Appendix C

Noise Analysis Technical Report

DRAFT ENVIRONMENTAL IMPACT REPORT NO. 617
JOHN WAYNE AIRPORT
SETTLEMENT AGREEMENT AMENDMENT

APPENDIX C
NOISE ANALYSIS TECHNICAL REPORT

APRIL 2014

Prepared For:

County of Orange
John Wayne Airport
3160 Airport Way
Costa Mesa CA 92626

Prepared By:

Mestre Greve Associates
Division of Landrum and Brown

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A-Weighting

A frequency-weighting network used to account for changes in human auditory sensitivity as a function of frequency.

Abatement

The method of reducing the degree of intensity of noise and the use of such a method.

Average Daily Departure (ADD)

ADD means "average daily departure," which is computed on an annual basis. One ADD authorizes any person requiring ADDs for its operations at JWA to operate 365 (or 366 in any "leap year") Authorized Departures during each Plan Year. Commercial Air Carrier Class A and permanent Class E departures at JWA are regulated departures and require an ADD allocation.

AIP

Santa Ana Heights Acoustical Insulation Program

ANCA

Airport Noise and Capacity Act of 1990

ANMS

The Airport Noise Monitoring System (ANMS) is a sophisticated, acoustical system which monitors noise impacts by time of day, season and on an annual basis. ANMS also monitors noise levels generated by a variety of outside aircraft activities and obtains accurate data of aircraft flight tracks and fleet mix.

Annoyance

Any bothersome or irritating occurrence.

Class A ADD – Class A Departure

Class A ADD means an ADD which has been allocated for use by aircraft qualified under Section 10 of the Access Plan. Class A Departure means a single departure allocated for use by aircraft qualified under Section 10 of the Access Plan as a Class A Aircraft.

Class E ADD – Class E Departure

Class E ADD means an ADD which has been allocated for use by aircraft qualified under Section 10 of the Access Plan, and which continue to operate during each Noise Compliance Period as Class E Aircraft. Class E Departure means a single departure allocated for use by aircraft qualified under Section 10 as a Class E Aircraft.

Class A Aircraft

Class A Aircraft means aircraft which: (i) operate at gross takeoff weights at JWA not greater than the Maximum Permitted Gross Takeoff Weight for the individual aircraft main landing gear configuration, as set forth in Section 2.27 of the Access Plan; and (ii) generate actual energy averaged SENEL levels, averaged during each Noise Compliance Period, as measured at the Noise Monitoring Stations, which are not greater than specific values defined in the Access Plan. The noise limits for Class A Aircraft are 7 to 11 dB higher than the limits for Class E Aircraft.

Class E Aircraft

Class E Aircraft means aircraft which: (i) operate at gross takeoff weights at JWA not greater than the Maximum Permitted Gross Takeoff Weight for the individual aircraft main landing gear configuration, as set forth in Section 2.27 of the Access Plan; and (ii) generate actual energy averaged SENEL levels, averaged during each Noise Compliance Period, as measured at the Noise Monitoring Stations, which are not greater than the specific values defined in the Access Plan. The noise limits for Class E Aircraft are 7 to 11 dB lower than the limits for Class A Aircraft.

CNEL

Community Noise Equivalent Level. Used in California and is nearly identical to DNL, except that CNEL includes a 5 dB penalty for the evening time period from 7 pm to 10 pm.

Commercial Air Carriers

Commercial Air Carrier or Air Carrier means any person other than a Commuter Air Carrier or Commuter Cargo Carrier who operates Regularly Scheduled Air Service into and out of JWA for the purpose of carrying passengers, freight, cargo, or for any other commercial purpose.

Commercial Cargo Carrier

Commercial Cargo Carrier means any entity which is an Air Carrier, but which conducts its operations at JWA solely for the purpose of carrying Commercial Cargo with aircraft regularly configured with zero (0) Passenger Seats available to the general public, and which does not offer passenger service to the public in connection with its operations at JWA.

Commuter Air Carrier

Commuter Air Carrier or Commuter Carrier means any entity which: (i) operates Regularly Scheduled Air Service into and out of JWA for the purpose of carrying passengers, freight, cargo, or for any other commercial purpose; (ii) with Class E Aircraft regularly configured with not more than seventy (70) passenger seats; and (iii) operating at gross takeoff weights of not more than ninety thousand (90,000) pounds.

Commuter Cargo Carrier

Commuter Cargo Carrier means any entity which is a Commuter Air Carrier, but which conducts its operations at JWA solely for the purpose of carrying Commercial Cargo with aircraft regularly configured with zero (0) Passenger Seats available to the general public, and which does not offer passenger service to the public in connection with its operations at JWA.

Day-Night Average Sound Level

(Abbreviation DNL, denoted by the symbol Ldn)

Twenty-four hour average sound level for a given day, after addition of 10 decibels to levels from midnight to 0700 hours and from 2200 hours to midnight. Ldn is computed as follows:

Ldn = LAE + 10*log10(Nday + 10*Nnight) - 49.4 (dB)

where:

LAE = Sound exposure level in dB (also known as SEL);

Nday = Number of noise events between 0700 and 2200 hours;

Nnight = Number of noise events between 2200 and 0700 hours; and

49.4 = A normalization constant which spreads the acoustic energy associated with noise events over a 24-hour period, i.e., 10*log10(86,400 seconds per day) = 49.4 dB.

dBA

The A-weighted Decibel (dBA) is the most common unit used for measuring environmental sound levels. It adjusts, or weights, the frequency components of sound to conform to the normal response of the human ear at conversational levels. dBA is an international metric that is used for assessing environmental noise exposure of all noise sources.

dBC

The C-weighted Decibel (dBC) is the method of measuring sound which takes into account the low frequency components of noise sources, such as aircraft operations, and reflects their contribution to the environment.

