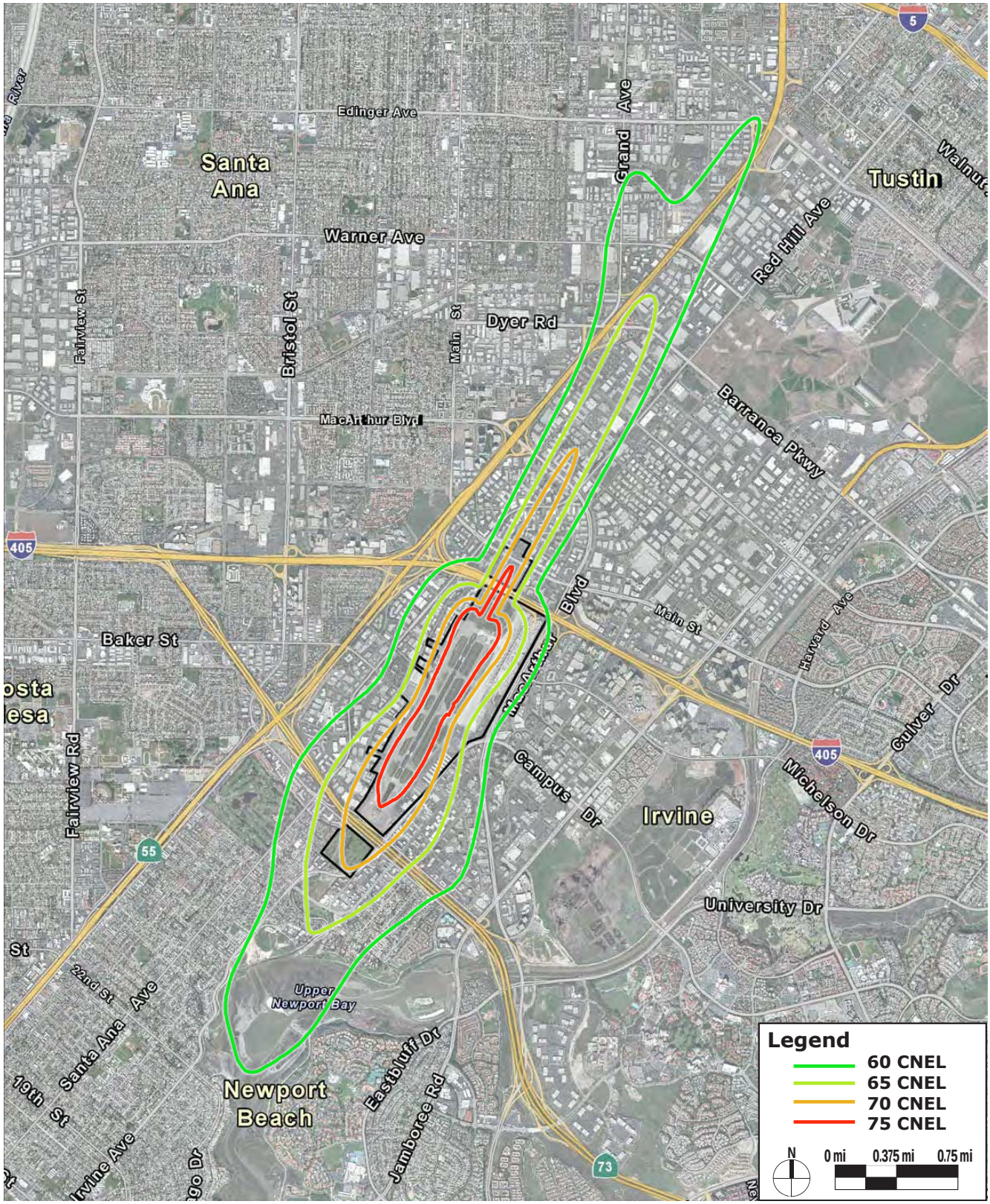
Phase 3

The calculated CNEL levels for Alternative A, Phase 3 and the change in CNEL compared to the existing conditions are shown in Table 4.6-11. The CNEL contours for Alternative A, Phase 3 are shown in Exhibit 4.6-19. Under Phase 3 conditions, all noise level increases would be less than 1.5 CNEL. Therefore, there would be no exceedance of the FAA or County of Orange standards. There would be noise level increases of 1.0 CNEL at NMS 1S and 2S in the Santa Ana Heights community of Newport Beach where the forecasted CNELs are 67.2 and 66.4, respectively; these increases equal the City of Newport Beach significance threshold and would be significant impacts.

Impact Conclusion: *Alternative A would have a less than significant impact for all phases for noise increases determined by FAA and County of Orange standards. In accordance with Newport Beach standards, Phase 3 of Alternative A would result in a significant noise impact at NMS 1S and 2S in the City of Newport Beach.*

Alternative B

Noise impacts for Alternative B were calculated using the INM modeling as described in Section 4.6.3, Methods. The numbers of Class A and Class E ADDs for each phase are shown in Table 4.6-12. The departures by aircraft type (fleet mix) are tabulated in Appendix C (Table 17). The results of the modeling are shown in Table 4.6-13.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative A Phase 3

Exhibit 4.6-19

John Wayne Airport Settlement Agreement Amendment

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TABLE 4.6-12
ALTERNATIVE B MILLION ANNUAL PASSENGERS AND AVERAGE DAILY DEPARTURES

	Existing	Alternative B Phase		
		1	2	3
MAP	9.17	10.8	13	15
Average Daily Departures				
Class A	80	100	110	115
Class E	36	43.2	62.2	84.2
Total	**116**	**143.2**	**172.2**	**199.2**

MAP: Million annual passengers.

Source: *Noise Analysis Technical Report,* Table 19, Landrum & Brown 2014.

TABLE 4.6-13
ALTERNATIVE B COMMUNITY NOISE EQUIVALENT LEVELS AND CHANGES IN COMMUNITY NOISE EQUIVALENT LEVELS

CNEL Levels					Change in CNEL Over Existing Conditions			
		Alternative B Phase				Alternative B Phase		
NMS*	Existing	1	2	3	NMS*	1	2	3
1S	66.2	**66.5**	**67.3**	**67.9**	1S	0.3	**1.1**	**1.7**
2S	65.4	**65.8**	**66.5**	**67.1**	2S	0.4	**1.1**	**1.7**
3S	64.7	64.8	**65.3**	**65.7**	3S	0.1	0.6	**1**
4S	57.5	57.7	58.4	59	4S	0.2	0.9	1.5
5S	57.3	57.4	58	58.5	5S	0.1	0.7	1.2
6S	58.2	58.5	58.9	59.2	6S	0.3	0.7	1
7S	55.8	56	56.6	57	7S	0.2	0.8	1.2
8N	68.8	**69.4**	**70.2**	**70.8**	8N	0.6	1.4	**2**
9N	51.5	52.2	53	53.6	9N	0.7	1.5	2.1
10N	54.1	54.7	55.4	56	10N	0.6	1.3	1.9

CNEL: Community Noise Equivalent Level; NMS: Noise monitoring stations.

Bold: : In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns, **bold** indicates an increase exceeding a significance threshold.

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Source: *Noise Analysis Technical Report,* Tables 20 and 21, Landrum & Brown 2014.

Phase 1

The calculated CNEL levels for Alternative B, Phase 1 and the change in CNEL compared to the existing conditions are shown in Table 4.6-13. The CNEL contours for Alternative B, Phase 1 are shown in Exhibit 4.6-20. Under Phase 1 conditions, all noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.

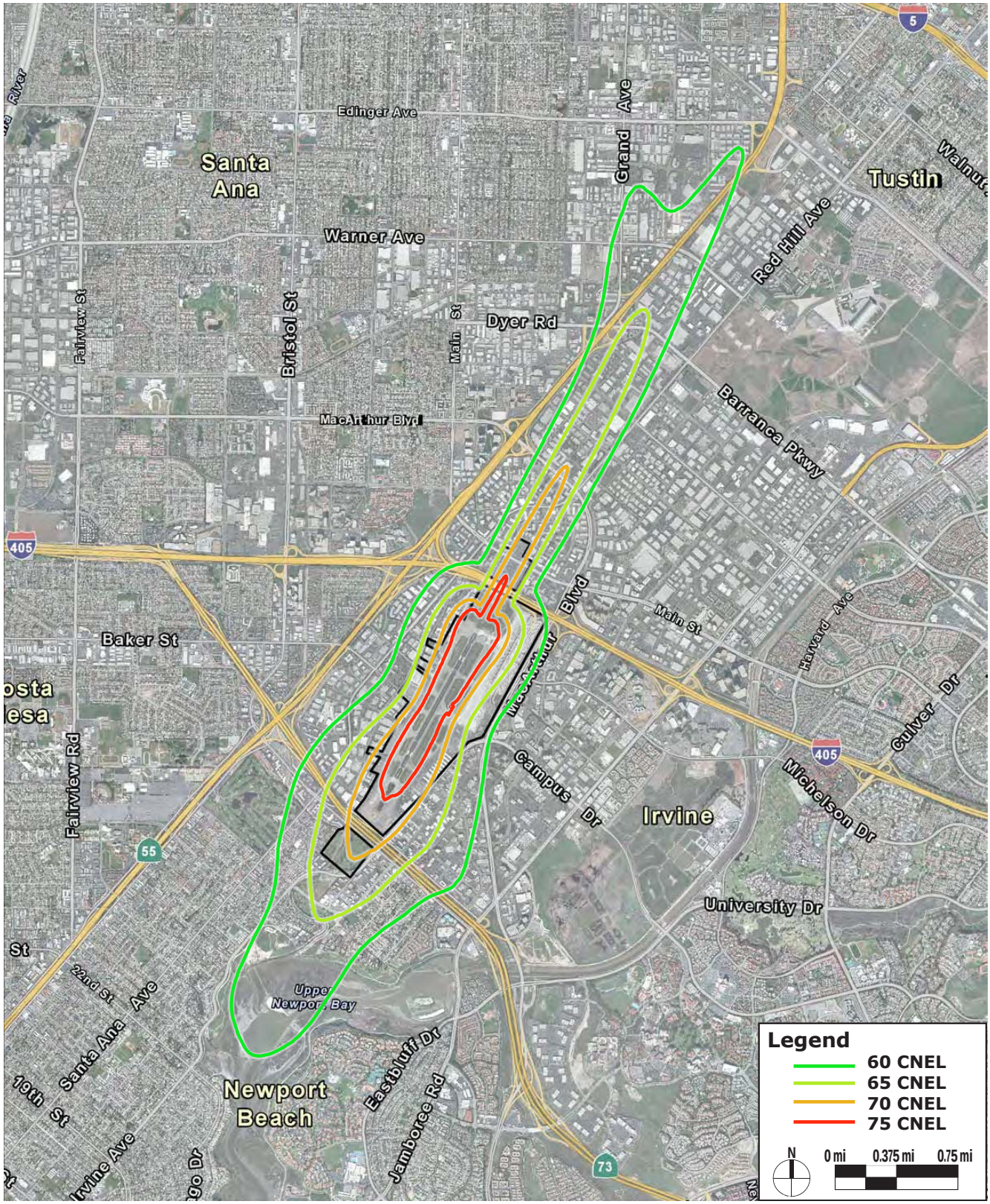
Phase 2

The calculated CNEL levels for Alternative B, Phase 2 and the change in CNEL compared to the existing conditions are shown in Table 4.6-13. The CNEL contours for Alternative B, Phase 2 are shown in Exhibit 4.6-21. Under Phase 2 conditions, all noise level increases would be less than 1.5 CNEL at locations where the CNEL is 65 or greater. Therefore, there would be no exceedance of the FAA or County of Orange standards. There would be noise level increases of 1.1 CNEL at NMS 1S and 2S in the Santa Ana Heights community of Newport Beach where the forecasted CNELs are 67.3 and 66.5, respectively; these increases exceed the City of Newport Beach significance threshold and would be significant impacts.

Phase 3

The calculated CNEL levels for Alternative B, Phase 3 and the change in CNEL compared to the existing conditions are shown in Table 4.6-13. The CNEL contours for Alternative B, Phase 3 are shown in Exhibit 4.6-22. There would be noise level increases of 1.7 CNEL at NMS 1S and 2S in the Santa Ana Heights community of Newport Beach where the forecasted CNELs are 67.9 and 67.1, respectively; these increases exceed the FAA, County of Orange, and Newport Beach significance thresholds and would be significant impacts. There also would be a noise level increase of 1.0 CNEL at NMS 3S in the Santa Ana Heights community of Newport Beach where the forecasted CNEL is 65.7; this increase equals the City of Newport Beach significance threshold and would be a significant impact. There would also be an increase of 2 CNEL as NMS 8N in the City of Irvine where the CNEL is forecasted to be 70.8; however, this would not be a significant impact because there are no sensitive receptors in the vicinity of NMS 8N.

Impact Conclusion: *Alternative B would have a less than significant impact for Phases 1 and 2 for noise increases determined by FAA and County of Orange standards. In accordance with Newport Beach standards, there would be no significant noise impacts for Phase 1; however, significant noise impacts would occur at NMS 1S and 2S for Phase 2. In Phase 3 of Alternative B, significant noise impacts would result at NMS 1S and 2S by FAA, County of Orange, and Newport Beach standards. In addition, NMS 3S would have a significant impact as determined by Newport Beach standards.*



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative B Phase 1

Exhibit 4.6-20

John Wayne Airport Settlement Agreement Amendment

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Map not to scale

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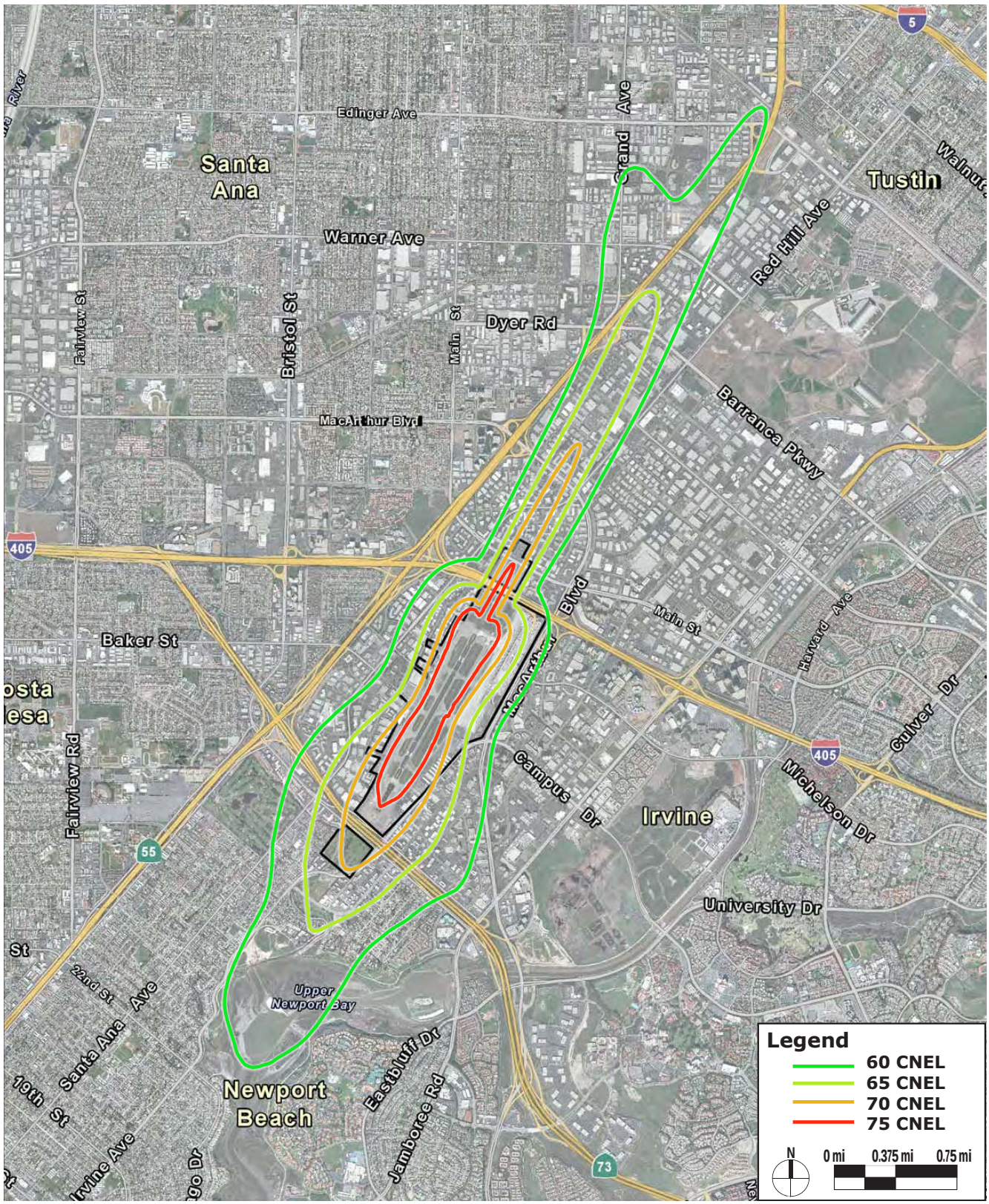

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative B Phase 2

Exhibit 4.6-21

John Wayne Airport Settlement Agreement Amendment

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Map not to scale

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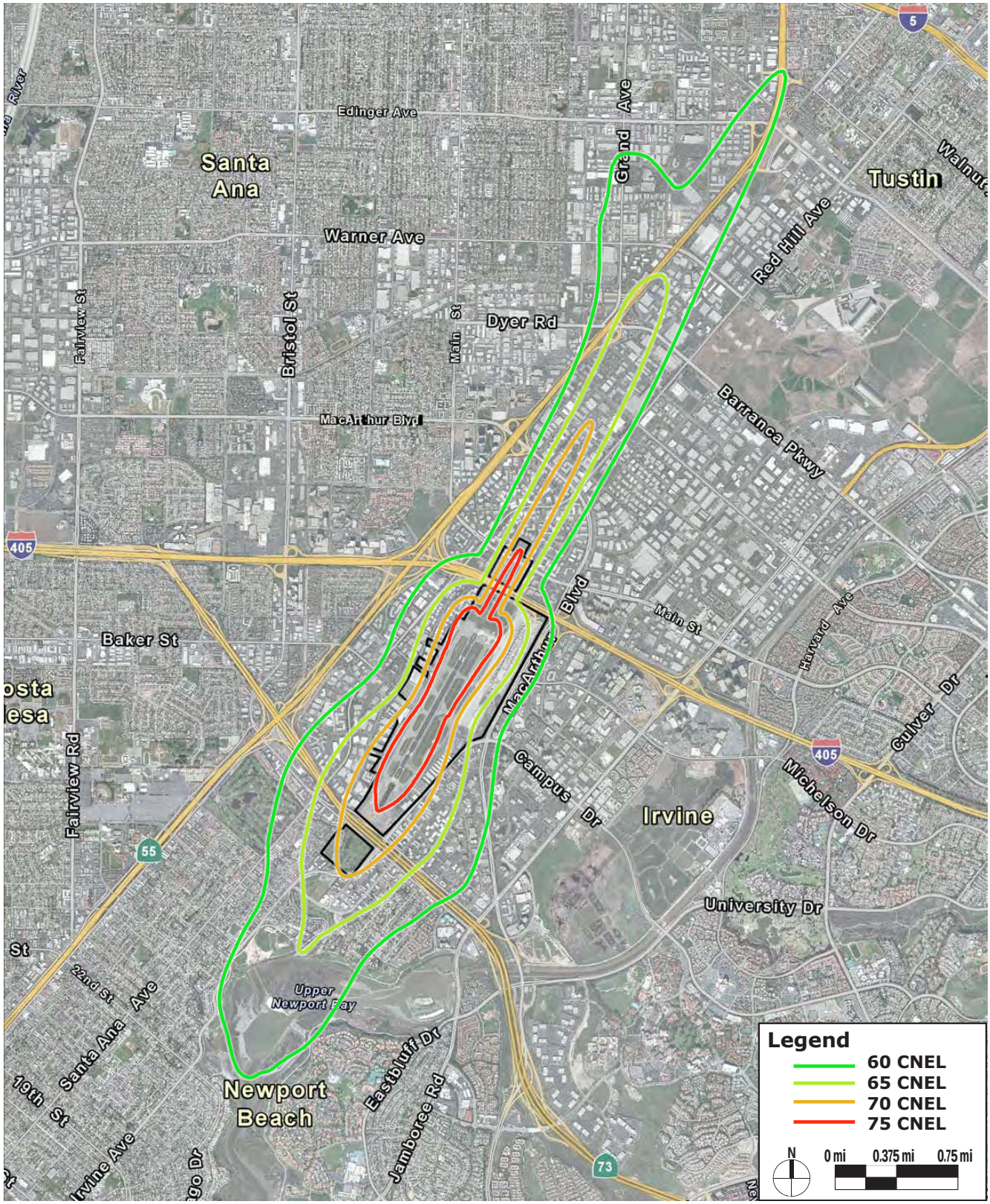

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative B Phase 3

Exhibit 4.6-22

John Wayne Airport Settlement Agreement Amendment

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Alternative C

Noise impacts for the Alternative C were calculated using the INM modeling, as described in Section 4.6.3, Methods. The numbers of Class A and Class E ADDs for each phase are shown in Table 4.6-14. The departures by aircraft type (fleet mix) are tabulated in Appendix C (Table 18). The results of the modeling are shown in Table 4.6-15.