Decibel (dB)

The Decibel (dB) is the unit used to measure the magnitude or intensity of sound. Decibel means 1/10 of Bel (named after Alexander Graham Bell). The decibel uses a logarithmic scale to cover the very large range of sound pressures that can be heard by the human ear. Under the decibel unit of measure, a 10 dB increase will be perceived by most people to be a doubling in loudness, i.e., 80 dB seems twice as loud as 70 dB.

Equivalent Sound Level
(abbreviation TEQ, denoted by the symbol LAeqT or Leq)

Ten times the logarithm to the base ten of the ratio of time-mean-squared instantaneous A-weighted sound pressure, during a stated time interval T, to the square of the standard reference sound pressure. LAeqT is related to LAE by the following equation:

LAeqT = LAE - 10*log10(t2-t1) (dB)

where,

LAE = Sound exposure level in dB

EPNdB

The Effective Perceived Noise Level (EPNdB) is another unit of measure for aircraft noise. It is based on how people judge the annoyance of sounds they hear with corrections for the duration of the event and for pure tones. The Federal Aviation Administration (FAA) uses EPNdB in the certification of large transport planes for Federal Noise Regulations (FAR Part 36).

FAA

Federal Aviation Administration

FAR

Federal Aviation Regulation

GIS

Geographic Information Systems. A computer software program to analyze spatial data. Can be especially useful in examining noise distribution over a geographic area.

General Aviation

Non-commercial airline aviation - primarily business aircraft and individuals traveling in private aircraft, includes those making connections to commercial flights.

Ground Absorption

As sound propagates near the ground the interaction of the sound wave with the ground results in attenuation of the sound. Hard ground, like water, has less attenuation that soft ground (most other surfaces). Also known as Lateral Attenuation.

Hertz (Hz)

The Hertz is a unit of measurement of frequency, numerically equal to cycles per second of the measure of the rate of the vibration of the sound. High frequencies can be thought of as having a high pitch; like a whistle; low frequency sounds are more like a rumble of a truck or airplane.

Hushkitted Aircraft

Hushkitted Stage III aircraft are previously Stage II aircraft that have been adapted to meet Stage III requirements.

IFR (Instrument Flight Rules)

Instrument Flight Rules govern flight procedures during limited visibility or other operational constraints. Under IFR, pilots must file a flight plan and fly under the guidance of radar.

Intensity

The sound energy flow through a unit area in a unit time.

ILS (Instrument Landing System

An Instrument Landing System (ILS) is a precise landing aid consisting of several components giving the pilot vertical and horizontal electronic guidance. Elements usually include: 1. an outer marker, a radio beam 4 to 6 miles from the touchdown point where the electronic signal begins; 2. an approach lighting system at the runway end; 3. a localizer radio beam which provides the horizontal guide; and 4. a glide slope which provides vertical guidance on the angle of descent for landing.

INM (Integrated Noise Model)

The Federal Aviation Administration's (FAA), Office of Environment and Energy (AEE-100) has developed the Integrated Noise Model (INM) for evaluating aircraft noise impacts in the vicinity of airports. The INM has been the FAA's standard tool since 1978 for determining the predicted noise impact in the vicinity of airports. The FAA requires airports use the INM in assessing environmental impacts for soundproofing, evaluating physical improvements to the airfield, analyzing changes to existing or new procedures and in assessing land use compatibility.

The INM Model utilizes flight track information, aircraft fleet mix, standard and user defined aircraft profiles and terrain as inputs. The INM model produces noise exposure contours that are used for land use compatibility maps. The INM program includes built in tools for comparing contours and utilities that facilitate easy export to commercial Geographic Information Systems. The model also calculates predicted noise at specific sites such as hospitals, schools or other sensitive locations.

LAE

see Sound Exposure Level

Leq or Laeq

See Equivalent Sound Level

Ldn

see Day-Night Average Sound Level

Lden

Similar to Day Night Noise Level, DNL, but includes an evening weighting period just like CNEL.

Lmax

see Maximum Noise Level

Lnight
Equivalent noise level, Leq, computed for nighttime hours, 10 pm to 7am.

MAP
Million Annual Passengers

Maximum Noise Level
The maximum noise level, in A-weighted decibels, that occurs during an aircraft flyover, Lmax.

NMS
Noise monitoring station (locations).

Noise
1. Unwanted sound. 2. Any sound not occurring in the natural environment, such as sounds emanating from aircraft, highways, industrial, commercial and residential sources. 3. An erratic, intermittent, or statistically random oscillation.

Noise Level
For airborne sound , unless specified to the contrary, it is the A-weighted sound level.

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

NPD
Noise Power Distance curves that are the basic data used in the Integrated Noise Model to define the source noise levels for different aircraft types. It defines the noise level as a function of distance and engine power setting.

NRC
The Noise Reduction Coefficient (NRC) is the measure of the acoustical absorption performance of a material, calculated by averaging its sound absorption coefficients at 250, 500, 1000 and 2000 Hz, expressed to the nearest multiple of 0.05. NRC is used in calculating soundproofing benefits.

Peak Sound Pressure Level
Level of the peak sound pressure with stated frequency weighting, within a stated time interval.

Preferential Runway Use
Preferential Runway Advisory System (PRAS) is a computer program that recommends to the FAA air traffic controllers runway configuration options that both will meet weather and demand requirements and will provide an equitable distribution of the airport's noise impacts on surrounding communities. Its primary objectives are to distribute the noise in accordance with (annual) runway utilization goals and to provide short-term relief from continuous operations over the same neighborhoods located at the ends of runways.

Reverberation
Sound that persists in an enclosed space, as a result of repeated reflection or scattering, after the source has stopped.

Reverberation Time
Of an enclosure, for a stated frequency or frequency band, time that would be required for the level of time-mean-square sound pressure in the enclosure to decrease by 60 dB, after the sound source has stopped.

Run-ups
An aircraft maintenance procedure; a "revving" of the engine.

SEL
see Sound Exposure Level

Sound Exposure Level (abbreviation SEL, denoted by the symbol LAE)
Over a stated time interval, T (where T=t2-t1), ten times the base-10 logarithm of the ratio of a given time integral of squared instantaneous A-weighted sound pressure, and the product of the reference sound pressure of 20 micropascals, the threshold of human hearing, and the reference duration of 1 sec. The time interval, T, must be long enough to include a majority of the sound source's acoustic energy. As a minimum, this interval should encompass the 10 dB down points (see Figure). In addition, LAE is related to LAeqT by the following equation:
LAE = LAeqT + 10*log10(t2-t1) (dB)
where,
LAeqT = Equivalent sound level in dB (see definition above, also known as Leq).

Sound Pressure Level (abbreviation (SPL)
Ten times the base-10 logarithm of the ratio of the time-mean-square pressure of a sound, in a stated frequency band, to the square of the reference sound pressure in gases of 20 micropascals.

Stage 2 and Stage 3 Aircraft
Commercial jet engines currently meet either Stage 2 or Stage 3 noise standards. Stage 2 engines are older and noisier than Stage 3 engines. Stage 3 aircraft incorporate the latest technology for suppressing jet-engine noise and, in general, are 10 dB quieter than Stage 2 aircraft. This represents a halving of perceived noise; however, actual noise reduction varies by aircraft. All aircraft greater than 75,000 lbs had to meet Stage 3 noise standards as of January 1, 2000. Aircraft less than 75,000 lbs that are Stage 2 aircraft are not allowed to arrive or depart from Logan between the 11:00 pm and 7:00 am.

Time Above
The Time Above is a measure identifying the number of minutes in a day which exceed a certain noise level. For example, a location may experience 10 minutes a day when the noise level exceeds 65 dBA.

VFR
Visual Flight Rules (VFR) are air traffic rules allowing pilots to land by sight without relying solely on instruments. VFR conditions require good weather and visibility.

WEPCNEL
Weighted Equivalent Continuous Perceived Noise Level, A noise metric commonly used in Japan. Similar in concept to DNL, but uses a different algorithm to compute. Includes an evening weighting similar to CNEL and Lden.

1.0 INTRODUCTION

This Technical Appendix includes a detailed analysis of the existing noise environment and future conditions that would result from implementation of the Proposed Project and Project Alternatives. As such, this appendix contains detailed background information, methodology, assumptions and analysis. The noise section of the EIR, Section 4.6 is a summary of the data contained in this Technical Appendix. The Technical Appendix is the reference source for the EIR and should be used for detailed review of the project impacts.

1.1 Outline of Noise Analysis

This report is divided into six sections plus this introduction. Section 2.0 presents background information on sound, noise, and how noise affects people. Section 3.0 describes the methodology used for this study. Section 4.0 describes the existing noise in the environs of John Wayne Airport. Section 5.0 presents the thresholds used to determine the significance of the noise impacts. Section 6.0 describes potential impacts from the Proposed Project and Project Alternatives. Section 7.0 presents a discussion of potential mitigation measures. Section 8.0 presents the list of references.

2.0 BACKGROUND INFORMATION

2.1 Introduction

This section presents background information on the characteristics of noise and summarizes federal, state and local noise/land use compatibility guidelines. This section also provides the reader with an understanding of the metrics used to assess noise impacts. This section is divided as follows:

- Properties of sound that are important for technically describing sound.
- Acoustic factors influencing human subjective response to sound.
- Potential disturbances to humans and health effects due to sound.
- Sound rating scales used in this study.
- Summary of noise assessment criteria.

2.2 Characteristics of Sound

Sound Level and Frequency. Sound can be technically 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 as sound pressure levels 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 are. As a result of this, various methods of frequency weighting have been developed. The most common weighting is the A-weighted noise curve. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating 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). Most community noise analyses are based upon the A-weighted decibel scale. Examples of various sound environments, expressed in dBA, are presented in Figure 1.

Propagation of Noise. Outdoor sound levels decrease as the distance from the source to the receiver increases. This decrease in sound level is a result of wave divergence, atmospheric absorption, and ground attenuation. Sound radiating from a source in an undisturbed manner travels in spherical waves. As the sound wave travels away from the source, the sound energy is dispersed over a greater area, decreasing the sound power of the wave. Spherical spreading of the sound wave reduces the noise level at a rate of 6 dB per doubling of the distance.

Atmospheric absorption also influences the sound levels received by the observer. The greater the distance traveled, the greater the influence of the atmosphere and the resultant fluctuations. Atmospheric absorption becomes important at distances of greater than 1,000 feet. The degree of absorption varies depending on the frequency of the sound, as well as the humidity and temperature of the air. For example, atmospheric absorption is lowest (i.e., sound carries farther) at high humidity and high temperatures. Absorption effects in the atmosphere vary with frequency. Higher frequencies are more readily absorbed than lower frequencies. Over large distances, lower frequencies become the dominant sound as the higher frequencies are attenuated. Turbulence and gradients of wind, temperature, and humidity also play a significant role in determining the degree of attenuation. Certain conditions, such as inversions, can channel or focus the sound waves resulting in higher noise levels than would result from simple spherical spreading. The effects of meteorological conditions on sound levels are illustrated in Figure 2.

In addition to atmospheric absorption, aircraft noise can also be affected by the physical properties of the surrounding terrain. The magnitude of this terrain-related absorption varies with the angle of the aircraft above the horizon as measured from the observer to the aircraft. Lateral attenuation is influenced by ground reflection, refraction, aircraft shielding, and engine aircraft installation effects. In general, the lower an aircraft is, the greater the lateral attenuation. Lateral attenuation is not considered to be a factor if the angle between the observer and aircraft, as measured from the horizon, is greater than 60°. In this case, the aircraft is essentially overhead the observer.