TABLE 4.6-14
ALTERNATIVE C MILLION ANNUAL PASSENGERS
AND AVERAGE DAILY DEPARTURES

	Existing	Alternative C Phase		
		1	2	3
MAP	9.17	16.9	16.9	16.9
Average Daily Departures				
Class A	80	228	228	228
Class E	36	0	0	0
Total	**116**	**228**	**228**	**228**

MAP: Million annual passengers.

Source: *Noise Analysis Technical Report,* Table 19, Landrum & Brown 2014.

TABLE 4.6-15
ALTERNATIVE C COMMUNITY NOISE EQUIVALENT LEVELS
AND CHANGES IN COMMUNITY NOISE EQUIVALENT LEVELS

CNEL Levels					Change in CNEL Over Existing Conditions			
		Alternative C Phase				Alternative C Phase		
NMS*	Existing	1	2	3	NMS*	1	2	3
1S	66.2	**68.6**	**71.2**	**71.2**	1S	**2.4**	**5**	**5**
2S	65.4	**67.8**	**70.3**	**70.3**	2S	**2.4**	**4.9**	**4.9**
3S	64.7	**66.7**	**69.1**	**69.1**	3S	**2**	**4.4**	**4.4**
4S	57.5	59.5	61.9	62	4S	2	**4.4**	**4.4**
5S	57.3	59.3	61.7	61.7	5S	2	**4.4**	**4.4**
6S	58.2	60.6	63	63	6S	**2.4**	**4.8**	**4.8**
7S	55.8	58	60.5	60.5	7S	2.2	**4.7**	**4.7**
8N	68.8	**71.2**	**72**	**72**	8N	**2.4**	**3.2**	**3.2**
9N	51.5	54	54.8	54.8	9N	2.5	3.3	3.3
10N	54.1	56.5	57.5	57.5	10N	2.4	3.4	3.4

CNEL: Community Noise Equivalent Level; NMS: Noise monitoring stations.

Bold: : In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns, **bold** indicates an increase exceeding a significance threshold.

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Note: Though the commercial ADDs stay the same in Phases 2 and 3, the business jet operations increase slightly in Phase 3 and the general aviation propeller operations decrease slightly. This results in slight differences between Phases 2 and 3 noise levels.

Source: *Noise Analysis Technical Report,* Tables 20 and 21, Landrum & Brown 2014.

Phase 1

The calculated CNEL levels for Alternative C, Phase 1 and the change in CNEL compared to the existing conditions are shown in Table 4.6-15. The CNEL contours for Alternative C, Phase 1 are shown on Exhibit 4.6-23. There would be noise level increases of 2.4 CNEL at NMS 1S and 2S and 2.0 CNEL at NMS 3S in the Santa Ana Heights community of Newport Beach where the forecasted CNELs are 68.6, 67.8, and 66.7, respectively; these increases exceed the FAA, County of Orange, and Newport Beach significance thresholds and would be significant impacts. There also would be a noise level increase of 2.4 CNEL at NMS 6S in the City of Newport Beach where the forecasted CNEL is between 60 and 65 CNEL; this increase exceeds the Newport Beach significance threshold of 2.0 and would be a significant impact. Finally, although there would be an increase of 2.4 CNEL at NMS 8N in the City of Irvine where the CNEL is forecasted to be 71.2, this would not be a significant impact because there are no sensitive receptors in the vicinity of NMS 8N.

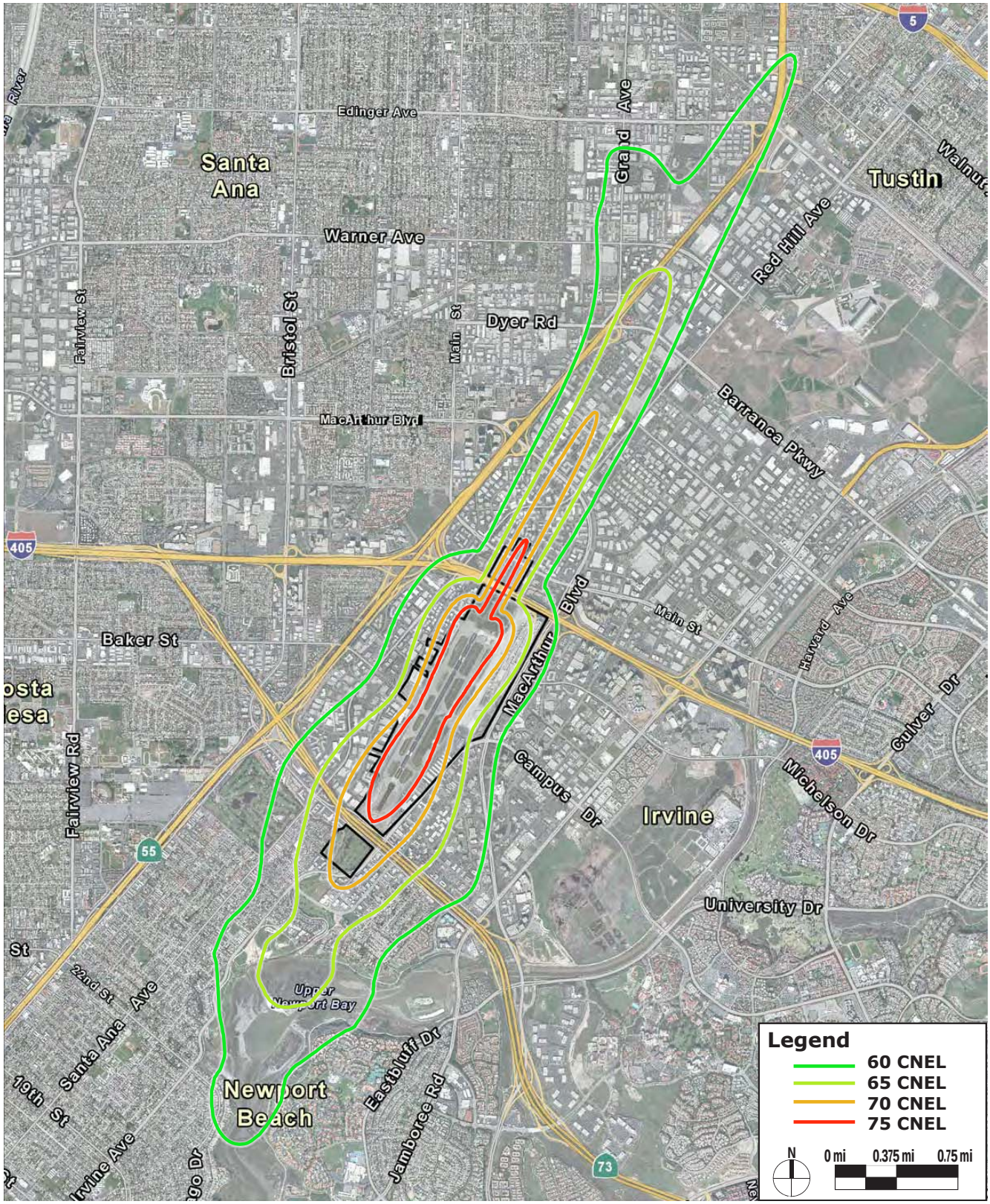
Phases 2 and 3

The calculated CNEL levels for Alternative C, Phases 2 and 3 and the changes in CNEL compared to the existing conditions are shown in Table 4.6-15. The CNEL contours for Alternative C, Phases 2 and 3 are shown in Exhibits 4.6-24 and 4.6-25. There would be noise level increases of more than 1.5 CNEL at NMS 1S, 2S, and 3S in the Santa Ana Heights community of Newport Beach where the forecasted CNELs are greater than 65 CNEL; these increases exceed the FAA, County of Orange, and Newport Beach significance thresholds and would be significant impacts. There also would be noise level increases of more than 3.0 CNEL at NMS 4S, 5S, 6S, and 7S in the City of Newport Beach where the forecasted CNELs are between 60 and 65 CNEL; these increases also exceed the FAA, County of Orange, and Newport Beach significance thresholds and would be significant impacts.

Phases 2 and 3 of Alternative C would result in the introduction of nighttime operations that would likely result in sleep disturbance. Exhibit 4.6-4 presents estimates of the percentage of persons awakened by indoor sound exposure levels. Because removal of the current curfew would result in new nighttime noise events, the upper red (non-habituated) curve in Exhibit 4.6-4 would be used to estimate awakenings in this case. The impact of added nighttime aircraft noise to an environment where there is little or no aircraft noise would be significant.

Finally, although there would be an increase of 3.2 CNEL at NMS 8N in the City of Irvine where the CNEL is forecasted to be 72.0, this would not be a significant impact because there are no sensitive receptors in the vicinity of NMS 8N.

Impact Conclusion: *Phase 1 of Alternative C would result in significant noise impacts at NMS 1S, 2S, and 3S as determined by FAA, County of Orange, and Newport Beach standards. In addition, with Phase 1 there would be a significant impact at NMS 6S based upon the Newport Beach standards. Phases 2 and 3 of Alternative C would result in significant noise impacts at NMS 1S, 2S, 3S, 4S, 5S, 6S, and 7S as determined by FAA, County of Orange, and Newport Beach standards. Phases 2 and 3 of Alternative C would also result in significant noise impact resulting from the introduction of nighttime aircraft noise.*



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative C Phase 1

Exhibit 4.6-23

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

JOHN WAYNE AIRPORT ORANGE COUNTY

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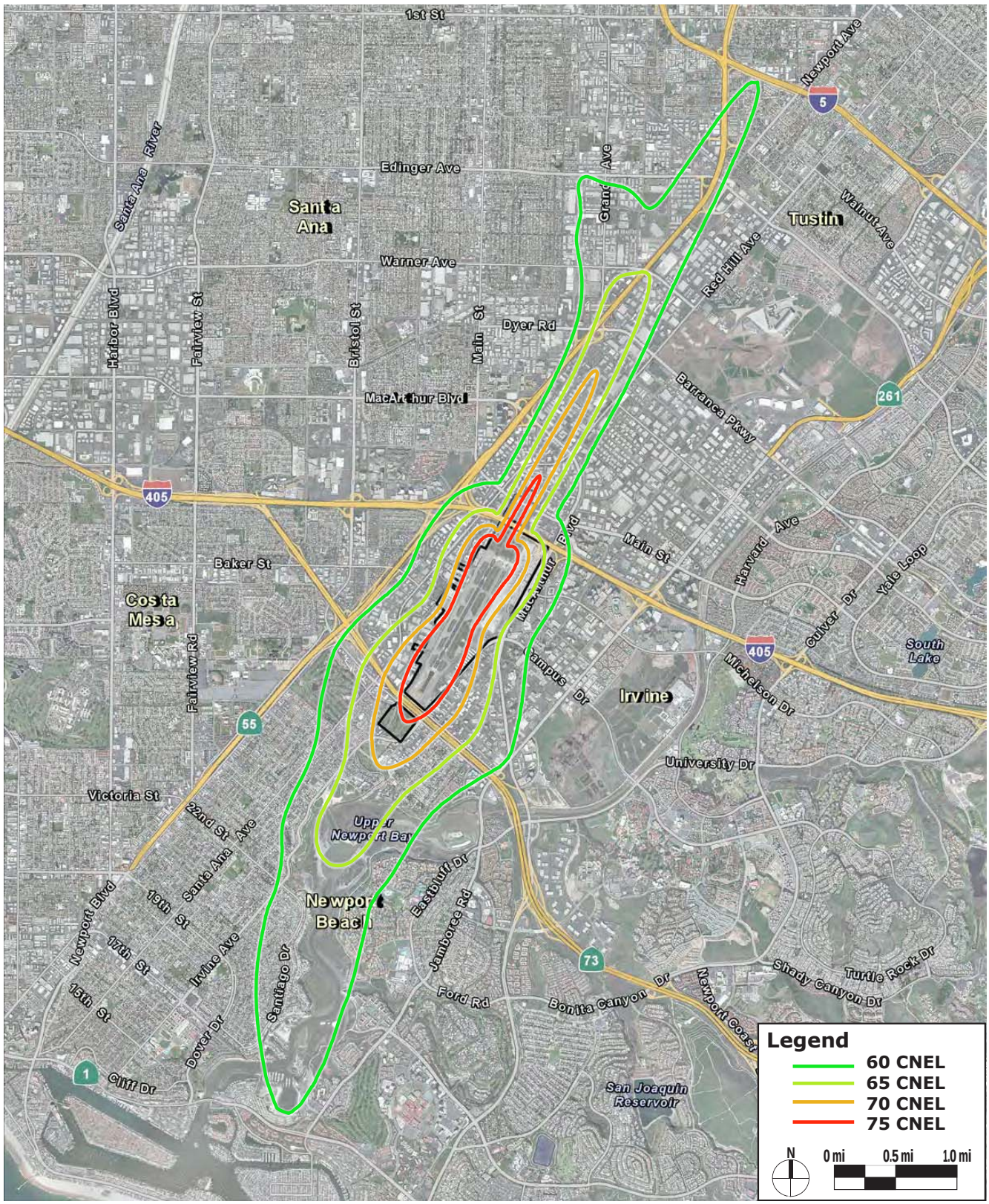

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative C Phase 2

Exhibit 4.6-24

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

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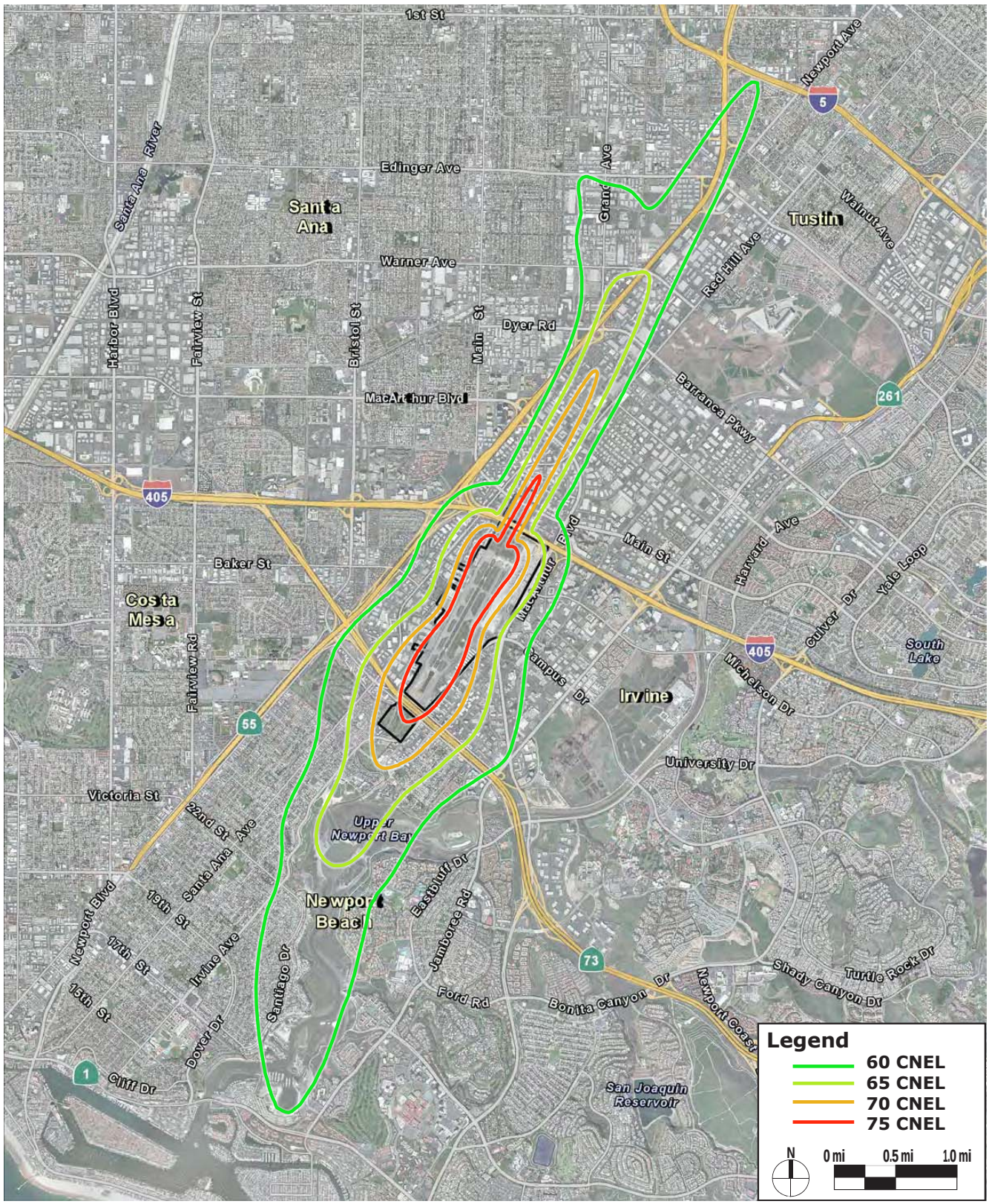

Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – Alternative C Phase 3

Exhibit 4.6-25

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

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No Project Alternative

Noise impacts for the No Project Alternative were calculated using the INM modeling as described in Section 4.6.3, Methods. The numbers of Class A and Class E ADDs for each phase are shown in Table 4.6-16. The departures by aircraft type (fleet mix) are tabulated in Appendix C (Table 14). The results of the modeling are shown in Table 4.6-17.

TABLE 4.6-16
NO PROJECT ALTERNATIVE MILLION ANNUAL PASSENGERS AND AVERAGE DAILY DEPARTURES

	Existing	No Project Alternative Phases 1, 2, 3
MAP	9.17	10.8
Average Daily Departures		
Class A	80	85
Class E	36	60.8
Total	**116**	**145.8**

MAP: Million annual passengers.

Source: *Noise Analysis Technical Report,* Table 19, Landrum & Brown 2014.

TABLE 4.6-17
NO PROJECT ALTERNATIVE COMMUNITY NOISE EQUIVALENT LEVELS AND CHANGES IN COMMUNITY NOISE EQUIVALENT LEVELS

CNEL Levels			Change in CNEL Over Existing Conditions	
NMS*	Existing	No Project Alternative Phases 1, 2, 3	NMS*	No Project Alternative Phases 1, 2, 3
1S	**66.2**	**66.6**	1S	0.4
2S	**65.4**	**65.8**	2S	0.4
3S	64.7	64.7	3S	0
4S	57.5	57.8	4S	0.3
5S	57.3	57.4	5S	0.1
6S	58.2	58.2	6S	0
7S	55.8	55.9	7S	0.1
8N	**68.8**	**69.5**	8N	0.7
9N	51.5	52.3	9N	0.8
10N	54.1	54.8	10N	0.7

CNEL: Community Noise Equivalent Level; NMS: Noise monitoring stations

Bold: : In the "CNEL Levels" columns, **bold** indicates the CNEL level is equal to or greater than 65, which is used as the noise level when assessing potential impacts. In the "Change in CNEL" columns, **bold** indicates an increase exceeding a significance threshold.