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

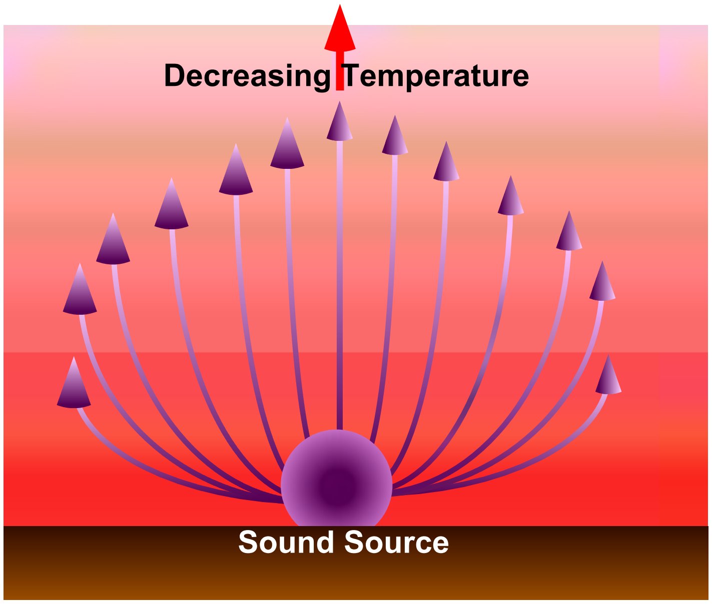
dB(A)	OVER-ALL LEVEL	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
120		Military Jet Aircraft Take-Off With After-Burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
110	UNCOMFORTABLY LOUD	Concord Takeoff (113)*	Riveting 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

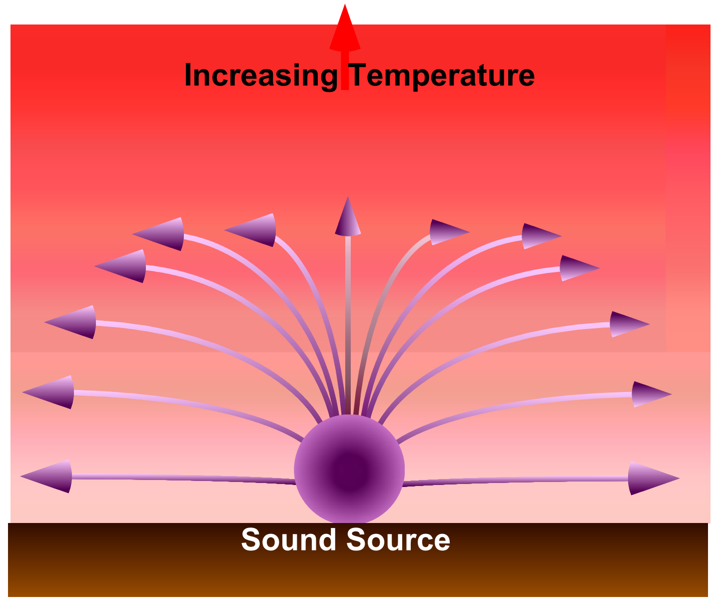
Source:
Leo L. Beranek "Noise And Vibration Control," 1971
*Aircraft Levels From FAA Advisory Circular AC-36-3G

Figure 1
Typical A-Weighted Noise Levels

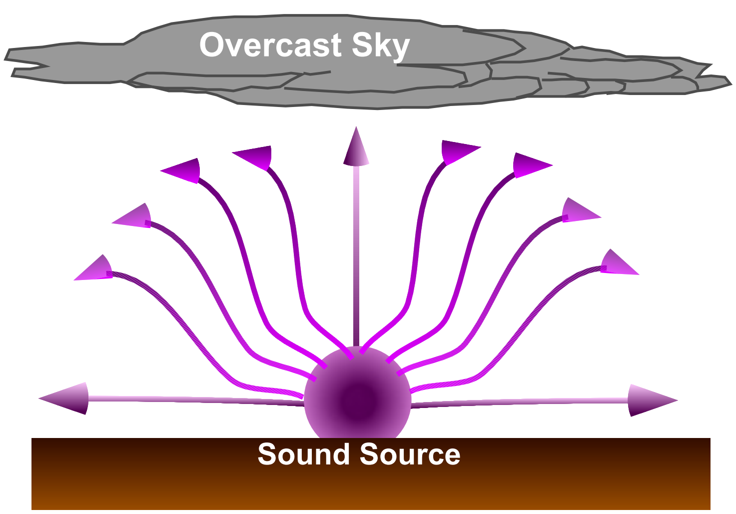
Refraction of sound in an atmosphere with a normal lapse rate. Sound rays are bent upwards.



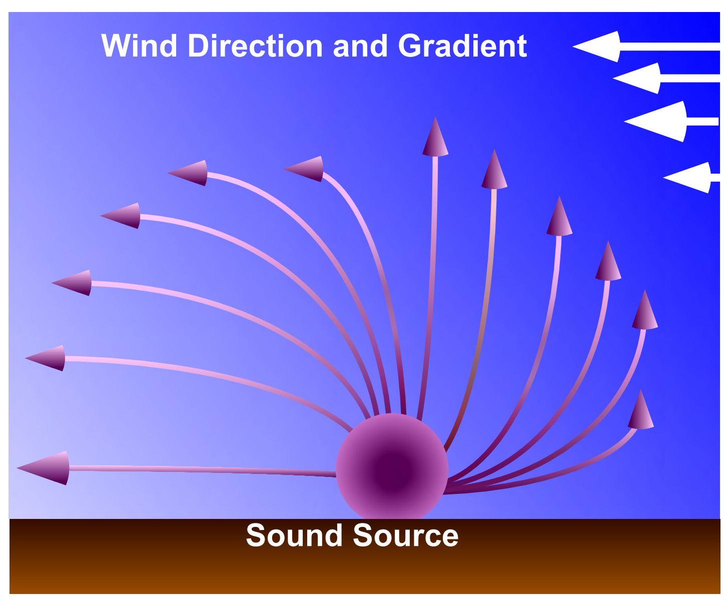
Refraction of sound in an atmosphere with an inverted lapse rate. Sound rays are bent downward.