* NMS 1S, 2S, and 3S are located in the Santa Ana Heights Community of the City of Newport Beach; NMS 4S, 5S, 6S and 7S are located in the City of Newport Beach; NMS 8N is located in the City of Irvine; NMS 9N is located in the City of Santa Ana; and NMS 10N is located in the City of Tustin.

Source: *Noise Analysis Technical Report,* Tables 20 and 21, Landrum & Brown 2014.

Phases 1 through 3

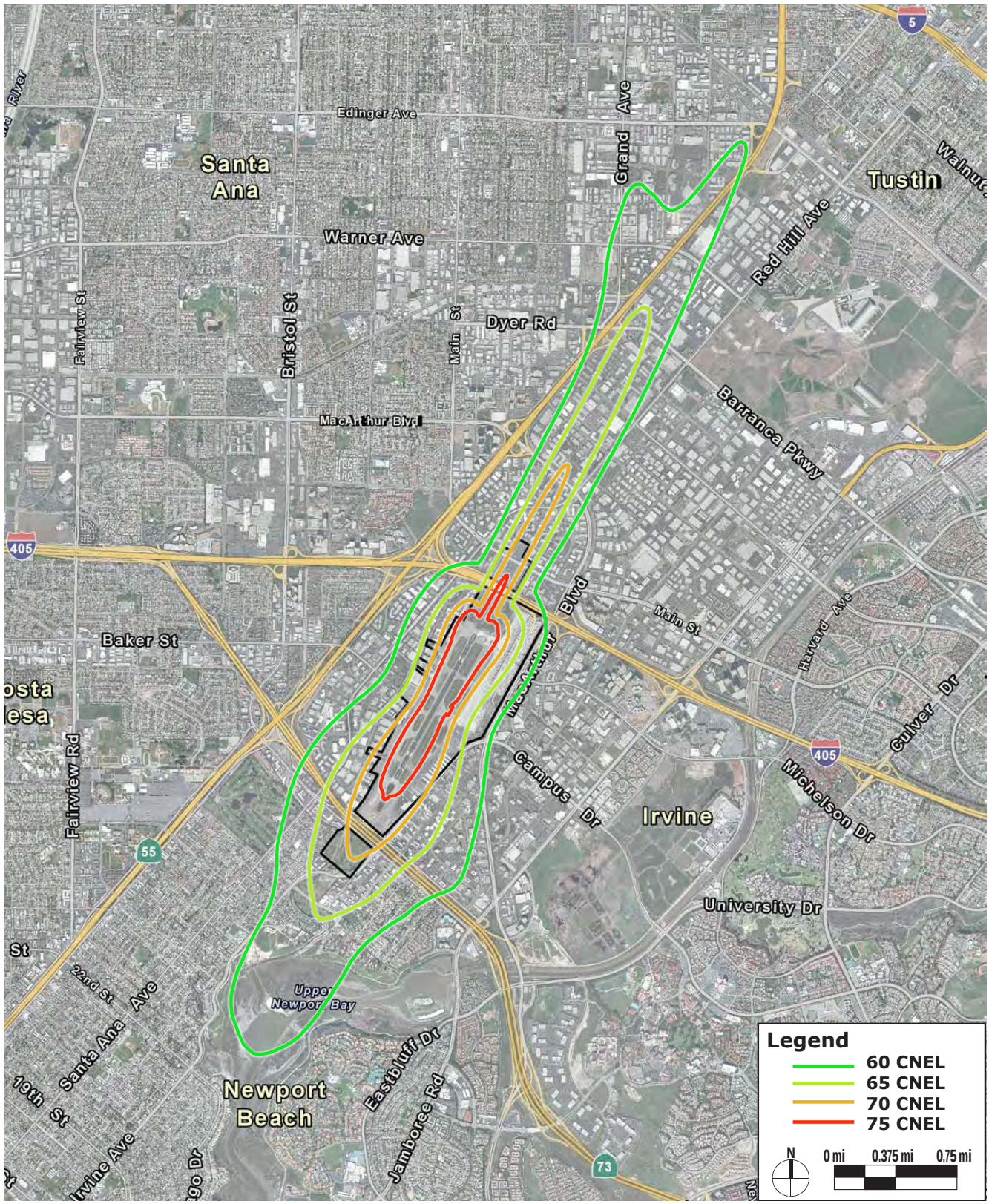
The calculated CNEL levels for Phases 1, 2, and 3 of the No Project Alternative and the change in CNEL compared to the existing conditions are shown in Table 4.6-17. The CNEL contours for the No Project Alternative are shown on Exhibit 4.6-26. All noise level increases would be less than 1.0 CNEL and there are no NMS in Newport Beach where the noise level would be 75 CNEL or greater. Therefore, there would be no exceedance of the FAA, County of Orange, or City of Newport Beach thresholds.

Impact Conclusion: *The No Project Alternative would have a less than significant noise impact relative to the FAA, County of Orange, and Newport Beach standards.*

Threshold 4.6-2 Would the project generate aircraft noise that would increase noise levels at exterior use areas of residences, schools or places of worship to noise levels of 65 CNEL or above, or interior areas of residences, schools, or places of worship to noise levels of 45 CNEL or above?

To preface, elements of the Proposed Project and alternatives and calculation of CNEL data for each phase are described under Threshold 4.6-1. To estimate the number of sensitive receptors that would be impacted, the land uses in the area between the existing CNEL contours and the corresponding CNEL for the Proposed Project and alternatives contours were counted. The results are shown in Tables 4.6-18 through 4.6-22.

In the following analysis of each phase, impacts to uninsulated noise-sensitive receptors that are newly located within the 65 to 70 CNEL contour are determined to be significant. The County's standard also identifies an interior noise standard of 45 dB CNEL. As discussed in Section 4.6.2, the outdoor to indoor noise reduction achieved by typical Southern California wood frame homes is 20 dBA with windows closed. Therefore, this analysis conservatively assumes that the outdoor-to-indoor noise reduction for an uninsulated home does not exceed 20 dBA and the indoor noise level of a sensitive receptor that is newly located within the 65 to 70 CNEL contour may have an interior noise level greater than 45 CNEL, which would potentially be a significant impact.



Source: *Noise Analysis Technical Report*, Landrum & Brown 2014

CNEL Contours – No Project Conditions

Exhibit 4.6-26

John Wayne Airport Settlement Agreement Amendment

N W E S

Map not to scale

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Proposed Project

Table 4.6-18 identifies the number of sensitive receptors that would be impacted by the Proposed Project. This was done by determining the number of noise-sensitive receptors in the area between the existing CNEL contours and the corresponding Proposed Project CNEL contours.

TABLE 4.6-18
PROPOSED PROJECT LAND USES WITHIN COMMUNITY NOISE EQUIVALENT LEVEL CONTOURS

	Total Number						Increase over Existing		
				Proposed Project Phase			Proposed Project Phase		
CNEL	Existing	Master Plan	No Project	1	2	3	1	2	3
Total Number of Residences									
65–70	96	407	127	127	158	173	31	62	77
>70	0	6	0	0	0	0	0	0	0
Number of Insulated Residences									
65–70	38	255	48	48	61	72	10	23	34
>70	0	5	0	0	0	0	0	0	0
Number of Uninsulated Residences									
65–70	58	141	79	79	97	102	21	39	43
>70	0	6	0	0	0	0	0	0	0
Number of Schools									
65–70	0	2	0	0	0	0	0	0	0
>70	0	0	0	0	0	0	0	0	0
Number of Places of Worship									
65–70	2	2	2	2	2	2	0	0	0
>70	1	3	1	1	1	1	0	0	0

CNEL: Community Noise Equivalent Level.
Source: *Noise Analysis Technical Report,* Table 22, Landrum & Brown 2014.

Phase 1

As shown in Table 4.6-18, no additional sensitive receptors would be within the 70 CNEL contour when Phase 1 of the Proposed Project is compared to existing conditions. Increased noise levels would add 31 residences to the area within the 65 to 70 CNEL contour, of which 10 are currently insulated and 21 are not insulated. Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Phase 2

As shown in Table 4.6-18, no additional sensitive receptors would be within the 70 CNEL contour when Phase 2 of the Proposed Project is compared to existing conditions. Increased noise levels would add 62 residences to the area within the 65 to 70 CNEL contour, of which 23 are currently insulated and 39 are not insulated. Exterior noise impacts to outdoor living areas would be

significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Phase 3

As shown in Table 4.6-18, no additional sensitive receptors would be within the 70 CNEL contour when Phase 3 of the Proposed Project is compared to existing conditions. Increased noise levels would add 77 residences to the area within the 65 to 70 CNEL contour, of which 34 are currently insulated and 43 are not insulated. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour. Exterior noise impacts to residential outdoor living areas would be significant and, interior noise impacts to the uninsulated residences and the Orange Coast Free Methodist Church would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Impact Conclusion: *The Proposed Project would have a significant exterior noise impact on 31 residences in Phase 1, 62 residences in Phase 2, and 77 residences in Phase 3. The Proposed Project would have a potentially significant interior noise impact on 21 residences in Phase 1, 39 residences in Phase 2, and 43 residences and one place of worship in Phase 3.*

Alternative A

Table 4.6-19 identifies the number of sensitive receptors that would be impacted by Alternative A. This was done by determining the number of noise-sensitive receptors in the area between the existing CNEL contours and the corresponding Alternative A CNEL contours.

Phase 1

As shown in Table 4.6-19, no additional sensitive receptors would be within the 70 CNEL contour when Phase 1 of Alternative A is compared to existing conditions. Increased noise levels would add 22 residences to the area within the 65 to 70 CNEL contour, of which 7 are currently insulated and 15 are not insulated. Exterior noise impacts to the outdoor living areas would be significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

It is noted that the Alternative A, Phase 1 noise impact would be slightly less than the No Project Alternative impact although there would be more Class A ADDs with Phase 1 of Alternative A. The differences result from the distribution of passengers among Class A and Class E aircraft. In Alternative A, Phase 1 there would be fewer Class E operations and also fewer total operations than for the No Project Alternative (compare Tables 4.6-10 and 4.6-16) resulting in a lesser noise impact.

TABLE 4.6-19
ALTERNATIVE A LAND USES WITHIN COMMUNITY NOISE EQUIVALENT LEVEL CONTOURS

	Total Number						Increase over Existing		
				Alternative A Phase			Alternative A Phase		
CNEL	Existing	Master Plan	No Project	1	2	3	1	2	3
Total Number of Residences									
65–70	96	407	127	118	144	181	22	48	85
>70	0	6	0	0	0	0	0	0	0
Number of Insulated Residences									
65–70	38	255	48	45	54	77	7	16	39
>70	0	5	0	0	0	0	0	0	0
Number of Uninsulated Residences									
65-70	58	141	79	73	90	104	15	32	46
>70	0	1	0	0	0	0	0	0	0
Number of Schools									
65–70	0	2	0	0	0	0	0	0	0
>70	0	0	0	0	0	0	0	0	0
Number of Places of Worship									
65–70	2	2	2	2	2	2	0	0	0
>70	1	2	1	1	1	1	0	0	0

CNEL: Community Noise Equivalent Level.

Source: *Noise Analysis Technical Report,* Table 22, Landrum & Brown 2014.

Phase 2

As shown in Table 4.6-19, no additional sensitive receptors would be within the 70 CNEL contour when Phase 2 of Alternative A is compared to existing conditions. Increased noise levels would add 48 residences to the area within the 65 to 70 CNEL contour, of which 16 are currently insulated and 32 are not insulated. Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Phase 3

As shown in Table 4.6-19, no additional sensitive receptors would be within the 70 CNEL contour when Phase 3 of Alternative A is compared to existing conditions. Increased noise levels would add 85 residences to the area within the 65 to 70 CNEL contour, of which 39 are currently insulated and 46 are not insulated. . The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour. Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences and the Orange Coast Free Methodist Church would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Impact Conclusion: *Alternative A would have a significant exterior noise impact on 22 residences in Phase 1, 48 residences in Phase 2, and 85 residences in Phase 3. Alternative A would have a potentially significant interior noise impact on 15 residences*

in Phase 1, 32 residences in Phase 2, and 46 residences and one place of worship in Phase 3.

Alternative B

Table 4.6-20 identifies the number of sensitive receptors that would be impacted by Alternative B. This was done by determining the number of noise-sensitive receptors in the area between the existing CNEL contours and the corresponding Alternative B CNEL contours.

TABLE 4.6-20
ALTERNATIVE B LAND USES WITHIN COMMUNITY NOISE EQUIVALENT LEVEL CONTOURS

Total Number							Increase over Existing		
				Alternative B Phase			Alternative B Phase		
CNEL	Existing	Master Plan	No Project	1	2	3	1	2	3
Total Number of Residences									
65–70	96	407	127	121	186	230	25	90	134
>70	0	6	0	0	0	1	0	0	1
Number of Insulated Residences									
65–70	38	255	48	46	81	111	8	43	73
>70	0	5	0	0	0	1	0	0	1
Number of Uninsulated Residences									
65–70	58	141	79	75	105	119	17	47	61
>70	0	1	0	0	0	0	0	0	0
Number of Schools									
65–70	0	2	0	0	0	0	0	0	0
>70	0	0	0	0	0	0	0	0	0
Number of Places of Worship									
65–70	2	2	2	2	2	2	0	0	0
>70	1	3	1	1	1	1	0	0	0

CNEL: Community Noise Equivalent Level.
Source: *Noise Analysis Technical Report,* Table 22, Landrum & Brown 2014.

Phase 1

As shown in Table 4.6-20, no additional sensitive receptors would be within the 70 CNEL contour when Phase 1 of Alternative B is compared to existing conditions. Increased noise levels would add 25 residences to the area within the 65 to 70 CNEL contour, of which 8 are currently insulated and 17 are not insulated. Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

It is noted that the Alternative B Phase 1 noise impact would be slightly less than the No Project Alternative impact although there would be more Class A ADDs with Phase 1 of Alternative B. The differences result from the distribution of passengers among Class A and Class E aircraft. In Alternative B Phase 1 there would be fewer Class E operations and also fewer total operations

than for the No Project Alternative (compare Tables 4.6-12 and 4.6-16) resulting in a lesser noise impact.

Phase 2

As shown in Table 4.6-20, no sensitive receptors would be within the 70 CNEL contour when Phase 2 of Alternative B is compared to existing conditions. Increased noise levels would add 90 additional residences to the area within the 65 to 70 CNEL contour, of which 43 are currently insulated and 47 are not insulated. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences and the Orange Coast Free Methodist Church would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Phase 3

As shown in Table 4.6-20, one insulated residence would be newly located in the greater than 70 CNEL contour with implementation of Phase 3 of Alternative B. Increased noise levels would add 134 additional residences to the area within the 65 to 70 CNEL contour, of which 73 are currently insulated and 61 are not insulated. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour Exterior noise impacts to outdoor living areas would be significant and interior noise impacts to the uninsulated residences, the one insulated residence newly located in the greater than 70 CNEL contour, and the Orange Coast Free Methodist Church would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Impact Conclusion: *Alternative B would have a significant exterior noise impact on 25 residences in Phase 1, 90 residences in Phase 2, and 135 residences in Phase 3. Alternative B would have a potentially significant interior noise impact on 17 residences in Phase 1, 47 residences and one place of worship in Phase 2, and 62 residences and one place of worship in Phase 3.*

Alternative C

Table 4.6-21 identifies the number of sensitive receptors that would be impacted by Alternative A. This was done by determining the number of noise-sensitive receptors in the area between the existing CNEL contours and the corresponding Alternative C CNEL contours.

TABLE 4.6-21
ALTERNATIVE C LAND USES WITHIN COMMUNITY NOISE EQUIVALENT LEVEL CONTOURS

	Total Number						Increase over Existing		
				Alternative C Phase			Alternative C Phase		
CNEL	Existing	Master Plan	No Project	1	2	3	1	2	3
Total Number of Residences									
65-70	96	407	127	345	870	869	249	774	773
>70	0	6	0	6	92	92	6	92	92
Number of Insulated Residences									
65-70	38	255	48	203	387	387	165	349	349
>70	0	5	0	4	38	38	4	38	38
Number of Uninsulated Residences Within 1985 AIP									
65-70	58	141	79	141	120	120	83	62	62
>70	0	1	0	2	54	54	2	54	54
Number of Uninsulated Residences Outside 1985 AIP									
65-70	0	11	1	1	363	362	1	363	362
>70	0	0	0	0	0	0	0	0	0
Number of Schools/Educational Facilities									
65-70	0	0	0	3	3	3	3	3	3
>70	0	0	0	0	0	0	0	0	0
Number of Places of Worship									
65-70	2	2	2	1	3	3	-1[a]	1	1
>70	1	3	1	2	3	3	1	2	2

CNEL: Community Noise Equivalent Level; AIP: Santa Ana Heights Acoustical Insulation Program .

a – There is an impact to one church not shown in net numbers because one church moves from the 65 CNEL contour to the 70 CNEL contour.

b - There are impacts to two places of worship not shown in net numbers because two places of worship move from the 65 CNEL contour to the 70 CNEL contour.

Source: *Noise Analysis Technical Report,* Table 22, Landrum & Brown 2014.

Phase 1

As shown in Table 4.6-21, six residences would be newly located in the greater than 70 CNEL contour with implementation of Phase 1 of Alternative C, of which four are currently insulated and two are not insulated. The four insulated residences were within the 65 to 70 CNEL contour when the 1985 Santa Ana Heights Acoustical Insulation Program ("AIP") was implemented and may not be adequately insulated for the increased noise level. Increased noise levels would add 249 additional residences to the area within the 65 to 70 CNEL contour, of which 165 are currently insulated and 84 are not insulated. One of the uninsulated residences is located outside the 1985 Master Plan area where the 1985 AIP was implemented.

Two schools (Newport Montessori, and Tutor Time Child Care/Learning Center) and the Peter & Mary Muth Interpretive Center (an educational facility), would be within the expanded 65 to 70 CNEL contour. Additionally, one place of worship, the Berean Community Church, would be within the expanded 70 to 75 CNEL contour. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour.

Exterior noise impacts to the outdoor living areas of the additional residences in the 65 to 70 CNEL and greater than 70 CNEL contours and the Interpretive Center would be significant. As discussed in Section 4.5, Land Use, the exterior areas for the two schools and churches would not meet the definition of "outdoor living areas" where an exterior noise level of less than 65 decibels standard is recommended. Therefore, Alternative C would not result in an impact based on the exterior noise standard for the schools or places of worship. The increase in interior noise levels in habitable areas for the above mentioned sensitive receptors (uninsulated residences added to the 65 to 70 and greater than 70 CNEL contours, insulated residences newly located in the greater than 70 CNEL contour, schools, interpretive center, and places of worship) would be potentially significant.

Phase 2

As shown in Table 4.6-21, 92 residences would be located in the greater than 70 CNEL contour with implementation of Phase 2 of Alternative C, of which 38 are currently insulated and 54 are not insulated. Of the insulated residences in the greater than 70 CNEL contour, 33 were within the 65 to 70 CNEL contour when the 1985 AIP was implemented and may not be adequately insulated for the increased noise level. Increased noise levels would add 774 additional residences to the area within the 65 to 70 CNEL contour, of which 349 are currently insulated and 425 are not insulated.

The impacts to the schools/educational facilities (Newport Montessori, and Tutor Time Child Care/Learning Center and the Peter & Mary Muth Interpretive Center) would be the same as discussed above for Phase 1. However, three place of worship would be newly within the expanded 65 to 70 CNEL contour (Disciple Church, Grace Fellowship Church, St. Mark Orthodox Church of Irvine), and two places of worship (Berean Community Church and Islamic Educational Center of Orange County) would move from the 65 to 70 CNEL contour to the expanded 70 to 75 CNEL contour. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour.

Exterior noise impacts to the outdoor living areas of the residences added to the 65 to 70 CNEL and greater than 70 CNELcontours and to the Interpretive Center would be a significant impact. The increase in interior noise levels in habitable areas for the uninsulated residences added to the 65 to 70 and greater than 70 CNEL contours, the 33 insulated residences that were in within the 65 to 70 CNEL contour when the 1985 AIP was implemented and are now within the greater than 70 CNEL contour, the schools/educational facilities, and places of worship would all be potentially significant.

Phase 3

As shown in Table 4.6-21, 92 residences would be located in the greater than 70 CNEL contour with implementation of Phase 3 of Alternative C, of which 38 are currently insulated and 54 are not insulated. Of the insulated residences in the greater than 70 CNEL contour, 33 were in within the 65 to 70 CNEL contour when the 1985 AIP was implemented and may not be adequately insulated for the increased noise level. Increased noise levels would add 773 additional residences to the area within the 65 to 70 CNEL contour, of which 349 are currently insulated and 424 are not insulated.

The impacts to the schools/educational facilities (Newport Montessori, and Tutor Time Child Care/Learning Center and the Peter & Mary Muth Interpretive Center) would be the same as discussed above for Phase 1. However, three place of worship would be newly within the

expanded 65 to 70 CNEL contour (Disciple Church, Grace Fellowship Church, St. Mark Orthodox Church of Irvine), and two places of worship (Berean Community Church and Islamic Educational Center of Orange County) would move from the 65 to 70 CNEL contour to the expanded 70 to 75 CNEL contour. The Orange Coast Free Methodist Church would move from the 70 to 75 CNEL contour to the greater than 75 CNEL contour.

Exterior noise impacts to the outdoor living areas of the residences added to the 65 to 70 CNEL and greater than 70 CNEL contours and to the Interpretive Center would be a significant impact. The increase in interior noise levels in habitable areas for the uninsulated residences added to the 65 to 70 and greater than 70 CNEL contours, the 33 insulated residences that were in within the 65 to 70 CNEL contour when the 1985 AIP was implemented and are now within the greater than 70 CNEL contour, the schools/educational facilities, and places of worship would all be potentially significant.

Impact Conclusion: *Alternative C would have a significant exterior noise impact on 255 residences in Phase 1, 866 residences in Phase 2, and 865 residences in Phase 3. Alternative C would have a potentially significant interior noise impact on 87 uninsulated residences, 3 schools/educational facilities, and 2 places of worship in Phase 1; 479 uninsulated residences, 3 schools/educational facilities, and 5 places of worship in Phase 2; and 478 uninsulated residences, 3 schools/educational facilities, and 5 places of worship in Phase 3. Additionally, Alternative C would have and potentially significant interior noise impact to 4 insulated residences in Phase 1 and 33 insulated residences in Phases 2 and 3.*

No Project Alternative

Table 4.6-22 identifies the number of sensitive receptors that would be impacted by the No Project Alternative. This was done by determining the number of noise-sensitive receptors in the area between the existing CNEL contours and the corresponding No Project Alternative CNEL contours.

TABLE 4.6-22
NO PROJECT ALTERNATIVE LAND USES
WITHIN COMMUNITY NOISE EQUIVALENT LEVEL CONTOURS

Total Number				Increase over Existing
				No Project
CNEL	Existing	Master Plan	No Project	All Phases
Total Number of Residences				
65–70	96	407	127	31
>70	0	6	0	0
Number of Insulated Residences				
65–70	38	255	48	10
>70	0	5	0	0
Number of Uninsulated Residences				
65–70	58	141	79	21
>70	0	1	0	0
Number of Schools				
65–70	0	2	0	0
>70	0	0	0	0
Number of Places of Worship				
65–70	2	2	2	0
>70	1	2	1	0

CNEL: Community Noise Equivalent Level.

Source: *Noise Analysis Technical Report,* Table 22, Landrum & Brown 2014.

Phases 1 through 3

As shown in Table 4.6-22, no additional sensitive receptors would be within the 70 CNEL contour when the No Project Alternative is compared to existing conditions. Increased noise levels would add 31 residences to the area within the 65 to 70 CNEL contour, of which 10 are currently insulated and 21 are not insulated. Exterior noise impacts to the outdoor living areas would be significant and interior noise impacts to the uninsulated residences would be potentially significant. No other sensitive receptors would be included in the area added to the 65 to 70 CNEL contour.

Impact Conclusion: *The No Project Alternative would have a significant exterior noise impact on 31 additional residences and a potentially significant interior noise impact on 21 residences.*

Threshold 4.6-3 **Would the project generate traffic noise that would result in:**

- **A noise increase of 1.5 CNEL or more at a sensitive receptor where the existing exposure is 65 CNEL or above, or**
- **A noise increase of 3.0 CNEL or more at a sensitive receptor where the existing exposure is between 60 and 65 CNEL, or**
- **A noise increase of 5.0 CNEL or more at a sensitive receptor where the existing exposure is between 45 and 60 CNEL, or**

- **A noise increase at a sensitive receptor in the City of Newport Beach of any magnitude if the noise level is 75 CNEL or greater or**
- **A noise increase at a sensitive receptor in the City of Newport Beach of 1.0 dB or greater where the noise level is less than 75 CNEL, which is the most restrictive noise increase threshold applied by the City of Newport Beach (see Table 4.6-3).**

Increases in CNEL traffic noise levels along roadways in the vicinity of the Airport were calculated using the methods described in Section 4.6.3 and traffic data provided in the Project traffic impact analysis (Section 4.8). Traffic volume data were developed for 177 road segments and each segment was identified as having or not having adjacent noise-sensitive receptors. Traffic noise level increases were projected for four analysis time frames: existing, 2016 through 2020; 2021 through 2025; and 2026 through 2030; corresponding to Phases 1, 2, and 3 for the Proposed Project and the alternatives. The data and results are tabulated in Appendix C to the *Noise Analysis Technical Report,* Appendix C of this EIR).

Proposed Project

Phases 1, 2, and 3

The traffic noise analysis for the Proposed Project shows that there are no roadways with existing adjacent noise-sensitive uses that are projected to experience a traffic noise level increase of 1.5 dB or greater. In Newport Beach, there are no roadways in the Project area with adjacent noise-sensitive uses with traffic volumes that could generate a noise level approaching 75 dBA in a private yard area where the noise standards are applicable. There also are no roadways in Newport Beach with existing adjacent noise-sensitive uses that are projected to experience a traffic noise level increase of 1.0 dB or greater.

Impact Conclusion: *The Proposed Project would have less than significant traffic noise impacts.*

Alternative A

Phases 1, 2, and 3

The traffic noise analysis for Alternative A shows that there are no roadways with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.5 dB or greater. In Newport Beach, there are no roadways in the Project area with adjacent noise sensitive uses with traffic volumes that could generate a noise level approaching 75 dBA in a private yard area where the noise standards are applicable. There also are no roadways in Newport Beach with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.0 dB or greater.

Impact Conclusion: *Alternative A would have less than significant traffic noise impacts.*

Alternative B

Phases 1, 2, and 3

The traffic noise analysis for Alternative B shows that there are no roadways with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.5 dB or greater. In Newport Beach, there are no roadways in the Project area with adjacent noise sensitive uses with traffic volumes that could generate a noise level approaching 75 dBA in a

private yard area where the noise standards are applicable. There also are no roadways in Newport Beach with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.0 dB or greater.

Impact Conclusion: *Alternative B would have less than significant traffic noise impacts.*

Alternative C

Phases 1, 2, and 3

The traffic noise analysis for Alternative C shows that there are no roadways with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.5 dB or greater. In Newport Beach, there are no roadways in the Project area with adjacent noise sensitive uses with traffic volumes that could generate a noise level approaching 75 dBA in a private yard area where the noise standards are applicable. There also are no roadways in Newport Beach with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.0 dB or greater.

Impact Conclusion: *Alternative C would have less than significant traffic noise impacts.*

No Project Alternative

Phases 1, 2, and 3

The traffic noise analysis for the No Project Alternative shows that there are no roadways with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.5 dB or greater. In Newport Beach, there are no roadways in the Project area with adjacent noise sensitive uses with traffic volumes that could generate a noise level approaching 75 dBA in a private yard area where the noise standards are applicable. There also are no roadways in Newport Beach with existing adjacent noise sensitive uses that are projected to experience a traffic noise level increase of 1.0 dB or greater.

Impact Conclusion: *The No Project Alternative would have less than significant traffic noise impacts.*

Threshold 4.6-4 Would the project expose persons to or generate excessive groundborne vibration or groundborne noise levels?

Proposed Project and All Alternatives

In the same way that sound is transmitted by vibrating air, vibrations can also be transmitted through the ground. It takes much more energy to get the ground vibrating and humans are much less sensitive to ground-borne vibrations than to noise.

One might suspect that the heavy aircraft traveling down the runway at high speed during takeoff would be a source of vibration. However, the runway surface is relatively smooth and the aircraft include large tires and shock absorbing mechanisms that absorb and minimize vibration generation. Further, as the aircraft travels down the runway it is effectively getting lighter and lighter and less able to cause the ground to vibrate. The largest potential vibration source associated with typical airport operations is a landing aircraft. From experience, it is known that while many landings are very smooth, there are occasional landings with considerable impacts at touchdown that could be expected to result in significant vibration levels. However, there is

no evidence that this is occurring at John Wayne Airport. The most impacted areas would be those located closest to the touch-down point on the runway. The Airport has not received any complaints or even any indication that vibration from such events is even noticeable outside of the Airport boundaries.

Heavier airplanes are able to generate higher vibration levels than lighter airplanes. However, maximum airplane weights are limited by the runway construction and length. The Proposed Settlement Agreement Amendment does not include any physical changes to the Airport or runway that would allow or expect to result in heavier aircraft using the Airport. Any such changes would require the assessment of potential impacts, including groundborne vibration, as required by the California Environmental Quality Act. Because groundborne vibration has not been identified as even being noticeable outside of the Airport property and no part of the Project would change the vibration generation potential of the Airport, the Project would not result in excessive groundborne vibration and the impact would be less than significant.

At high levels, airborne noise can induce structural vibrations. At its lowest levels, airborne noise induced vibration causes annoyance due to secondary vibrations generating noise, objects within the dwelling such as hanging pictures, dishes, plaques or bric-a-brac rattling, or due to vibrating window frames. However, for considerable vibration levels to be induced, the noise levels impacting a structure would need to exceed 110 dB.

The Phase 2 access plan prohibits aircraft with departure SENEL levels that exceed 101.8 dB at NMS 1 and 101.1 dB at NMS 2. The noise levels at these NMS are the highest noise levels impacting a sensitive use. Maximum aircraft overflight noise levels are approximately 10 dB lower than SENEL levels. Therefore, the maximum noise level at any sensitive use would be less than approximately 92 dB. Therefore, the noise levels will be at least 18 dB lower and have approximately 63 times less energy than the minimum noise level that would be expected to induce noticeable structural vibrations. Therefore there are no sensitive uses potentially impacted by airborne noise induced structural vibrations.

Impact Conclusion: *There would be a less than significant impact associated with groundborne and noise for the Proposed Project and all alternatives.*

Noise Evaluation For Informational Purposes

The following analysis of single event noise and TA values is provided for informational purposes, as there are no established regulatory benchmarks available for purposes of assessing significance to changes in either metric. Also, due to public concern expressed during the EIR's scoping process, an evaluation of potential effects to noise sensitive uses in the City of Laguna Beach is provided.

Single Event Noise

The analysis in this EIR, assumes the aircraft types expected to use JWA in the future are the same that currently use it or there would be aircraft that have similar noise characteristics.[7]

[7] As discussed in Section 3.7.2, Operation Assumptions, given the Project's term length (through 2030), it is likely that there will be some fleet turnover at the Airport through the commercial airlines' purchase and utilization of newer, and next generation aircraft. These newer aircraft likely would generate less noise and air pollutants as compared to the current fleet at JWA (AECOM 2014). However, the timing of changes to the fleet mix cannot be known at this time and CEQA does not allow speculation. In order to be conservative, the environmental analysis presented in this EIR

Accordingly, the future SENEL contours are forecasted to be the same as the existing conditions, which appeared in Table 4.6-7 and Exhibits 4.6-12 and 4.6-13 in Section 4.6.3. SENEL at sensitive receptor locations are provided in the Noise Analysis Technical Report, provided in Appendix C ([Appendix A: SENEL Levels by Year/Airline/Aircraft/Class] and Figures 14A and 14B. The SENEL data was developed using output from the noise monitoring stations.

Time Above Values

The TA metric is described above in Section 4.6.5. TA values were generated for JWA existing conditions, as well as each Phase of the Proposed Project and Alternatives at each of the permanent noise monitoring stations. The values of 65 dBA, 77 dBA, and 85 dBA correlate respectively to speech interference outdoors, indoors with windows open and indoors with windows closed. There are no accepted thresholds of significance for the TA metric and this analysis is presented for informational purposes only.

Tables presenting the number of minutes each day that aircraft noise levels are projected to exceed 65 dBA, 77 dBA, and 85 dBA for the existing conditions along with all phases of the Proposed Project and Alternatives are included in Appendix E. Tables 4.6-23, 4.6-24, and 4.6-25 present the increase in the time above 65, 77, and 85 dBA, respectively.

assumes the Project would maintain the Airport's existing fleet mix, thereby likely presenting the maximum environmental impact assessment of noise, air quality, and greenhouse gas impacts.

The next generation of aircraft at the Airport may not require any modifications to the existing facilities and could be incorporated into the fleet mix once the commercial airlines demonstrate that these aircraft meet the requirements of a Class A aircraft, as defined in the Phase 2 Access Plan. However, it also is possible that some newer aircraft would require facilities modifications. At this point in time, it is not known what, if any, facilities modifications would need to be undertaken as no specific aircraft have been identified for introduction at the Airport. Any changes to the facilities needed for the Airport to service the next generation of aircraft would require subsequent CEQA documentation subject to County evaluation.

TABLE 4.6-23
INCREASE IN TIME ABOVE 65 DBA OVER EXISTING CONDITIONS (MINUTES)

NMS	No Project	Project			Alternative A			Alternative B			Alternative C		
		P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1S	5.9	5.9	11.6	15.6	5.0	7.6	16.0	5.3	19.3	32.3	50.3	54.3	53.5
2S	6.2	6.2	11.9	16.2	5.1	7.9	16.3	5.4	19.6	32.6	49.9	53.9	53.3
3S	1.9	1.9	5.5	7.7	1.8	3.4	9.0	1.8	11.2	19.7	35.4	37.4	36.3
4S	3.3	3.3	6.8	9.7	2.1	3.9	8.8	2.5	10.6	18.3	25.2	27.2	27.4
5S	1.6	1.6	5.0	7.0	2.9	5.4	10.2	2.4	9.1	14.9	28.6	31.0	31.2
6S	0.8	0.8	3.9	4.9	4.9	8.2	12.8	3.6	8.2	11.7	32.9	35.6	35.7
7S	2.7	2.7	5.7	7.5	3.8	6.0	10.4	3.5	9.6	14.9	28.0	30.1	30.1
8N	4.2	4.2	7.3	9.8	3.1	4.3	9.1	3.4	11.9	19.9	28.7	31.8	31.0
9N	1.5	1.5	2.3	2.9	1.0	1.3	2.3	1.2	3.1	4.9	5.6	6.4	6.4
10N	3.1	3.1	4.8	6.1	2.7	3.5	5.8	2.8	6.7	10.3	13.4	14.8	14.9

dBA: A-weighted decibel; NMS: Noise Monitoring Station; P: Phase.

Source: *Noise Analysis Technical Report,* Table 24, Landrum & Brown 2014.

TABLE 4.6-24
INCREASE IN TIME ABOVE 77 DBA OVER EXISTING CONDITIONS (MINUTES)

NMS	No Project	Project			Alternative A			Alternative B			Alternative C		
		P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1S	1.7	1.7	3.7	5.2	1.7	2.9	5.8	1.7	6.2	10.2	17.4	18.9	1.7
2S	1.8	1.8	3.7	5.1	1.6	2.7	5.3	1.7	5.9	9.7	15.6	17.0	1.8
3S	0.0	0.0	0.0	3.0	1.1	2.2	4.1	0.0	3.8	6.2	11.5	12.4	0.0
4S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6S	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0
7S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8N	2.8	2.8	4.5	5.9	2.2	3.1	5.5	2.4	6.4	10.2	13.0	14.6	2.8
9N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

dBA: A-weighted decibel; NMS: Noise Monitoring Station; P: Phase

Source: *Noise Analysis Technical Report,* Table 26, Landrum & Brown 2014.

TABLE 4.6-25
INCREASE IN TIME ABOVE 85 DBA OVER EXISTING CONDITIONS (MINUTES)

NMS	Existing	No Project	Proposed Project			Alternative A			Alternative B			Alternative C		
			P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1S	2.1	2.3	2.3	2.5	2.6	2.3	2.5	2.8	2.3	2.8	3.2	4.3	4.3	4.3
2S	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.9	0.7	0.7	0.8	1.6	1.6	1.6
3S	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.7	0.8	0.9	1.3	1.3	1.3
4S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8N	6.0	7.0	7.0	7.6	8.1	6.7	7.0	7.9	6.8	8.3	9.7	10.8	11.5	11.5
9N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

dBA: A-weighted decibel; NMS: Noise Monitoring Station; P: Phase

Source: *Noise Analysis Technical Report,* Table 28, Landrum & Brown 2014.

Aircraft Noise in Laguna Beach

Flight Tracks

Flight tracks over Laguna Beach from Septembers in 1998, 2000, 2007, and 2013 are shown in Exhibits 4.6-27 through 4.6-30. The flight tracks are color coded for altitude and the approximate boundary of the City of Laguna Beach is shown in light green. The most striking difference between the four snapshots is the consistency of the tracks in 2013 compared to previous years. This is due to the introduction of Performance Based Navigation ("PBN") procedures at JWA. These procedures were introduced by the FAA and are the sole responsibility of the FAA; (i.e., JWA has no control over flight tracks or altitudes used by aircraft). While the definition of PBN can be complex, it can best be summarized in lay terms by saying that, prior to the PBN procedures, pilots determined the course of the aircraft based on air traffic control instructions and the location of certain navigation aids. After the introduction of PBN, the aircraft position is controlled by on-board computers using global positioning system ("GPS")[8] or inertial guidance systems.