Refraction of sound in an atmosphere with overcast sky conditions. Sound rays are bent near the ground and then downward at higher elevations near the overcast.



Refraction of sound in an atmosphere with a wind present. Sound rays are bent in the direction of the wind.



Source: Adapted from Vancouver International Airport, Noise Management Report.

Figure 2
Effects of Weather on Sound

John Wayne Airport (JWA) Settlement Agreement Amendments

Duration of Sound. Annoyance from a noise event increases with increased duration of the noise event, i.e., the longer the noise event, the more annoying it is. 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. Psycho-acoustic studies have determined the relationship between duration and annoyance and the amount a sound must be reduced to be judged equally annoying for increased duration. Duration is an important factor in describing sound in a community setting.

The relationship between duration and noise level is the basis of the equivalent energy principal of sound exposure. Reducing the acoustic energy of a sound by one-half results in a 3 dB reduction. Doubling the duration of the sound increases the total energy of the event by 3 dB. This equivalent energy principal 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 [1]. Defined in subsequent sections of this study, noise metrics such as CNEL, DNL, LEQ and SENEL are all based upon the equivalent energy principle.

Change in Noise. The concept of change in ambient sound levels can be understood with an explanation of the hearing mechanism's reaction to sound. The human ear is a far better detector of relative differences in sound levels than absolute values of levels. Under controlled laboratory conditions, 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 five decibel change is readily noticeable while a 10 decibel 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 discernable.

Masking Effect. The ability of one sound to limit a listener from hearing another sound is known as the masking effect. The presence of one sound effectively raises the threshold of audibility for the hearing of a second sound. For a signal to be heard, it must exceed the threshold of hearing for that particular individual and exceed the masking threshold for the background noise.

The masking characteristics of sound depend on many factors including the spectral (frequency) characteristics of the two sounds, the sound pressure levels and the relative start time of the sounds. Masking effect is greatest when the frequencies of the two sounds are similar or when low frequency sounds mask higher frequency sounds. High frequency sounds do not easily mask low frequency sounds.

2.3 Factors Influencing Human Response to Sound

Many factors influence sound perception and annoyance. This includes not only physical characteristics of the sound but also secondary influences such as sociological and external factors. Molino, in the Handbook of Noise Control [2] describes human response to sound in terms of both acoustic and non-acoustic factors. These factors are summarized in Table 1.

Sound rating scales are developed in reaction to the factors affecting human response to sound. Nearly all of these factors are relevant in describing how sounds are perceived in the community. Many non-acoustic parameters play a prominent role in affecting individual response to noise. Background sound, an additional acoustic factor not specifically listed, is also important in describing sound in rural settings. Fields [3], in his analysis of the effects of personal and situational variables on noise annoyance, has identified a clear association of reported annoyance and various other individual perceptions or beliefs. In particular, Fields stated:

"There is therefore firm evidence that noise annoyance is associated with: (1) the fear of an aircraft crashing or of danger from nearby surface transportation; (2) the belief that aircraft noise could be prevented or reduced by designers, pilots or authorities related to airlines; and (3) an expressed sensitivity to noise generally."

Thus, it is important to recognize that non-acoustic factors such as the ones described above as well as acoustic factors contribute to human response to noise.

Table 1
Factors that Affect Individual Annoyance to Noise

Primary Acoustic Factors
Sound Level
Frequency
Duration
Secondary Acoustic Factors
Spectral Complexity
Fluctuations in Sound Level
Fluctuations in Frequency
Rise-time of the Noise
Localization of Noise Source
Non-acoustic Factors
Physiology
Adaptation and Past Experience
How the Listener's Activity Affects Annoyance
Predictability of When a Noise will Occur
Is the Noise Necessary?
Individual Differences and Personality

Source: C. Harris, 1979

2.4 Sound Rating Scales

The description, analysis, and reporting of community sound levels is made difficult by the complexity of human response to sound and myriad of sound-rating scales and metrics developed to describe acoustic effects. Various rating scales approximate the human subjective assessment to the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters such as duration and cumulative effect of multiple events.

Noise metrics are categorized as single event metrics and cumulative metrics. 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 the day. Noise metrics used in this study are summarized below:

2.4.1 Single Event Metrics

- **Frequency Weighted Metrics (dBA).** In order to simplify the measurement and computation of sound loudness levels, frequency-weighting networks have obtained wide acceptance. The A-weighting (dBA) scale has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this study are all based upon the dBA scale.

- **Maximum Noise Level.** The highest noise level reached during a noise event is called the "Maximum Noise Level," or Lmax. 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 until the sound level again settles to ambient levels. Such a history of a flyover is plotted at the top of Figure 3. It is this metric to which people generally instantaneously respond when an aircraft flyover occurs.

- **Single Event Noise Exposure Level (SENEL) or Sound Exposure Level (SEL).** 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 Figure 3, 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. Speech and sleep interference research can be assessed relative to Single Event Noise Exposure Level data.

  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. Single event metrics are a convenient method for describing noise from individual aircraft events. This metric is useful in that airport noise models contain aircraft noise curve data based upon the SENEL metric. In addition, cumulative noise metrics such as LEQ, CNEL and DNL can be computed from SENEL data.

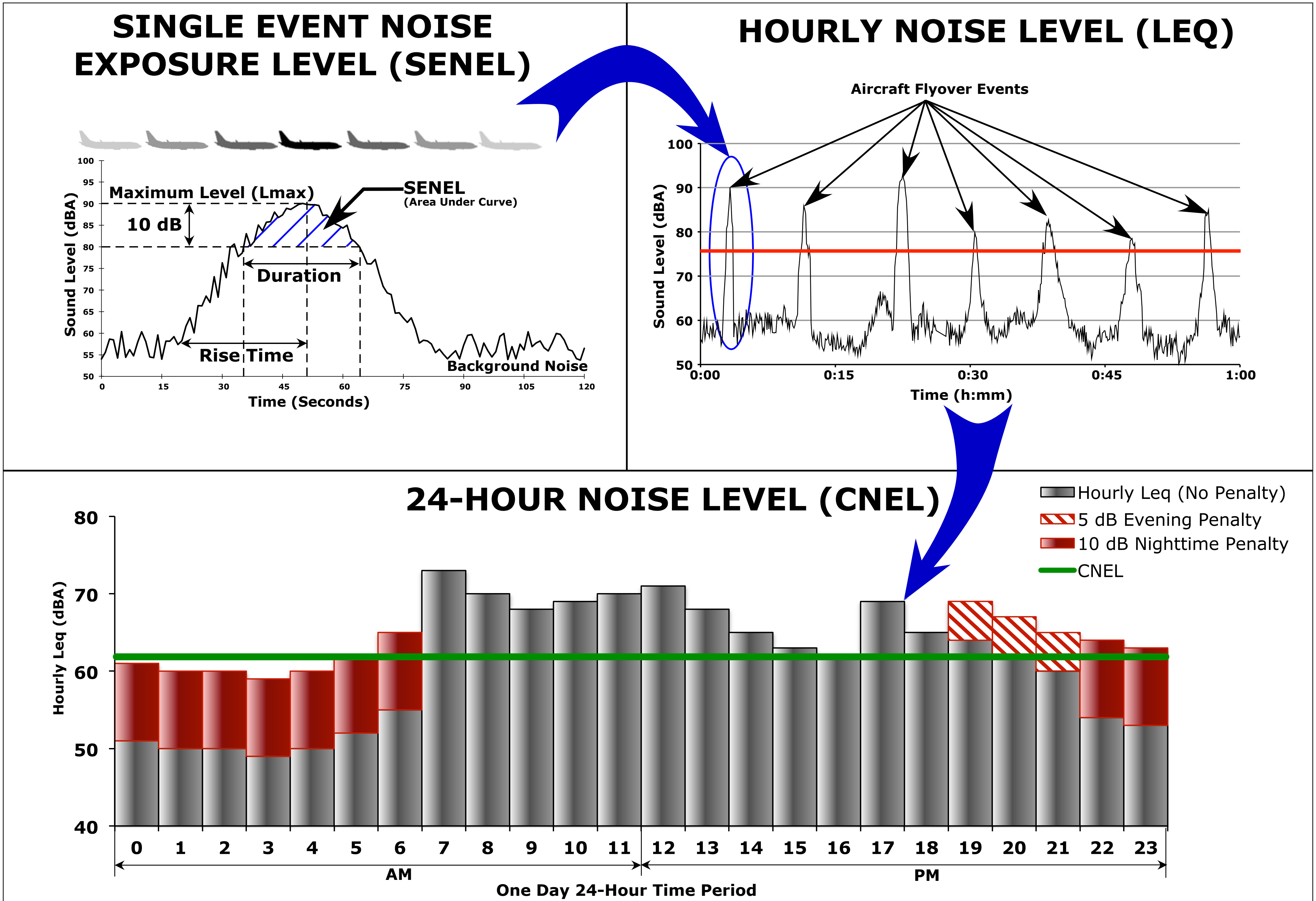


Figure 3

Single and Cumulative Noise Metric Definitions

John Wayne Airport (JWA) Settlement Agreement Amendments

2.4.2 Cumulative Metrics

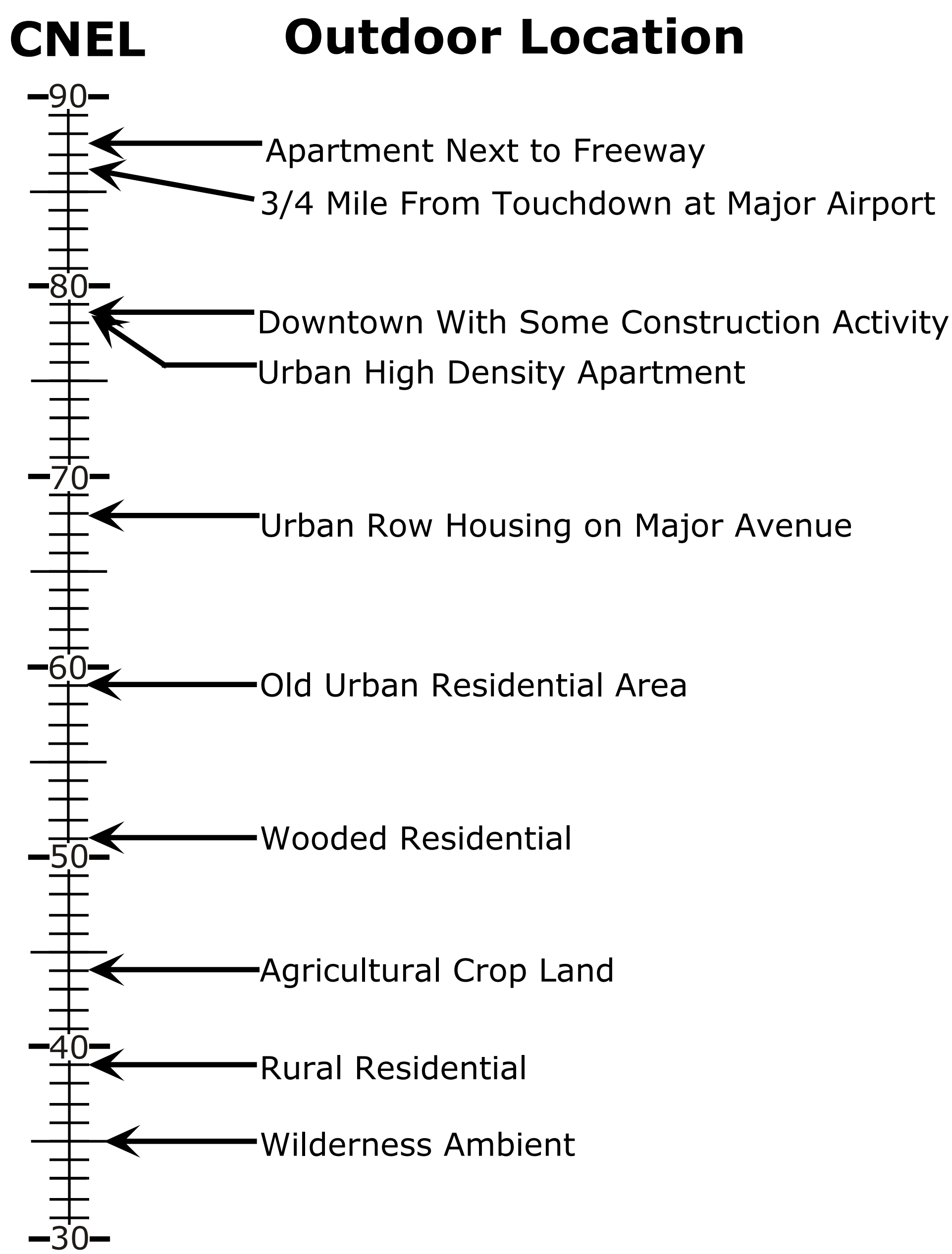
Cumulative noise metrics assess community response to noise by including the loudness of the noise, the duration of the noise, the total number of noise events and the time of day these events occur in one single number rating scale.

Equivalent Noise Level (Leq). Leq is the sound level corresponding to a steady-state, A-weighted sound level containing the same total energy as several SEL events during a given sample period. Leq 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 Figure 3. Leq can be measured for any time period, but is typically measured for 15 minutes, 1 hour or 24-hours. Leq for a one-hour period is used by the Federal Highway Administration for assessing highway noise impacts. Leq for one hour is called Hourly Noise Level (HNL) in the California Airport Noise Regulations [4] and is used to develop Community Noise Equivalent Level (CNEL) values for aircraft operations.

Community Noise Equivalent Level (CNEL). 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. In the CNEL scale, noise occurring between the hours of 7 pm and 10 pm is penalized by approximately 5 dB. This penalty accounts for the greater potential for noise to cause communication interference during these hours, as well as typically lower ambient noise levels during these hours. Noise that takes place during the night (10 pm to 7 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 Figure 3. Examples of various noise environments in terms of CNEL are presented in Figure 4. 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 (DNL). The DNL index is very similar to CNEL but does not include the evening (7 pm to 10 pm) penalty that is included in CNEL. It does include the nighttime (10 pm to 7 am) penalty. 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 to 10 pm time period. DNL is specified by the Federal Aviation Administration (FAA) for airport noise assessment and by the Environmental Protection Agency (EPA) for community noise and airport noise assessment. The FAA guidelines (described later) allow for the use of CNEL as a substitute to DNL.



Source:
U.S. Environmental Protection Agency, "Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure," EPA Report NTID 73.4, 1973.

Figure 4
Typical Outdoor Noise Levels

2.4.3 Supplemental Metrics

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