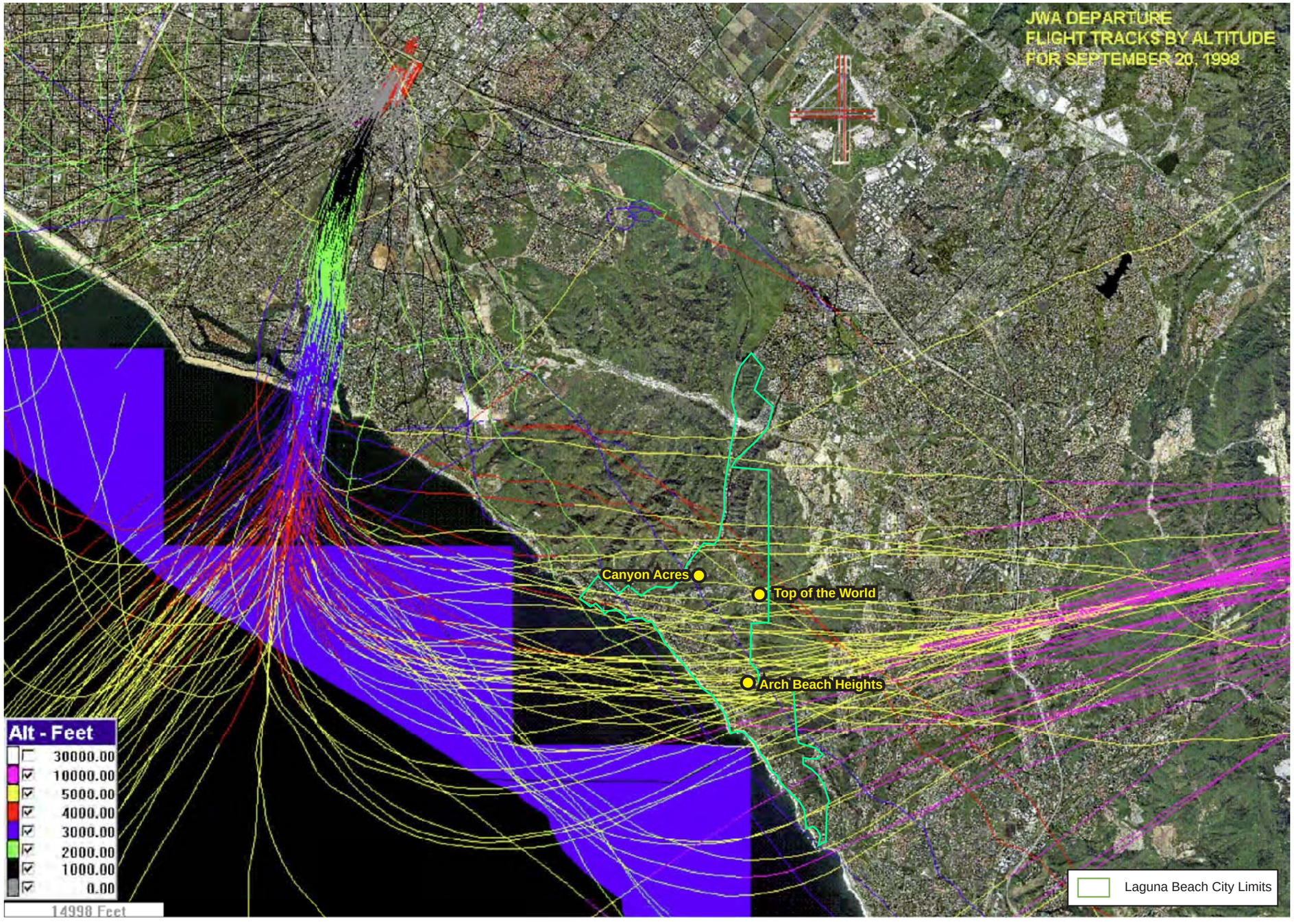
The four flight track exhibits show an apparent drift in the central tendencies of the tracks. In 1998, the tracks appear more evenly distributed over Laguna Beach, with a central tendency over Arch Beach Heights and Moulton Meadows Park. In the year 2000, after the closure of Marine Corps Air Station El Toro, there are concentrations over the Bluebird Park area and Lang Park area, but still a great deal of scatter over the entire City. In 2007, the central tendency is more of North Laguna continuing over Bluebird and southern end of Top of the World with also a grouping over Lang Park, but still a great deal of dispersion over all of Laguna Beach. In 2013, there is less dispersion, but still wide swaths of Laguna Beach are overflown with the central tendency moved north of North Laguna and continuing more over Top of the World than previous years.

Altitudes

The altitudes are shown as different colors along the flight tracks. Of interest is where the aircraft reach an altitude of 10,000 feet and color of tracks shown in the exhibits turn from yellow to magenta. Exhibit 4.6-30 shows that this transition occurred closer to the coastline than in previous years where the aircraft were generally further inland before they reach an altitude of 10,000 feet. This indicates that aircraft are generally flying at higher altitudes when the pass over Laguna Beach than they have in previous years. This would be consistent with the newer aircraft performance capabilities and the Required Navigation Performance ("RNP") flight tracks.

A review of radar data from individual departures showed that some aircraft would hold their altitude and fly level as they made the turn back towards the coast and Laguna Beach, while others would keep climbing to their cruising altitude. Those aircraft that hold their altitude and fly level as they fly over the Laguna Beach coast fly over the coast at an altitude between about 5,700 feet and 7,000 feet and maintain this altitude as they fly over the city and then start climbing again at various points, sometimes directly over the city. Aircraft that hold their altitude do so at the direction of air traffic control to ensure enough spacing from other aircraft flying at higher altitudes parallel to the coastline.

[8] GPS is a navigation system that uses space-based satellites to provide location data.



Source: *Noise Analysis Technical Report,* Landrum & Brown, 2014

Flight Tracks From The Year 1998

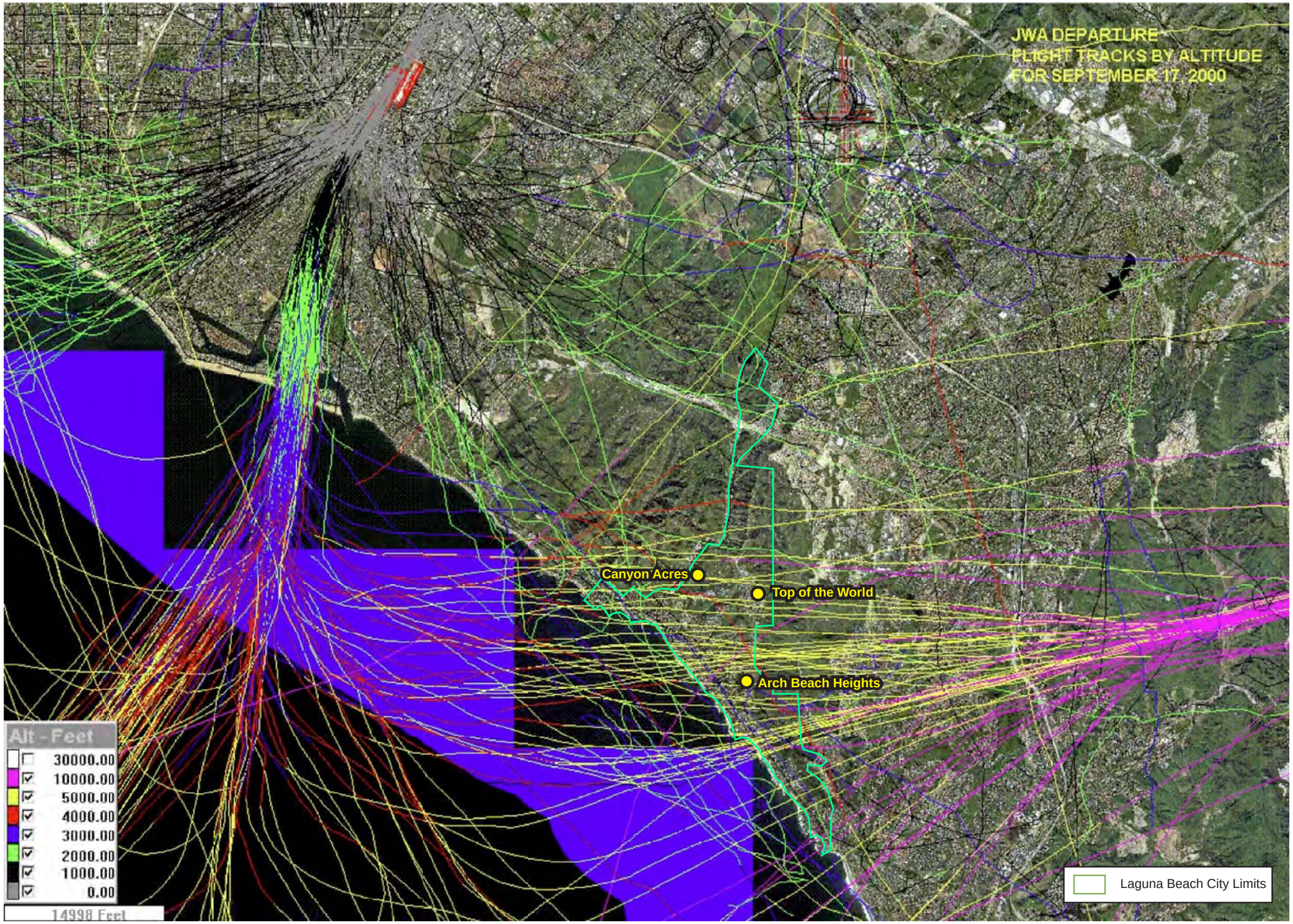
Exhibit 4.6-27

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

(04/10/14 JAZ) R:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks1998.pdf

D:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks1998.ai



Source: *Noise Analysis Technical Report,* Landrum & Brown, 2014

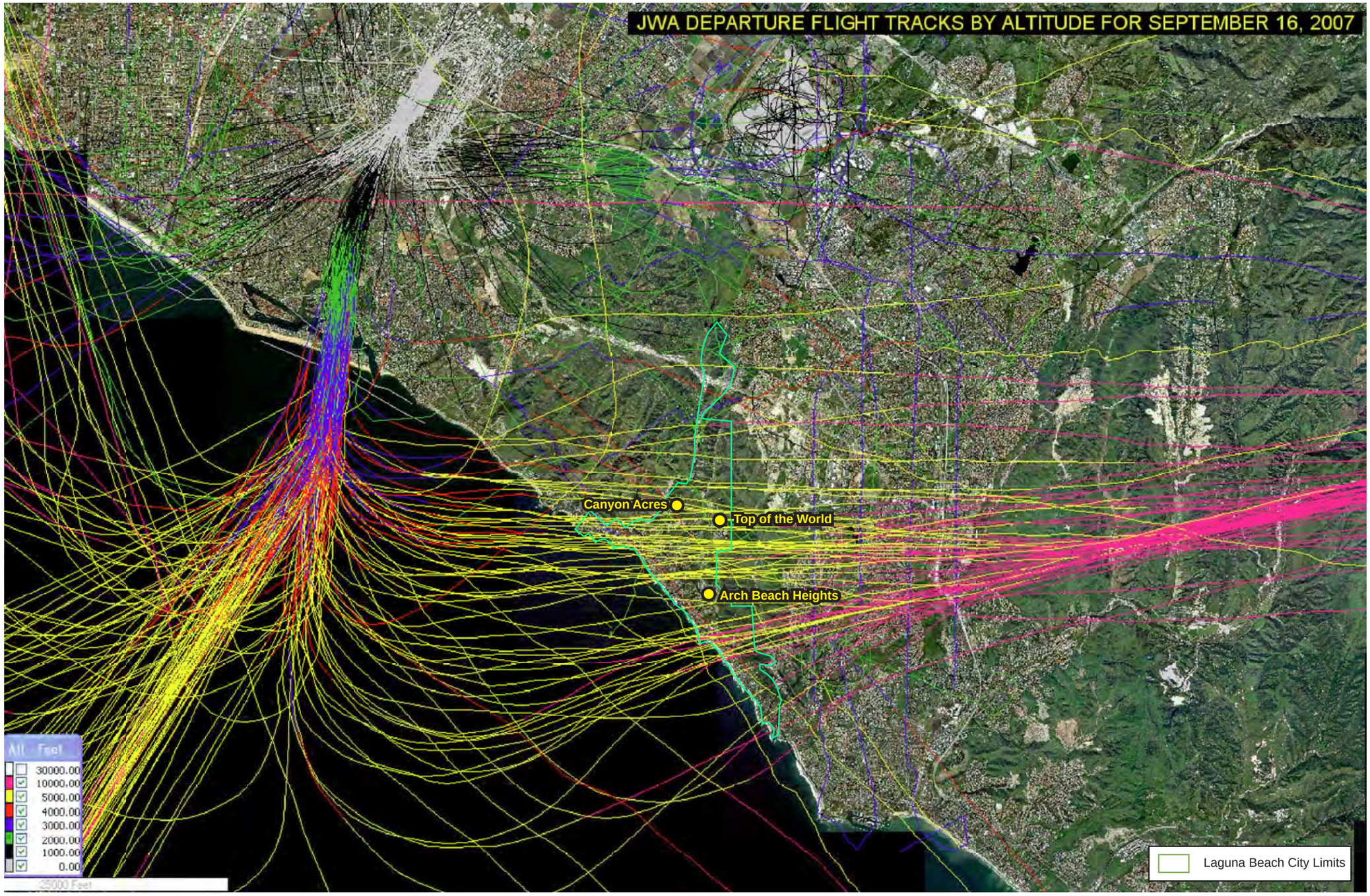
Flight Tracks From The Year 2000

Exhibit 4.6-28

John Wayne Airport Settlement Agreement Amendment

(04/10/14 JAZ) R:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks2000.pdf

D:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks2000.ai



Source: *Noise Analysis Technical Report,* Landrum & Brown, 2014

Flight Tracks From The Year 2007

Exhibit 4.6-29

John Wayne Airport Settlement Agreement Amendment

(04/10/14 JAZ) R:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks2007.pdf

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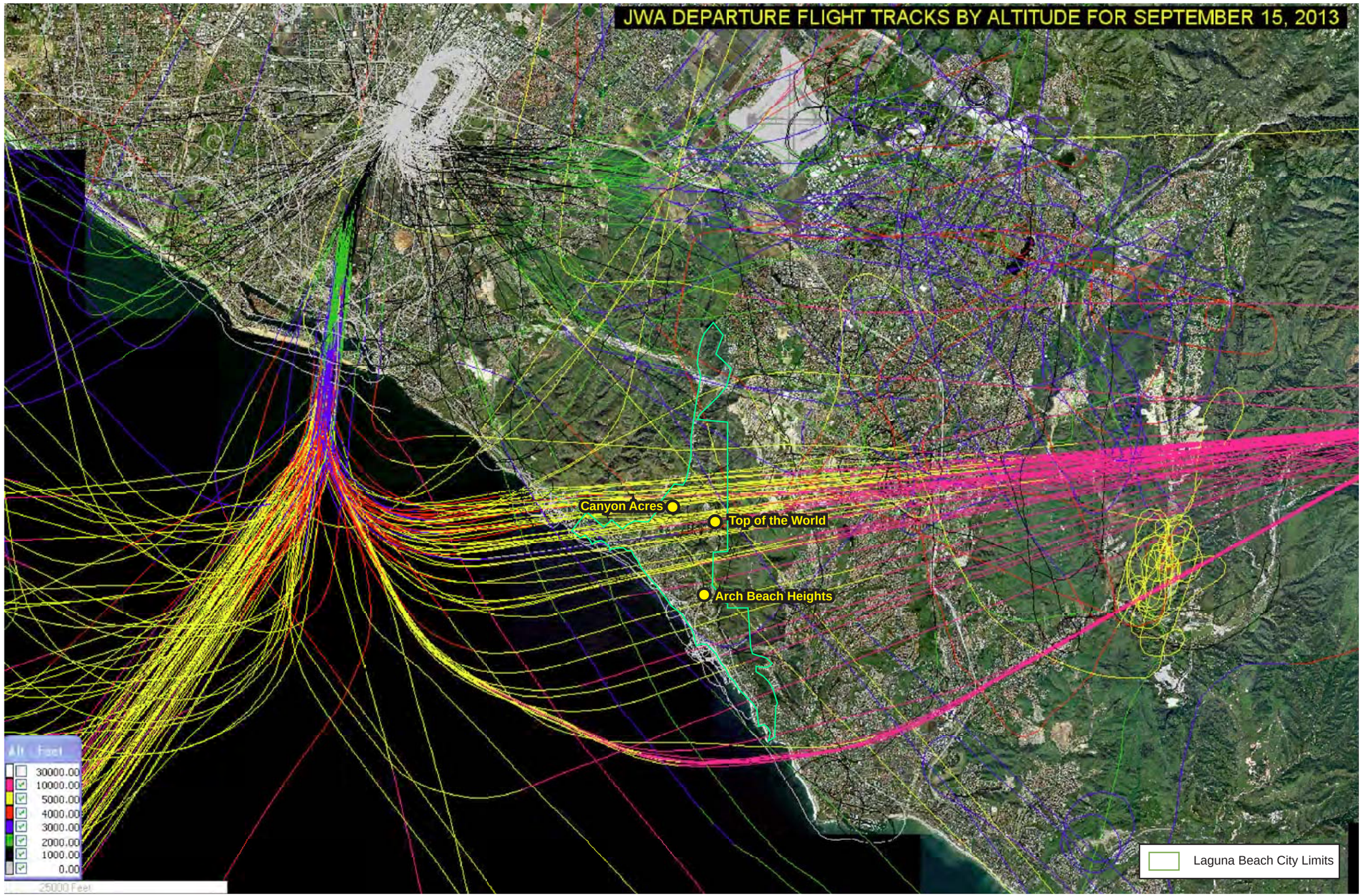

Source: *Noise Analysis Technical Report,* Landrum & Brown, 2014

D:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks2013.ai

Flight Tracks From The Year 2013

Exhibit 4.6-30

John Wayne Airport Settlement Agreement Amendment

JOHN WAYNE AIRPORT ORANGE COUNTY

(04/10/14 JAZ) R:\Projects\JWA\J003\Graphics\EIR\ex_FlightTracks2013.pdf

Single Event Noise

Three specific points, Canyon Acres, Top of the World, and Arch Beach Heights, were analyzed for flyover noise. Canyon Acres was selected due to the large number of concerns about aircraft noise from this neighborhood, the same for Top of the World, as well as the fact that Top of the World and Arch Beach Heights are at higher elevation and thus closer to the aircraft than other neighborhoods in Laguna Beach. These three areas of Laguna Beach, excepting the parts of Canyon Acres nearest Laguna Canyon Road, currently have low ambient noise levels and the aircraft noise is more intrusive than it would be in a more urban area.

The maximum noise level at each of these locations during a fly over by the most commonly used aircraft serving JWA, the Boeing 737-700, was computed using the INM. The noise levels were calculated with flight tracks that passed directly overhead of the analysis locations for two flight profiles. The "held down" profile represents flights subject to altitude holds from air traffic control, as described above; the aircraft hold altitude at 5,700 feet and resume their climb as they pass over each of the analysis locations. This results in an estimate of the maximum environmental impact for noise levels. The second flight profile assumes that the departing aircraft climbed to their cruising altitude without air traffic control restrictions, which is the "typical" maximum aircraft overflight noise level at these sites.

The maximum noise level was estimated because it represents the instantaneous maximum heard during a flyover. Further, these locations are too far from the Airport and too far outside the regulatory threshold of 65 dB CNEL to reliably estimate CNEL. Moreover, it is the aircraft noise level during the flyover that is of concern to residents, not the 24-hour average. Table 4.6-26 shows the estimated maximum noise levels (i.e., Lmax values).

TABLE 4.6-26
MAXIMUM AIRCRAFT OVERFLIGHT SINGLE EVENT NOISE LEVEL

Receiver Location	Departure Type	
	Held Down	Typical
Canyon Acres	64.5 dBA	62.8 dBA
Top of the World	66.6 dBA	63.5 dBA
Arch Beach Heights	65.8 dBA	62.0 dBA

Source: *Noise Analysis Technical Report*, Table 35, Landrum & Brown, 2014.

The maximum noise levels shown in Table 4.6-26, in the range of approximately 62 dBA to 67 dBA, are noise levels not exceptional in terms of other ambient noises, such as cars, trucks, motorcycles, etc. that are typical of a 67 dBA noise level. The noise levels do not exceed any County, State, or Federal standard or guideline for environmental noise in residential areas.

Project Effects

Neither the Proposed Project nor any of the Project alternatives would affect the location or altitudes of flight tracks over Laguna Beach. The number of flights would increase commensurate with the increase in ADDs associated with the Proposed Project and each alternative. It is noted

that JWA operations peaked in the year 2007 and have decreased since that time. Although there have been recent increases in air carrier operations, the number of flights are still well below year 2007 levels. (See Table 3-1 in the *Aviation Forecast Technical Report* [Appendix B].)

Table 4.6-27 presents the percentage increase in ADDs (relative to the existing Settlement Agreement terms) for the Proposed Project and each alternative. Only Alternative C, Phases 2 and 3 consider the effect of removing the current curfew. Consequently, Alternative C, Phases 2 and 3 would result in a considerable increase in nighttime operations over Laguna Beach. Note that adoption of Alternative C, Phases 2 and 3 and the removal of the current curfew would require further Board of Supervisors discretionary action and additional environmental documentation.

Currently, there are no late nighttime overflights of Laguna Beach from JWA. However, there are several LAX arrivals and departures that overfly Laguna Beach at nighttime, particularly flights to and from Mexico. Additional discussion relative to current night flights is included Section B4 of the *Noise Analysis Technical Report* (Appendix C).

TABLE 4.6-27
PERCENT INCREASE IN TOTAL AIR CARRIER/CARGO DEPARTURES

Alt	Phase	Average Daily Departures (Class A and E)	% Increase
No Project Alternative		146	0
Proposed Project	1	146	0
	2	158	8
	3	168	15
Alternative A	1	142	-3
	2	148	2
	3	165	13
Alternative B	1	143	-2
	2	172	18
	3	199	37
Alternative C	1	228	56
	2	228	56
	3	228	56

Note: Total Operations decrease slightly between Alternative A and Alternative B because the number of Class A Average Daily Departures increases but the number of MAP remains constant. This results in a decrease in Class E operations due to larger load factors for Class A aircraft.

Source: *Noise Analysis Technical Report*, Table 36, Landrum & Brown, 2014.

4.6.7 MITIGATION PROGRAM

AN INTRODUCTION TO MITIGATION MEASURES

Because of the complexity of the roles of the airport proprietor, the federal government, state government and local municipalities, aviation noise mitigation is a complex subject. Generally, the responsibility and authority for noise abatement mitigation measures does not rest with one individual, one governmental entity or agency, or one community. To the contrary, the authority and responsibility lies with a wide variety of federal, state, local and private entities and corporations, both on a national and local level.

The federal government has the authority and responsibility to control aircraft noise sources, implement and enforce flight operational procedures and manage the air traffic control system in ways that minimize noise impacts on people. State and local governments have the responsibility to provide land use planning, zoning and development controls that will encourage development or redevelopment of land that is compatible with both present and projected Airport operations. In order to accomplish this task, the state must provide enabling legislation that grants authority to the local units of government to implement land use controls that are not confiscatory or discriminatory. In addition, the local units of government having land use control must work closely with airport management to coordinate land use compatibility planning beyond the airport's boundary. Sometimes, the airport management has no authority to control the types of land uses outside the airport ownership boundary and must therefore work cooperatively with the appropriate local unit of government.

Noise standards for individual aircraft are established by the federal government and must be met by the aircraft manufacturers through newly-designed engines and aircraft. The airlines are then responsible for replacing or retrofitting their fleet with these new aircraft and/or engines. The airlines are also responsible for scheduling and flying airplanes in a manner that minimizes the impact of aircraft-generated noise on people.

The airport management is responsible for planning and implementing airport development actions designed to reduce noise. Generally, such actions include improvements in airport design and noise abatement ground procedures, in addition to evaluating restrictions on airport use that does not unjustly discriminate against any user, impede the federal interest in safety and management of the air navigation system, or unreasonably interfere with interstate commerce.

The objective is to explore a range of feasible mitigation options, including land use patterns and noise control actions, seeking optimum accommodation of both airport users and airport neighbors within acceptable safety, economic and environmental parameters. Consideration of measures addresses both physical planning and the implementation aspects of proposed solutions. Some measures may have little or no value in a particular situation, especially if used alone. In order to be considered for implementation a measure should:

1. have the potential of resolving a recognized problem;
2. be implementable within acceptable economic, environmental and social costs; and
3. be legally permissible within existing state, federal and local legislation, regulations, and ordinances.

The following sections contain a description of potential noise abatement measures or actions for the reduction of noise levels associated with civilian aircraft operations. The list of mitigation measures presented here for evaluation was developed from FAR Part 150 guidelines ("Noise Control and Compatibility Planning for Airports", AC 150/5020-1, 1983).

A general evaluation of each measure has been made to determine if the measures are applicable or inapplicable to the Project; are associated with land use controls available to the state or local unit of government; or, are measures that have previously been or are existing noise abatement measures at JWA. This is then followed by a discussion of the mitigation measures recommended as part of this EIR.

MEASURES INAPPLICABLE TO THE PROPOSED PROJECT AND ALTERNATIVES

The following measures were determined not to be feasible mitigation option for the Proposed Project and Alternatives. This determination was made based on: the need to comply with FAR Part 161 (see discussion below regarding requirements of Part 161 and the unlikelihood that these measures could be implemented); the measures pertain to aircraft operation and are outside of the control of JWA; physical limitations of JWA; because they do not address a noise condition applicable to JWA; and/or are subject to regulatory restrictions.

Aircraft Noise Mitigation Options Requiring Federal Aviation Regulations Part 161 Compliance

The following discussion describes measures that are potentially available to airport proprietors to mitigate aircraft noise. As discussed, most of these measures require the proprietor to comply with FAR Part 161, which was adopted as required by the 1990 ANCA. One of the goals of ANCA was to minimize the burden of higher costs and inefficient use of aircraft on the nation's air transportation system from a lack of coordination among individual airport mitigation measures. ANCA and Part 161 apply to any "noise or access restriction" which is defined very broadly and includes, for example, "any other limit on Stage 2 or Stage 3 aircraft that has the effect of controlling airport noise." Any number of actions could have an effect on aircraft noise.

The onerous requirements of Part 161 that must be satisfied for an airport proprietor to implement these measures are quite stringent and unlikely to be satisfied except in unique situations. And, in the case of Stage 3 restrictions, the statutory and regulatory conditions for Stage 3 restrictions make it abundantly clear that the FAA will approve a restriction on Stage 3 aircraft only in exceptional circumstances. Airports that adopt restrictions subject to ANCA and Part 161 without following the regulations may lose eligibility for Airport Improvement Program grants and authority to collect Passenger Facility Charge ("PFCs").

A handful of airports have proposed implementing these mitigation measures and prepared analyses to demonstrate compliance with Part 161. However, only two have received approval of their proposals to restrict Stage 2 aircraft. The majority of the others have been abandoned based on FAA comments or denied by the FAA. The remaining have been abandoned because of voluntary agreements between the airports and airlines.

Denial of Use of Airport to Aircraft Not Meeting FAR Part 36 Stage 3 Standards

This measure limits access to the airport to aircraft that conform with certain FAR Part 36, Stage 3, noise level requirements. Older, non-complying (Stage 2) turbojets would be denied or given only restricted access.

Denying such aircraft use of the airport prior to the date required by the federal statute is a feasible option provided the action is not unjustly discriminatory, does not constitute a burden on interstate and foreign air commerce, does not conflict with any Airport policy or requirement, and is compliant with the requirements of FAR Part 161. Federal law required the elimination of Stage 2 aircraft from domestic operations by the year 2000 and all domestic airlines in the contiguous 48 states are in compliance. Therefore, this measure is inapplicable to the Proposed Project, as no Stage 2 operations are forecast for JWA under the Proposed Project, Alternatives A, B or C, or the No Project Alternative.

Capacity Limits Based on Noise

Historically, restrictions on airport use have, in certain limited instances, been based upon noise limits. The form of such restrictions can take three broad forms of implementation. These are outlined below.

All three measures can be successful when there is a significant noise problem affecting people beyond the boundary of the airport, but are usually not recommended for airports where there is little noise impact on people. Also, these measures have been severely limited by the 1990 ANCA and, unlike the existing JWA regulations, all of which were adopted before 1990, any new more restrictive regulations applied to JWA would require the Airport to satisfy the onerous requirements of FAR Part 161 prior to implementation.

Restrictions Based on Cumulative Impact. With this approach, a maximum cumulative impact (such as the total area within the existing CNEL 65, 70 or 75 dB contour) is established as the baseline cumulative impact and then the airport's operations are adjusted or limited so as not to exceed that maximum in the future. This is accomplished through "capacity limitations," whereas either the aircraft types, based upon their "noisiness;" the numbers and mix of aircraft; or the time of operations are limited or adjusted so as not to exceed the existing noise impact. This approach is sometimes referred to as a "noise budget" regulation. No commercial air carrier airport in the United States has ever implemented a regulatory restriction of this type. This type of regulation was considered and rejected by the County for JWA operations because of the extreme difficulties inherent in implementation and enforcement.

Restrictions Based on Certificated Single Event Noise Levels. Most aircraft today have been certificated for noise by the FAA, as part of the FAR Part 36 process explained earlier. These levels are published as part of the Advisory Circular ("AC") 36-1C and 36-3G, and it is possible to devise limitations based upon those certificated data. This measure can be formulated so as to set a threshold noise level for the airport which cannot be exceeded, or different levels can be implemented for either day or nighttime operations. An aircraft's compliance with this limit would be determined from the published FAA certification data. However, certificated levels are not always representative of actual operational noise levels of any given airport or for any specific flight. For this reason, the County has historically rejected this form of regulation at JWA, relying instead on actual measured noise levels rather than certificated levels.

Restrictions Based on Measured Single Event Noise Levels. Although aircraft noise levels vary widely with changes in operational procedures, as well as with atmospheric conditions, it is possible to set limits on measured single event noise levels. Aircraft which exceed this limit can be prohibited from using the airport. This does not mean that the airport, the community or citizen group can set up a microphone and noise level limit and challenge the pilots to not exceed

the limits (also known as "beat the box"). For air carrier aircraft, compliance with the single event level should be measured over an extended period of time (at JWA it is a quarterly measurement) and for many single events when practical (i.e., scheduled commercial operations), and violation determined from repeated excess noise or long-term average. This is one of the main air carrier noise control measures in effect at JWA. This long-term averaging is not practical for general aviation aircraft, where noise level limits are applied to each individual operation. Repeated violation of the limits can result in the aircraft owner, the aircraft operator and the aircraft being subject to denial of use of the Airport. At JWA, for general aviation three violations of the noise level limits within three years are grounds for denial of use.

Complete or Partial Curfews

Airport curfews are an effective but costly means of controlling noise intrusion into areas adjacent or in close proximity to the airport. Curfews can have a very significant negative economic effect upon airport users and those providing airport-related services. The issue is sometimes articulated as a concern of unjust discrimination or as an unreasonable burden to interstate or foreign commerce.

A curfew can take various forms, from restrictions upon some or all flights during certain times of the day or night, or restrictions based upon noise thresholds and certificated aircraft noise levels contained in the AC 36-3G. Curfews are usually implemented to restrict operations during periods when people are most sensitive to noise intrusion, which most often occurs between the hours of 10:00 PM or 11:00 PM to 6:00 AM or 7:00 AM. Again, generally, implementation of these measures as a new restriction has been severely limited by the 1990 ANCA and would require a Part 161 application for implementation.

JWA has two types of nighttime restrictions in place. Air carrier departures are prohibited from 10:00 PM to 7:00 AM (8:00 AM on Sundays). Air carrier arrivals are prohibited from 11:00 PM to 7:00 AM (8:00 AM on Sundays). General aviation aircraft may operate at nighttime if they comply with strict noise limits that have been set at the noise monitors. The nighttime general aviation noise limit is very restrictive and only the quietest of the general aviation fleet can operate at night. None of the nighttime restrictions at JWA are subject to change as part of the Proposed Project, Alternatives A, B, and C (Phase 1), and the No Project Alternative and the nighttime restrictions remain in place after the expiration of the 1985 Settlement Agreement (as amended in 2003), absent additional discretionary action by the County's Board of Supervisors. Even with Alternative C, Phases 2 and 3, subsequent CEQA documentation and action by the Board of Supervisors would be required to remove the curfew.

Measures Pertaining to Aircraft Operation

The following measures would restrict aircraft operations, which are under FAA jurisdiction. As such, these measures are outside of the control of JWA and do not directly relate to the Project.

Departure Thrust Cutback

This measure would involve the imposition of thrust cutbacks following takeoff. Because of system-wide needs, each airline has developed its own standardized takeoff procedure. This measure is recommended where the airlines have the opportunity to utilize a different departure thrust setting and still be within safety limits as per the particular type of aircraft they are flying

given the characteristics of the particular airport concerned. This measure cannot be implemented without the direct concurrence of the FAA and compliance with AC 91-53A.

Many of the airlines already use departure procedures at JWA that include a power cutback. This provides a noise benefit to residences near the Airport, in Santa Ana Heights. No changes in the JWA departure procedures are proposed as part of the Proposed Project or Alternatives.

Flight Track Alterations

This measure involves routing takeoff or approach flight tracks to minimize noise exposure on sensitive areas. These procedures are dictated by considerations of operational safety and air traffic control procedures. Generally speaking, the air traffic control procedures can be resolved, perhaps with penalties involving reductions in Airport use and airspace capacity. However, aircraft turns at low altitudes, where the aircraft are in a low-speed, high drag configuration, can cut deeply into aircraft operating margins. Turns during the last three to four miles of the final approach in good weather, and within the final six to seven miles during poor weather, are undesirable because they do not allow pilots to establish and maintain a stabilized approach. Aircraft bank angles near the ground need to be restricted to no more than 15–20 degrees. This measure cannot be implemented without the direct concurrence of the FAA.

The FAA has published AC 91-53-A regarding noise abatement departure procedures ("NADP"). AC 91-53-A sets minimum requirements for departure procedures and limits the number of NADPs that an airline may use. Again, these procedures cannot be implemented without the concurrence of the FAA, taking into account both operational, safety, and airspace considerations.

The current south flow departure track used by jet aircraft at JWA includes a left turn to generally follow Newport Back Bay. This locates the aircraft between the noise sensitive communities of East Bluff and Dover Shores. Note that flight track dispersion results in some aircraft performing the turn earlier or later than the ideal track and that results in some aircraft over flying the communities adjacent to the Back Bay. Historically, jet aircraft performed the noise abatement turn using distance-measuring equipment and the aircraft compass as the main guide. Increasing implementation of GPS procedures has resulted in reduced dispersion along the flight track.

Preferential Runway System

This measure involves the use of specific runways to minimize noise impacts. The FAA is responsible for implementing this measure based on the recommendation of the Airport operator and the safety considerations contained in FAR Part 121.

There is only one runway available to jet aircraft at JWA. The runway use (north or south flow) for that runway is determined largely by the prevailing wind. During calm or near calm conditions, the FAA tower will occasionally allow north flow departures as traffic permits. During an informal preferential runway program authorized by the Board of Supervisors in the early 1970s, aircraft were permitted to depart to the north in the early morning departure rush when the winds permitted. That test resulted in significant negative response from communities north of the Airport and the Board adopted a resolution ordering the discontinuance of this runway use program (Minute Order dated October 9, 1973).

Power and Flap Settings

A variety of operating procedures is possible for implementation at an airport. These include minimum flap landings and delaying flap and gear deployment. More extensive delayed flap procedures have not been considered safe with current air traffic control procedures and safety criteria. This is particularly true for an airport like JWA where the runway length is a limiting factor.

GPS Landing System

A landing system based on GPS Satellites is a new type of instrument landing system which, when fully installed, may allow noise abatement landing procedures which are not possible presently. This system is not yet fully serviceable, and it is unknown when this system will be available for instrument flight rules. Therefore, no recommendations concerning such a system are included in this analysis.

Not Applicable Due to Physical Limitation at John Wayne Airport

Construct a New Runway in a Different Orientation

Many times the construction of a new runway with a different orientation will shift impacts away from noise sensitive uses to less populated areas. The orientation of a runway is dependent upon many factors, including prevailing winds, topography, obstacles and other conditions. A new runway cannot be constructed if wind direction and topographic conditions are such that safety criteria cannot be met. New runways are not recommended for JWA because the Airport property is very limited (less than 500 total Airport acres).

Runway Extensions

Many times a runway extension, coupled with other noise-abatement procedures, can mitigate noise impacts on areas in close proximity to the Airport. The extension can allow aircraft to gain altitude quicker relative to surrounding land uses and produce less noise impact at ground level. In addition, noise-abatement turns are sometimes possible with an extension as a result of enhanced altitude position. Many times, with an extension, the area off the end of the runway with an extension can experience greater amounts of noise due to lower approach altitudes at this end of the runway. This can sometimes be corrected by establishing a displaced threshold so that aircraft land farther down the runway and maintain altitude over the area beyond the extension. This practice is not generally recommended by the FAA.

An additional factor to consider with a runway extension is that heavier, larger aircraft often can be accommodated at the airport as a result of the extension. This may not necessarily be undesirable, for many of the larger, heavier aircraft are new generation aircraft and are actually quieter than certain smaller or older aircraft. In addition, they are capable of handling a larger seating capacity, which may actually reduce the overall number of operations occurring at the airport. This could result in an overall reduction of noise intrusion. Runway extensions can also be used as a noise abatement measure to help reduce the need for using reverse thrust upon landing, which can generate a considerable amount of ground-level noise to areas in close proximity to the airport.

JWA has very limited real estate to consider a runway extension; therefore, any potential extension would be small. A movement of the runway threshold to the north could reduce noise

to the south of the Airport, except for any increase in departure weight that would be accommodated by the extended runway. There would be a concomitant increase in noise to the north unless a displaced threshold kept the landing point at its current position. If the runway were lengthened to the south the only change in noise to the south would be an increase associated with any increase in aircraft weight permitted by the extension. The Settlement Agreement Amendment pertains to operation restrictions and therefore, physical modifications to the Airport are not being evaluated at this time. A runway extension would need to be a separate discretionary action by the Board of Supervisors and would need to be evaluated in subsequent CEQA document.

High Speed Taxiways

High speed taxiways can help reduce noise intrusion by allowing aircraft to exit the runway quicker and reducing the need for extended use of reverse thrust. This measure is only viable with a runway of sufficient length to allow aircraft the opportunity to slow down to a speed sufficient enough to exit the runway. The runway at JWA is too short for this measure to be effective.

Address a Noise Condition Not Applicable to John Wayne Airport

Noise Barriers (Shielding)

Noise generated from ground-level sources on an airport can be a result of engine run-up and maintenance operations, taxiways and warehouse activities. Noise intrusion from these sources is usually only significant to those areas in close proximity to the airport. One method of mitigating this type of noise is through the use of noise barriers or earthen berms. These can protect immediately adjacent areas from the unwanted noise generated by aircraft still at ground level. Once the aircraft is airborne these measures have no effect. Another method is through the strategic and well planned location of airport structures that can provide shielding to adjacent areas to prevent noise intrusion. Run-up and maintenance areas can also be moved to areas which are away from noise sensitive uses adjacent the airport, and if necessary "hush houses" can be constructed to absorb sound for run-up and maintenance operations.

JWA does not support any maintenance facilities for large aircraft and there are no opportunities to achieve significant noise reductions at the Airport through the use of noise barriers.

Touch and Go Restrictions

Restrictions on training flights performing touch-and-go operations can mitigate noise impacts at airports where there are a significant number of such operations, especially jet training. This measure is also effective if the operations are occurring during the nighttime and early morning hours, for the restriction may be for certain time periods. Training operations at JWA are generally confined to areas over commercial land use and are not a significant source of noise impacts at JWA.

Infeasible Due to Other Regulatory Requirements and Restrictions

Ban All Jet Aircraft

This measure is sometimes proposed at general aviation airports, but it has been well settled and documented by case law that this is not legally possible. The federal courts have held that a regulation based on an aircraft's engine type rather than its noise level results in unjust

discrimination in violation of the grant assurances required by the Airport and Airway Improvement Act of 1982, as amended. An outright ban on all jet aircraft, especially at an air carrier airport, cannot be legally implemented.

Landing Fees Based on Noise

This measure is based on the premise that all or part of the landing fee for each aircraft focuses on the noisiness of that individual aircraft. This would apportion the "cost" of the noise to those aircraft which contribute the most to it. This measure would be implemented to encourage the use of quieter aircraft while generating additional revenue for the airport. In order to avoid unlawful discrimination, the FAA has suggested that the noise fee should be based upon a published standard for single event noise levels, such as those contained in AC 36-3G. As a corollary to this, the opposite strategy can also be used. That is, quieter aircraft could be apportioned a lesser fee than noisier aircraft, thus serving as an incentive for quieter aircraft. In this manner, airlines which go to extra lengths to reduce noise generated by their aircraft are rewarded. In effect, the theory of this type of approach is to create "market incentives" to "encourage" use of quieter aircraft.

This measure has never been successfully implemented primarily because any feasible price differential would be inconsequential to airline operating costs and there is no guarantee that noise will be reduced. This approach has historically been rejected by the County at JWA in favor of the strict noise limit with sanctions for non-compliance.