The Time Above 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 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 Time Above for any user defined noise level threshold.

While there are no definitive land use standards for the Time Above metric, the metric is provided in this analysis as an additional description of the noise exposure because of its ready quantification of the amount of time that specific noise levels will 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 associated with interfering noise. In general, speech interference effects start when interfering noise, such as an aircraft, exceed 65 dBA for normal face-to-face conversation. Using this as a criteria threshold, three Time Above thresholds were selected for this analysis, each corresponding to a level at which speech interference might occur. 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 homes is 12 dBA with windows open and 20 dBA with windows closed (older homes built prior to UBC improved requirements for Energy Insulation), 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. Homes that are more modern could warrant the use of higher thresholds, but this analysis uses the more conservative values specified above.

Percent Noise Level (Ln). To account for intermittent or fluctuating noise, another method to characterize noise is the Percent Noise Level (Ln). The Percent Noise Level is the level exceeded n% of the time during the measurement period. It is usually measured in the A-weighted decibel, but can be an expression of any noise rating scale. Percent Noise Levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, L50 is the level exceeded 50 percent, and L10 is the level exceeded 10 percent of the time. L90 represents the background or minimum noise level; L50 represents the median noise level, and L10 the peak or intrusive noise levels. Percent Noise Level is commonly used in community noise ordinances that regulate noise from mechanical equipment, entertainment noise sources and the like. It is not normally used for transportation noise regulation.

Detectability. Cumulative measures of community noise (such as CNEL or DNL) are less sensitive to low-level sounds that may occur infrequently and thereby do not materially affect integrated energy averages. This situation is predominant in remote locations far from urban and suburban noise sources, in which otherwise quiet areas are intermittently disturbed by low-level sounds from aircraft over flights or train pass-bys. For this reason, a metric that considers both background sound and the relative level from the aircraft over flights may be useful to supplement the CNEL or DNL analysis in some circumstances.