LAND USE CONTROLS AVAILABLE TO STATE/LOCAL GOVERNMENT

Land use and development controls which are based on a well-defined and thoroughly documented comprehensive plan are among the easiest and most powerful tools available to the local unit of government to ensure land use compatibility. It is very important for the local unit of government to exercise these controls, for these controls are beyond the authority of the airport management to implement, and it is the responsibility of the local unit of government having land use jurisdiction to implement these controls to protect the Airport from encroachment.

Traditionally, even if the airport is managed by the same unit of government that has land use control authority for the land area beyond the airport's boundary, there has been little coordination and discussion as to what land use controls should be implemented and which land uses are compatible with airport development. This is very important to ensure coordination of development plans for all parties involved, particularly where more than one unit of government has land use control authority for the area outside the airport's boundary. The airport is in a particularly precarious position, because the airport is liable for noise intrusion but has no authority to control what types of land uses are developed beyond its borders. It is extremely critical that the local units of government accept responsibility for ensuring land use compatibility in their planning and development actions.

It is also important that the State government provide the necessary enabling legislation that will allow the local unit of government to institute land use controls. The most common forms of land use controls available to the local governments include: zoning, easements, transfer of development rights, building code modifications, capital improvement programs, subdivision regulations and comprehensive planning. These forms of land use controls are briefly outlined in the following paragraphs.

Zoning. Zoning is the most common and traditional form of land use control used in the United States today. It controls the type and placement of different land uses within the designated areas. It is used to encourage land use compatibility while leaving property ownership in the hands of private individuals or business entities, thus leaving the land on the tax rolls. Zoning is not applied retroactively and is not necessarily permanent. It is most effective in areas which are not presently developed and which can be encouraged to develop with compatible uses.

Easements. As stated earlier, an easement is a right held by one to make use of the property of another for a limited purpose. Two specific types of easements are usually referenced in airport planning, a positive easement which would allow the generation of noise over the land and a negative easement to prevent the creation of a hazard or obstacle on the property of another.

Transfer of Development Rights. The transfer of development rights involves separate ownership of the "bundle of rights" associated with property ownership. The concept involves the transfer of the right to develop a certain parcel of property to a certain density/intensity to another parcel of property under separate ownership. This would allow the property that obtains the added development rights to develop to an intensity/density that is beyond that which would normally be allowed. The airport could also purchase these rights from the landowner and retain them or sell them to another landowner. This concept can be used to retain property in compatible uses and still compensate the landowner for his loss of development. The idea depends on market conditions of the area and (there is some disagreement on this point) upon the availability of state enabling legislation authorizing the development of the concept at the local level.

Building Code Modifications. This measure is to modify existing or potential building codes to include specific sound attenuation provisions for structures within areas impacted by aircraft noise.

Capital Improvements Program. This is a document that establishes priorities and costs on the funding and development of public facilities. It can be used very successfully, in concert with subdivision regulations and a comprehensive plan, to control not only the areas of development but the timing of development by controlling the timing and location of public facilities.

Subdivision Regulations. Subdivision regulations are used to control the design and placement of public and private facilities in the conversion of raw land to developed property.

Comprehensive Planning. When it is coordinated with the zoning ordinance, subdivision regulations and the capital improvements program, comprehensive future land use planning can reduce or avoid land use incompatibilities in the future. The County of Orange has adopted extensive regulations and mitigation measures for projects. These mitigation measures are presented in Section 7.6.4 of the *Noise Analysis Technical Report* (Appendix C), and include the County of Orange Standard Noise Mitigation Measures. The Airport Land Use Commission for Orange County has adopted a comprehensive AELUP and has a State-mandated review authority over planning in the vicinity of each Orange County airport.

State and local jurisdiction land use controls have been implemented near JWA by the County and the neighboring cities based on the planning policy boundary created by the 1985 Master Plan. It is recommended that no changes be made to those land use controls to prevent the creation of new noise impacts.

PREVIOUS AND EXISTING NOISE ABATEMENT MEASURES AT JWA

The Phase 2 Commercial Airline Access Plan and Regulation at John Wayne Airport

The Phase 2 Access Plan, was adopted by the County to implement mitigation measures identified in Orange County EIR 508/EIS prepared for the 1985 Master Plan. In addition, the Plan also implements the 1985 Settlement Agreement between the County, the City of Newport Beach and two community groups.

The Plan defines the noise level limits for Class A and Class E aircraft along with limits on the number of ADDs for airline and cargo aircraft and the number of annual passengers. It also specifies the hours that commercial and cargo aircraft can operate, prohibiting them during the nighttime. Commercial departures are allowed Monday through Saturday from 7:00 AM to 10:00 PM, and on Sundays from 8:00 AM to 10:00 PM Commercial arrivals are allowed Monday through Saturday from 7:00 AM to 11:00 PM, and on Sundays from 8:00 AM to 11:00 PM.

The Plan has been amended several times for clarification and to reflect changing conditions since its origination. In 2002, the Settlement Agreement was amended to provide additional ADDs and passengers in light of improvements to aircraft design that considerably lowered the noise emissions from newer aircraft, especially when compared to aircraft in use in 1985. The purpose of this Project is to further amend the Settlement Agreement to allow for additional, but limited, growth in airport operations in the future.

Nighttime Curfew

JWA has two types of nighttime restrictions in place. As discussed above, the Phase 2 Access Plan prohibits commercial aircraft activity during the nighttime. The General Aviation Noise Ordinance (GANO) also prohibits general aviation aircraft that are unable to comply with strict noise limits from operating during the nighttime hours. Aircraft that comply with the noise level limits are not restricted during the nighttime. However, nighttime general aviation noise limit is very restrictive and only the quietest of the general aviation fleet can operate at night.

Noise Abatement Departure

Anyone who has ever flown in a commercial aircraft departing from JWA is familiar with the noise abatement departure procedure. Under this procedure, commercial aircraft use full power to climb as quickly as safety permits right after takeoff. At approximately 1,000 feet, the aircraft level out and reduce power as they fly over Back Bay, Newport Beach, and Balboa Island. After the aircraft have passed the coast, the aircraft increase power to resume the climb to their cruising altitude. This departure procedure concentrates the noise close to the Airport, where the aircraft is climbing under full power, and reduces the noise between the point where the aircraft level out and where they resume their climb.

In addition, the current south flow departure track used by jet aircraft at JWA includes a left turn to generally follow Newport Back Bay. This locates the aircraft between the noise sensitive communities of East Bluff and Dover Shores. Historically, jet aircraft performed the noise abatement turn using distance-measuring equipment and the aircraft compass as the main guide. This resulted in flight track dispersion. That is, some aircraft performed the turn earlier or later than the ideal track and that resulted in some aircraft over flying the communities adjacent to

the Back Bay. Increasing implementation of GPS procedures has resulted in reduced dispersion along the flight track.

Noise Monitoring System

JWA's noise monitoring system is one of the most sophisticated systems in the world. To perform these duties the Office uses a start-of-the art noise monitoring and flight tracking system that allows them to track every aircraft operation and review noise levels at the ten noise monitoring stations (NMS) located around the airport. This system operates twenty-four hours a day, seven days a week. The NMS transmit noise events to the Access and Noise office, enabling the staff to have real-time data on these aircraft operations used for measurement and reporting of aircraft operation compliance with the regulations. The precision noise measurement equipment used in the noise monitoring system meets the highest professional standard of accuracy in the acoustical engineering industry. Daily electronic calibration checks are performed on of all ten (10) stations and they are field calibrated once each month. The field calibration equipment is laboratory certified annually.The Phase 2 Access Plan, described in Section 4.6.2 and above, defines the SENEL noise level limits for Class A and Class E commercial aircraft that cannot be exceeded on an energy average basis each calendar quarter. These limits are presented in Table 4.6-28. As discussed previously, SENEL represents the total acoustic energy from an aircraft overflight. The maximum instantaneous noise level is typically 10 dB less than the SENEL level. The General Aviation Noise Ordinance (GANO), described in Section 4.6.2, establishes SENEL noise level limits that cannot be exceeded by general aviation aircraft on a per flight basis. Separate limits are defined for the daytime hours and the nighttime hours and are shown in Table 4.6-28. The nighttime general aviation noise limit is very restrictive and only the quietest of the general aviation fleet can operate at night.

TABLE 4.6-28
NOISE MONITORING STATION SENEL NOISE LIMITS

	Commercial Aircraft		General Aviation	
NMS	**Class A**	**Class E**	**Daytime**	**Nighttime**
NMS 1S	101.8 dB	93.5 dB	101.8 dB	86.8 dB
NMS 2S	101.1 dB	93.0 dB	101.1 dB	86.9 dB
NMS 3S	100.7 dB	89.7 dB	100.7 dB	86.0 dB
NMS 4S	94.1 dB	86.0 dB		86.0 dB
NMS 5S	94.6 dB	86.6 dB		86.0 dB
NMS 6S	96.1 dB	86.6 dB		86.0 dB
NMS 7S	93.0 dB	86.0 dB		86.0 dB
NMS 8N	--	--		86.0 dB
NMS 9N	--	--		86.0 dB
NMS 10N	--	--		86.0 dB

NMS: Noise Monitoring Station
Source: *Noise Analysis Technical Report*, Tables 29 and 30, Landrum & Brown, 2014.

Noise Complaint/Citizen Liaison Program

The JWA Access and Noise staff answers approximately 2,500 calls a year regarding aircraft operations, noise complaints and questions, and requests for information. The staff strives to provide outstanding customer service by listening and responding to noise complaints, concerns of the community, and requests for information. Calls to the office during business hours are answered directly by the staff. Calls received after hours with a request for a return call are researched and called back, usually by the next business day. All noise complaints are entered into the noise database and the statistics are reported by community in the JWA Noise Program Quarterly Report, and made available to the public on the Airport's web site Quarterly Noise Abatement Reports and Annual Noise Contours

The Access and Noise office produces quarterly Noise Abatement Reports. These Reports present the previous quarter's aircraft operations and noise levels. Daily CNEL levels at each of the NMS are reported along with the monthly and quarterly levels. The number and average single event exposures for each commercial airline aircraft type are presented. In addition noise modeling is performed, and calibrated to the measured levels, to determine the extent of the 65 CNEL contour in the Santa Ana Heights Area. The noise monitoring and operational data for an entire year are used to model annual noise contours. All of this information is made readily available on the Airport's Website.

Santa Ana Heights Land Use Plan

This measure has been extensively implemented at JWA as a mitigation measure to the 1985 Master Plan EIR. Portions of Santa Ana Heights were included in a redevelopment area that has resulted in the conversion of some residential areas to commercial use.

All of the state and local jurisdiction land use controls have been implemented near JWA by the County and the neighboring cities based on the planning policy boundary created by the 1985 Master Plan. It is recommended that no changes be made to those land use controls to prevent the creation of new noise impacts.

Santa Ana Heights Specific Plan

As part of the mitigation of the 1985 Master Plan portions of Santa Ana Heights were included in a redevelopment area and the Santa Ana Heights Specific Plan. This plan zoned the areas subject to the highest aircraft noise levels as Business Park. In 1990 there were approximately 12.5 acres of residential uses in this area and there is currently less than 6 acres of non-conforming uses. These actions comprise the entirety of the state and local jurisdiction land use controls available to minimize noise impacts

Acoustical Insulation Program

As part of the easement acquisition process, airport proprietors may institute a program to install sound insulation in residences and others uses, such as schools, located in high noise impact areas. Typically, the airport provides examples and demonstrations of replacement doors and windows, ventilation systems and other sound insulating construction. The airport proprietor contracts with the property owner to install the insulation in return for an avigation easement The cost of these programs is sometimes funded from the proceeds of the PFC upon approval of the FAA. Additional funding sources include Acoustical Insulation Program Grant funds, JWA revenues and financing (JWA Bonds).

In August of 2012, the FAA issued Program Guidance Letter 12-09, Eligibility and Justification Requirements for Noise Insulation Projects (FAA 2012). This memorandum was issued to reconfirm that both indoor and outdoor noise levels must be evaluated to determine eligibility for residential and other noise insulation projects. Specifically, structures must have an existing exterior noise exposure greater than 65 CNEL and an existing interior noise exposure greater than 45 CNEL in order to be eligible for a sound insulation program funded under Airport Improvement Program.

The measured interior noise levels with windows and doors closed are used to establish eligibility. Only habitable rooms such as living, sleeping, eating or cooking areas are eligible for insulation. Bathrooms, closets, halls, vestibules, foyers, stairways, storage or utility spaces, as well as areas that are not allowed under the local building code are not considered habitable.

The FAA memorandum also specifies that the average interior noise level in all habitable rooms must exceed 45 CNEL in order to be eligible for sound insulation. This requirement could prevent eligibility although the noise level in some habitable rooms may exceed 45 CNEL. For example, if the noise level in one room was measured to be 40 CNEL, the noise level in a second room could be as high as 49.9 CNEL and the home would not be eligible for insulation.

Structures that do not have existing ventilation systems are eligible for the installation of a Continuous Positive Ventilation System even if the interior noise levels are measured to be less than 45 CNEL with windows closed. For homes with interior noise levels greater than 45 CNEL, noise insulation measures are typically limited to window and door replacement, ceiling insulation, caulking, and weather stripping. The insulation must provide a discernable amount of noise reduction, at least 5 dB. Sound insulation funds cannot be used for any improvements that are not directly related to the insulation. If other improvements are needed to conform to local building codes, these improvements will need to be completed before the insulation upgrades are installed.

It should be noted that the FAA guidance also states that previously insulated residences are ineligible for additional insulation. While it is recognized that noise insulation improvements will deteriorate over time, these are considered normal home maintenance expenses and the responsibility of the homeowner. The Santa Ana Heights Acoustical Insulation Program (AIP)[9] was extensively implemented at JWA as a mitigation measure for the 1985 Master Plan EIR. A total of 602 dwelling units (du) remain in the AIP eligibility area, consisting of 323 single-family residences and 279 multi-family residences. Of these, sound insulation was provided for 71% of the eligible residences (427 residences). Of those not insulated, five residences were found to already have sufficient insulation to reduce interior noise levels to less than 45 CNEL. Avigation easements were acquired from the property owners for 16 residences.[10] Seventy six (76) du were found to be non-conforming uses located in an area zoned for business park uses; prescriptive avigation easements were acquired for these residences. Of the 78 remaining

[9] To avoid confusion between the residential noise attenuation program adopted as part of the 1985 Master Plan and the program recommended as part of this EIR, the 1985 program has been identified as the Santa Ana Heights Acoustical Insulation Program ("AIP"), whereas the program identified in conjunction with this Project (Mitigation Measures LU-1 and N-3) is identified as a Sound Insulation Program ("SIP").

[10] An avigation easement is a recorded document which grants a perpetual non-exclusive easement for aircraft operations, sound and noise, avigation and flight, hazard and airspace in, to over and through the owner's property.

residences that were not insulated, 19 homeowners declined the offer, and 59 homeowners did not respond despite a good faith effort to contact them.

AIP eligibility was based on the future 65 CNEL contour predicted in the 1985 Master Plan. The existing 65 CNEL contour is much smaller than anticipated in the 1985 Master Plan. Currently, 96 du are located within the 65 CNEL contour. Insulation has been provided for 30 of these du (39%), 47 are non-conforming uses, and one was determined to have sufficient insulation to reduce interior noise levels to less than 45 CNEL. The nine remaining AIP eligible homes have not been insulated; of this amount, one homeowner declined the insulation offer and eight homeowners did not respond.

PROJECT MITIGATION MEASURES

The Proposed Project and Alternatives A through C contemplate an extension of the 1985 Settlement Agreement. Each scenario differs in the details of the proposed adjustments to the agreement.

The following noise control measures are in place and are assumed to be continued independent of the Project scenario selected[11]:

- Nighttime operations restrictions (except under Alternative C Phases 2 and 3, which would allow removal of these restrictions);
- South flow departure left turn over Newport Bay (primarily a responsibility of FAA);
- Class A and Class E departure noise limits;
- ALUC land use restrictions;
- Orange County General Plan land use restrictions;
- Orange County Standard Conditions of Approval, which are applicable to projects where the County of Orange issues permits. (These would minimize potential impacts associated with new development, but would not be applicable to the impacts identified above. The Standard Conditions of Approval are identified in the *Noise Analysis Technical Report*, provided in Appendix C (see Section 7.6, Mitigation Measures Recommend for Further Consideration). Each of the surrounding jurisdictions have similar control measures for new noise sensitive development surrounding the Airport. The City of Newport Beach has policies in the Noise Element of the General Plan regarding noise exposure for new development (see Table 4.5-10 in Land Use for discussion of these policies).

Mitigation of Impacts Based on County Significance Thresholds for Noise Increase

Impact analysis for Threshold 4.6-1 shows that significant noise impacts are projected to occur with Alternative B, Phase 3 and all three Phases of Alternative C. Under Phase 3 of Alternative B, significant noise impacts are projected to occur in the vicinity of NMS 1S and 2S. These two NMS are projected to experience noise levels exceeding 65 CNEL and have a Project-related increase

[11] There are no assurances these measures would continue under the No Project Alternative; however, elimination of certain measures, such as the curfew, would require subsequent CEQA documentation and additional discretionary action by the County's Board of Supervisors.

of more than 1.5 CNEL over existing conditions. Under all three Phases of Alternative C, NMS 1S, 2S, and 3S are projected to be significantly impacted for the same reason. Under Phases 2 and 3 of Alternative C, NMS 4S, 5S, 6S, and 7S are also shown to be significantly impacted because they are projected to be exposed to noise levels between 60 and 65 CNEL and subject to a Project-related noise level increase of more than 3 dB.

The primary area where significant impacts will occur is in the Santa Ana Heights area represented by NMS 1S, 2S, and 3S. The adoption of the 1985 Master Plan for JWA included adoption of the Santa Ana Heights Land Use Compatibility Plan ("SAH LUCP"). The SAH LUCP was, in part, project mitigation for the 1985 Master Plan and contemplated a combination of actions to achieve land use compatibility between Santa Ana Heights and JWA. This included zoning actions, a purchase assurance program, and a sound insulation program as discussed above.

Table 4.6-29 presents the number of residences that would be exposed to 65 CNEL or greater and be exposed to a noise level increase over existing conditions of 1.5 dB or more. The total number of impacted residences are shown in the first column of values. The remaining columns break out the number of residences that were insulated and not insulated under the 1985 Master Plan AIP along with the number of residences outside of the AIP. The number of residences within the AIP area that were insulated under the program is shown in the second column of values.

The number of residences that were included in the AIP but were not insulated are presented in the next two columns. These columns show the number of residences that were not insulated that conform to the SAH LUCP zoning and the number of residences that are non-conforming uses. The next column shows the number of du that are located outside of the SIP area. The final column shows the total number of residences that have not been previously insulated.

Mitigation Measure LU-2. described in Section 4.5, Land Use and Planning, provides a process for avoiding the exterior noise impacts forecasted to occur for Alternative B, Phase 3. Briefly, Mitigation Measure LU-2 would limit increases in MAP and/or ADD to ensure that noise increases at NMS 1S and 2S would be less than 1 CNEL. Because there is no practical method for mitigating outdoor noise levels, the number of residences presented in the "Total DU" column in Table 4.6-28 for all phases of Alternative C, identifies the total number of residences that will be subject to a significant and unavoidable outdoor noise impact.

TABLE 4.6-29
NUMBER OF RESIDENCES EXPOSED TO 65 CNEL OR GREATER AND AN INCREASE OVER EXISTING CONDITIONS OF 1.5 dB OR MORE

Nearest NMS	Total DU	Within AIP Insulated	Within AIP Not Insulated		Outside AIP Not Insulated	Total Not Insulated
			Conforming	Non-Conforming		
Alternative B, Phase 3						
1S	**309**	**295**	**13**	**1**	**0**	**14**
2S	94	13	6	75	0	81
Total	*188*	*93*	*19*	*76*	*0*	*95*
Alternative C, Phase 1						
1S	322	303	17	2	0	19
2S	118	28	16	74	0	90
3S	47	30	15	1	1	17
Total	*487*	*361*	*48*	*77*	*1*	*126*
Alternative C, Phase 2						
1S	647	315	16	7	309	332
2S	145	42	24	31	48	103
3S	121	81	33	1	6	40
Total	*913*	*438*	*73*	*39*	*363*	*475*
Alternative C, Phase 3						
1S	646	315	16	7	308	331
2S	145	42	24	31	48	103
3S	121	81	33	1	6	40
Total	*912*	*438*	*73*	*39*	*362*	*474*

NMS=Noise Monitoring Station; DU=Dwelling Unit; AIP: Santa Ana Heights Acoustical Insulation Program
Source: *Noise Analysis Technical Report*, Table 31, Landrum & Brown, 2014.

Significant indoor noise impacts occur when the interior noise level exceeds 45 CNEL. The residences located within the AIP that were insulated achieve sufficient outdoor-to-indoor reduction, such that the future interior noise levels under the Alternatives shown will be less than 45 CNEL. Therefore, the interiors of these residences will not be significantly impacted and no mitigation is required. The remaining residences that were not insulated may be impacted unless additional sound insulation is provided. Mitigation Measure N-1 outlines the parameters for determining those noise sensitive uses that would be considered for implementation of a sound insulation program.

As a part of the AIP, the noise reduction of the treated residences were measured before and after the insulation. The "before" measurements provide a reasonable estimate of the noise reduction provided by the residences that were not treated. Of the 903 rooms tested, only 2.5 percent had a noise reduction of 20 dB or less. In all cases, those residences that had a room with a noise reduction of 20 dB or less, the noise reduction of the other rooms was considerably higher. This indicates that these rooms had specific deficiencies that are not typical. Approximately 95 percent of the untreated rooms achieved more than 22 dB of outdoor-to-

indoor noise reduction. Therefore, most of the remaining untreated residences would need to be exposed to outdoor noise levels of 67 dB CNEL or greater in order to experience interior noise levels greater than 45 dB CNEL. The measured noise reduction in the vast majority of rooms, 75 percent, was 25 dB or greater before acoustical insulation was provided. These rooms would need to be exposed to outdoor noise levels greater than 70 dB CNEL in order for the interior noise level to exceed 45 dB CNEL

Mitigation Measure N-1: Sound Insulation Program Eligibility – County of Orange

N-1 Starting with the 2015 Fourth Quarter Noise Report,[12] the annual noise levels at NMS 1S, 2S, and 3S will be compared by the County of Orange to the 2013 annual noise levels. If the noise levels have increased by 1.5 dB or more at any of these NMS, all noise sensitive uses represented by that NMS (i.e., that is the closest NMS to the parcel) that have not been previously insulated under the 1985 AIP will be eligible for evaluation for participation in the Sound Insulation Program ("SIP") as described in Mitigation Measure N-3. Those uses with interior noise levels exceeding an average of 45 CNEL will be eligible for insulation under the SIP as described in the mitigation measure.

For those uses with interior noise levels less than 45 CNEL, the amount of outdoor-to-indoor noise reduction for each habitable room will be recorded. In each subsequent Fourth Quarter Noise Report, the noise level impacting these uses and the measured noise reduction will be used to estimate the interior noise level. If the estimated interior noise level exceeds an average of 45 CNEL, then the use will be eligible for re-evaluation in the form of new interior noise level measurements. If the interior noise level in any habitable room exceeds an average of 45 CNEL, then the use will be eligible for the SIP described in Mitigation Measure N-3.

Mitigation of Impacts Based on Newport Beach Significance Thresholds

As previously discussed, the City of Newport Beach has adopted significance thresholds for noise that are more restrictive than those recommended by the FAA and used by the County. Impact analysis for Threshold 4.6-1 shows that Proposed Project, Phase 3; Alternative A, Phase 3; Alternative B, Phases 2 and 3; and all Phases of Alternative C would result in significant impacts due to a noise exposure between 65 and 75 CNEL and a 1 dB increase over existing conditions.

Table 4.6-30 presents the number of residences in the City of Newport Beach that are projected to have a noise exposure exceeding 65 CNEL and an increase over existing conditions of 1.0 dB or more. The total number of impacted residences are shown in the first column of values. The remaining columns break out the number of residences that were insulated and not insulated under the 1985 Master Plan AIP along with the number of residences outside of the AIP. The number of residences within the AIP area that were insulated under the program is shown in the second column of values.

The number of residences that were included in the AIP but were not insulated are presented in the next two columns. These columns show the number of residences that were not insulated that conform to the SAHSP zoning and the number of residences that are non-conforming uses.

[12] As described above, quarterly reports are available on the airport web site.

The next column shows the number of du that are located outside of the SIP area. The final column shows the total number of residences that have not been previously insulated.

TABLE 4.6-30
NUMBER OF NEWPORT BEACH RESIDENCES EXPOSED TO 65 CNEL OR GREATER AND AN INCREASE OVER EXISTING CONDITIONS OF 1.0 dB OR MORE

Nearest NMS	Total DU	Within AIP Insulated	Within AIP Not Insulated		Outside SIP Not Insulated	Total Not Insulated
			Conforming	Non-Conforming		
Proposed Project, Phase 3						
2S	23	8	5	10	0	15
Total	*23*	*8*	*5*	*10*	*0*	*15*
Alternative A, Phase 3						
1S	74	66	7	1	0	8
2S	22	7	5	10	0	15
Total	*96*	*73*	*12*	*11*	*0*	*23*
Alternative B, Phase 2						
1S	79	70	8	1	0	9
2S	24	9	5	10	0	15
Total	*103*	*79*	*13*	*11*	*0*	*24*
Alternative B, Phase 3						
1S	309	295	13	1	0	14
2S	94	13	6	75	0	81
3S	188	93	19	76	0	95
Total	*309*	*295*	*13*	*1*	*0*	*14*
Alternative C, Phase 1						
1S	322	303	17	2	0	19
2S	118	28	16	74	0	90
3S	47	30	15	1	1	17
Total	*487*	*361*	*48*	*77*	*1*	*126*
Alternative C, Phase 2						
1S	647	315	16	7	293	316
2S	145	42	24	31	48	103
3S	121	81	33	1	5	39
Total	*913*	*438*	*73*	*39*	*346*	*458*
Alternative C, Phase 3						
1S	646	315	16	7	292	315
2S	145	42	24	31	48	103
3S	121	81	33	1	5	39
Total	*912*	*438*	*73*	*39*	*345*	*457*

Source: *Noise Analysis Technical Report,* Table 33, Landrum & Brown 2014.

Mitigation Measure LU-2. described in Section 4.5, Land Use and Planning, provides a process for avoiding the exterior noise impacts forecasted to occur for the Proposed Project, Alternative A, and Alternative B. Briefly, Mitigation Measure LU-2 would limit increases in MAP and/or ADD to ensure that noise increases at NMS 1S and 2S would be less than 1 CNEL Because there is no practical method for mitigating outdoor noise levels, the data presented in the "Total DU" column for all phases of Alternative C in Table 4.6-29 identifies the total number of residences that will be subject to a significant and unavoidable outdoor noise impact.

Significant indoor noise impacts occur when the interior noise level exceeds 45 CNEL. The residences located within the AIP that were insulated achieve sufficient outdoor-to-indoor reduction, such that the future interior noise levels under the Alternatives shown will be less than 45 CNEL. Therefore, the interiors of these residences will not be significantly impacted and no mitigation is required. The remaining residences that were not insulated may be impacted unless additional sound insulation is provided. Mitigation Measure N-2 outlines the parameters for determining those noise sensitive uses that would be considered for implementation of a sound insulation program.

As a part of the AIP, the noise reduction of the treated residences were measured before and after the insulation. The "before" measurements provide a reasonable estimate of the noise reduction provided by the residences that were not treated. Of the 903 rooms tested, only 2.5 percent had a noise reduction of 20 dB or less. In all cases, those residences that had a room with a noise reduction of 20 dB or less, the noise reduction of the other rooms was considerably higher. This indicates that these rooms had specific deficiencies that are not typical. Approximately 95 percent of the untreated rooms achieved more than 22 dB of outdoor-to-indoor noise reduction. Therefore, most of the remaining untreated residences would need to be exposed to outdoor noise levels of 67 dB CNEL or greater in order to experience interior noise levels greater than 45 dB CNEL. The measured noise reduction in the vast majority of rooms, 75 percent, was 25 dB or greater before acoustical insulation was provided. These rooms would need to be exposed to outdoor noise levels greater than 70 dB CNEL in order for the interior noise level to exceed 45 dB CNEL.

Mitigation Measure N-2: Sound Insulation Program Eligibility – City of Newport Beach

N-2 Starting with the 2015 Fourth Quarter Noise Report,[13] the annual noise levels at NMS 1S, 2S, and 3S will be compared by JWA to the 2013 annual noise levels. If the noise levels have increased by 1.0 dB or more at any of these NMS, all noise sensitive uses represented by that NMS (i.e., that is the closest NMS to the parcel) exposed to noise levels of 65 CNEL or greater that have not been previously insulated under the 1985 AIP will be eligible for evaluation for participation in the Sound Insulation Program ("SIP") as described in Mitigation Measure N-3. Those uses with interior noise levels exceeding 45 CNEL will be eligible for insulation under the SIP as described in the mitigation measure.

For those uses with interior noise levels less than 45 CNEL, the amount of outdoor-to-indoor noise reduction for each habitable room will be recorded. In each subsequent Fourth Quarter Noise Report, the noise level impacting these uses and the measured noise reduction will be used to estimate the interior noise level. If the estimated interior

[13] As described above, quarterly reports are available on the Airport web site.

noise level exceeds an average of 45 CNEL then the use will be eligible for re-evaluation in the form of new interior noise level measurements. If the interior noise level in any habitable room exceeds an average of 45 CNEL then the use will be eligible for the SIP described in Mitigation Measure N-3.

All three Phases of Alternative C will result in significant impacts to the residences in the City of Newport Beach along the edge of Newport Back Bay represented by NMS 4S, 5S, 6S, and 7S (note Phase 1 of Alternative C only impacts the area near NMS 6S). Table 4.6-31 presents the number of residences that would be significantly impacted by each of these Phases of Alternative C.

As described above in the general description of the FAA Acoustical Insulation Program, the FAA has mandated that aircraft noise sound insulation programs can only be funded by the FAA or the airport operator when noise exposures are greater than 65 CNEL. Therefore, the use of a sound insulation program is not available to mitigate impacts for residences outside the 65 CNEL contour because there is no funding source (FAA 2012). These residences would be unavoidably and significantly impacted by aircraft noise under Alternative C.

TABLE 4.6-31
NUMBER OF NEWPORT BEACH RESIDENCES EXPOSED TO 60 CNEL AND 65 CNEL AND AN INCREASE OF 2.0 dB OR GREATER OVER EXISTING CONDITIONS

Nearest NMS	Residences
Alternative C, Phase 1	
6S	75
Total	*75*
Alternative C, Phase 2	
4S	112
5S	311
6S	797
7S	261
Total	*1,481*
Alternative C, Phase 3	
4S	112
5S	311
6S	797
7S	261
Total	*1,481*

Source: *Noise Analysis Technical Report,* Table 34, Landrum & Brown 2014.

Mitigation Measure N-3: Sound Insulation Program

N-3 The only practical way to mitigate indoor noise levels is through a Sound Insulation Program (SIP). Mitigation Measure LU-1, as described in the Section 4.5, Land Use, and Mitigation Measures N-1 and N-2, described above, will determine the sensitive land uses that will be eligible for participation in the SIP described below as Mitigation Measure N-3. FAA regulations require that residences be exposed to an outdoor noise level of 65 CNEL or greater and interior noise levels greater than 45 CNEL for FAA or Airport funds to be used for sound insulation. The referring Mitigation Measures, LU-1, N-1, and N-2, will ensure the outdoor noise criterion is met. The interior noise level criterion will be determined in the evaluation phase of Mitigation Measure N-3. Sensitive uses with interior noise levels greater than 45 CNEL will be eligible for sound insulation.

The FAA guidance for implementing sound insulation programs specifically states that the average noise level in all habitable rooms of a residence or all educational spaces in school must be greater than 45 CNEL for the use to be eligible for sound insulation funded by the Airport or FAA. However, the County's noise standards specifically require that the noise level in <u>any</u> habitable room or educational space must be less than 45 CNEL. This is implied in the City of Newport Beach's noise standards, as well. Under CEQA, the lead agency's noise standard is used to determine impacts. Therefore, a noise sensitive use is considered significantly impact if the noise level in any habitable room or educational space exceeds 45 CNEL.

As discussed below, the Airport will request that the FAA waive its requirement that the average noise level in all habitable rooms or educational spaces exceed 45 CNEL in order for sound insulation to be funded by the FAA or Airport in order that all noise related impacts are mitigated to a less than significant level in a timely manner. If the FAA does not agree to waive this requirement, then uses with one or more habitable rooms or educational spaces exceeding 45 CNEL but with the average noise level in all habitable rooms or educational spaces less than 45 CNEL would be significantly and unavoidably impacted as there is no other funding source for a SIP. However, these uses would be eligible for insulation when and if the average noise level exceeded 45 CNEL. As discussed in Mitigation Measures, LU-1, N-1, and N-2, if an individual land use is not eligible for insulation because the interior noise level does not exceed 45 CNEL, there are criteria for re-evaluation. If the annual report noise levels and previous evaluation measurements indicate that the use may meet the interior noise requirement it will be re-evaluated for insulation eligibility.

Part 1, Evaluation: When Mitigation Measures LU-1, N-1, or N-2 determines that a noise sensitive use is significantly impacted based on measured noise levels and the relevant significance thresholds, that use will be evaluated by the County of Orange for eligibility for sound insulation. The evaluation will be performed by measuring the indoor noise levels for each habitable room or educational space. If the average noise level in all habitable rooms or education spaces of a use is greater than an average of 45 CNEL then the use will be eligible for sound insulation. Additionally, if the average noise level is less than 45 CNEL, any use with a noise level greater than an average of 45 CNEL in any habitable room or educational space also will be eligible for sound insulation if the FAA waives its requirement that noise levels be averaged across all habitable rooms or education spaces.

Per FAA guidance, noise levels will be measured with all windows and doors closed. Uses with measured interior noise levels less than 45 CNEL that do not have an existing central ventilation system, but rely on keeping windows open for air circulation will be eligible for a Continuous Positive Ventilation System. Implementation of such a system will be dependent on meeting the FAA requirements for implementation of such a system.

Part 2, Sound Insulation Program: Schools or residences that have interior noise levels exceeding 45 CNEL as determined by the evaluation measurements will be eligible for sound insulation. The implementation of sound insulation will depend on satisfying the FAA criteria described in Chapter 812 of Order 5100.38C Airport Improvement Program Handbook.

Note that as an alternative to providing sound insulation, an impacted property may also be mitigated by converting an incompatible use to a compatible use or removing the incompatible use.

4.6.8 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impact analysis shows that significant exterior noise impacts are projected to occur with each phase of the Proposed Project and all alternatives, including the No Project Alternative. Residence, that are currently exposed to noise levels less than 65 CNEL would be impacted if exposed to noise levels greater than or equal to 65 CNEL. In addition to residential areas, with Alternative C, the Peter and Mary Muth Interpretive Center (an educational facility with outdoor classrooms) would be exposed to exterior noise levels in excess of adopted standards. Mitigation measure LU-2, as described in the Section 4.5, Land Use, would avoid the exterior noise impacts for the Proposed Project, Alternative A, and Alternative B. Because there is no practical method for mitigating outdoor noise levels, the sensitive land uses that would be impacted under Alternative C would be subject to a significant and unavoidable outdoor noise impact.

Impact analysis shows that potentially significant interior noise impacts are projected to occur with each phase of the Proposed Project and all alternatives, including the No Project Alternative. Significant indoor noise impacts occur when the interior noise level exceeds the 45 CNEL interior noise standard. The residences exposed to noise levels in excess of 65 CNEL that were not insulated may have significant interior noise impacts unless sound insulation is provided. Some of the residences located within the AIP were previously insulated to achieve sufficient outdoor-to-indoor reduction, such that the future interior noise levels under the Proposed Project and alternatives would be less than 45 CNEL. Therefore, the interiors of these residences would not be significantly impacted and no mitigation would be required, with the potential exception of 4 residences in Alternative C, Phase 1 and 33 residences in Alternative C, Phases 2 and 3 that received insulation as part of the AIP for being within the 65 to 70 CNEL contour and would now be exposed to noise levels in excess of 70 CNEL. Potentially significant noise impacts to schools and places of worship are also projected to occur with all phases of Alternative C. With implementation of Mitigation Measure N-3, potentially significant interior noise impacts that would occur could be reduced to less than significant. However, it cannot be determined at this time whether the noise evaluation conducted as part of the SIP will find that the <u>average</u> noise levels in all habitable rooms of residences, schools, or places of worship exceed 45 CNEL even though the noise level in one or more habitable rooms may exceed 45 CNEL As previously described, if the average value does not exceed 45 CNEL and the FAA does not grant a waiver from the average level evaluation methodology, there would be no funding source and the SIP

could not proceed. Therefore, at this time all potential interior noise impacts must be determined to be significant and unavoidable.

Alternative C Phases 2 and 3 would also impact the residences surrounding Newport Back Bay represented by NMS 4S, 5S, 6S, and 7S. These residences are projected to be impacted because they would experience a noise level increase of 3.0 dB or greater; however, the absolute noise levels at these residences will be less than 65 CNEL. Table 4.6-32 presents the number of residences that would be significantly impacted. In an August 2012 Memorandum, the FAA mandated that aircraft noise sound insulation programs can only be funded by the FAA or the Airport operator when noise exposures are greater than 65 CNEL (FAA 2012). Therefore, the measures used previously to address impacts in Santa Ana Heights are not available to mitigate impacts for residences outside the 65 CNEL contour because there is no funding source. Therefore, these residences would be significantly and unavoidably impacted by aircraft noise under the Alternative C, Phases 2 and 3.

TABLE 4.6-32
NUMBER OF RESIDENCES EXPOSED TO 60 CNEL OR GREATER AND AN INCREASE OVER EXISTING CONDITIONS OF 3.0 dB OR GREATER

Nearest NMS	Residences
Alternative C, Phase 2	
4S	472
5S	311
6S	797
7S	261
Total	*1,841*
Alternative C, Phase 3	
4S	473
5S	311
6S	797
7S	261
Total	*1,842*

Source: *Noise Analysis Technical Report,* Table 32, Landrum & Brown 2014.

The noise impact findings are summarized in Table 4.6-33.

TABLE 4.6-33
SUMMARY OF NOISE IMPACTS

Threshold	Proposed Project	Alternative A	Alternative B	Alternative C	No Project Alternative
Threshold 4.6-1	***Orange County Standards*** Less than significant impacts (All phases)	***Orange County Standards*** Less than significant impacts (All phases)	***Orange County Standards*** Less than significant impact (All phases)	***Orange County Standards*** Significant, unavoidable impact (All phases)	***Orange County Standards*** Less than significant impacts (All phases)
	Newport Beach Standards Less than significant impact (All phases)	***Newport Beach Standards*** Less than significant impact (All phases)	***Newport Beach Standards*** Less than significant impact (All phases)	***Newport Beach Standards*** Significant, unavoidable impact (All phases)	***Newport Beach Standards*** Less than significant impacts (All phases)
Threshold 4.6-2	*Exterior Noise:* Significant, unavoidable impact (all phases) *Interior Noise:* Significant, unavoidable impact (All phases)	*Exterior Noise:* Significant, unavoidable impact (all phases) *Interior Noise:* Significant, unavoidable impact (All phases)	*Exterior Noise:* Significant, unavoidable impact (all phases) *Interior Noise:* Significant, unavoidable impact (All phases)	*Exterior Noise:* Significant, unavoidable impact (all phases) *Interior Noise:* Significant, unavoidable impact (All phases)	*Exterior Noise:* Significant, unavoidable impact (all phases) *Interior Noise:* Significant, unavoidable impact (All phases)
Threshold 4.6-3	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)
Threshold 4.6-4	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)	Less than significant impacts (All phases)

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