Research [5] demonstrates that the annoyance of low-level sounds may be predicted through a descriptor known as detectability. The research showed that in low-level sound settings, signal detection or audibility could be the most important factor in predicting annoyance. Detectability provides a method of measuring this level of intrusion.

Detectability, as it is known today, began with the development of a formal psycho-acoustic theory of detectability in the mid-1960s [6]. This concept evolved into an analytical tool through interest in military, industrial, and environmental applications. Emphasis also has been placed on establishing criteria for non-detectability as well. For example, predicting the audibility of acoustic signals from military vehicles in the field is a prime application area [7][8]. Detectability is a function of the differential between the 1/3 octave band noise level of the source and the background in the same frequency band. Other factors include the bandwidth in that same frequency band and the efficiency of the listener.

Detectability is useful in describing when a signal is detectable in various background settings. In addition to these low-level sound applications, more recent work [9][10] suggests that the detectability concept may also be applicable to more complex noise environments.

In summary, the concept of detectability and its relation to annoyance appears to be applicable to low-level sound situations that are common in remote areas. However, it should be noted that the research on detectability was conducted primarily under constrained laboratory conditions. Detectability has not been tested to predict annoyance in an outdoor setting where both the background and source vary with respect to amplitude, frequency and temporal domain or in urban or suburban areas such as the area surrounding John Wayne Airport. As a result, it will not be used as a metric for analysis in this study.

2.4.4 Effects of Noise on Humans

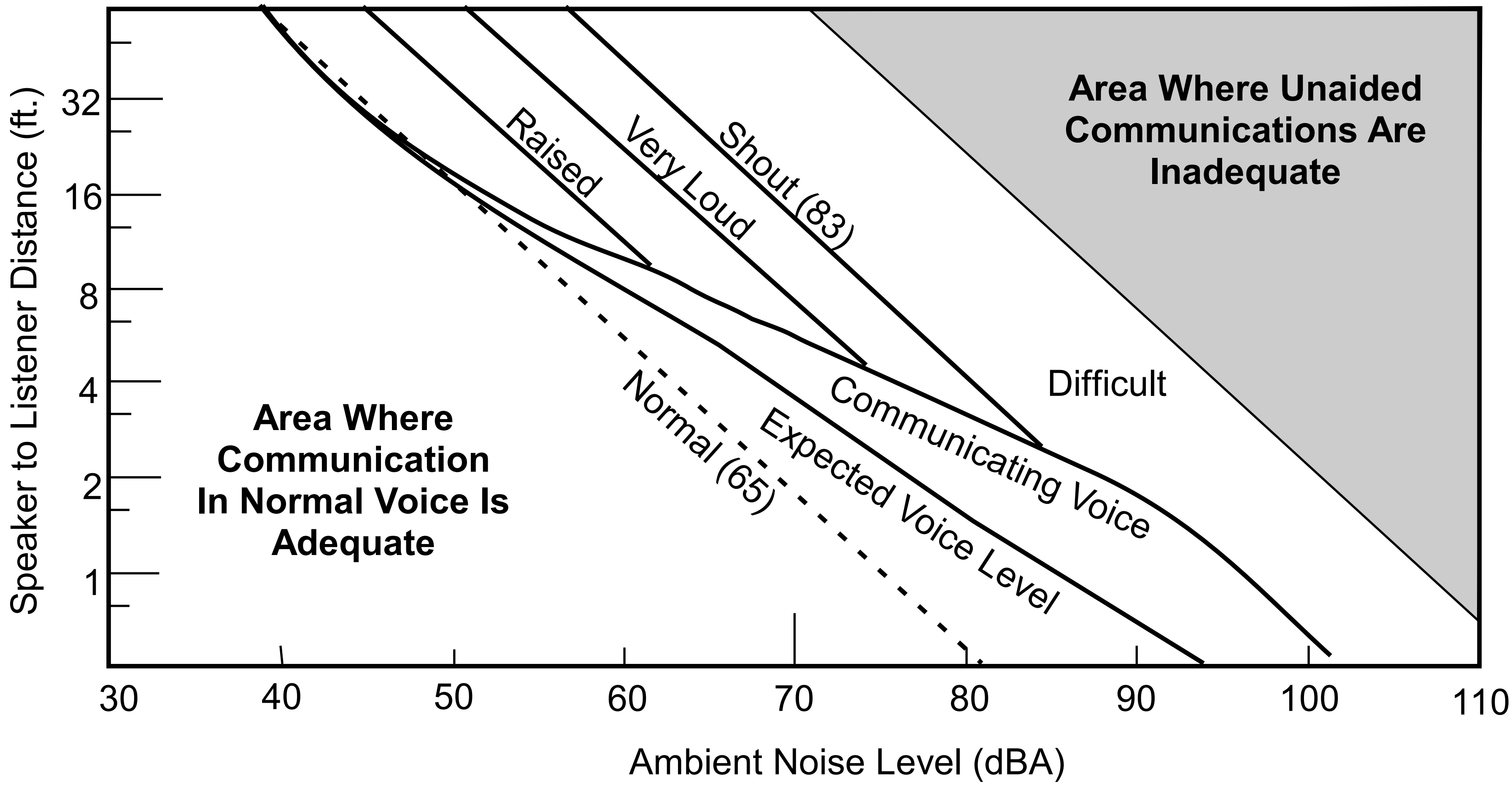
Noise, often described as unwanted sound, is known to have several adverse effects on humans. From these known adverse effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. These criteria are based on effects of noise on people such as hearing loss (not a factor with typical community noise), communication interference, sleep interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narrative:

Hearing Loss is generally not a concern in community noise problems, 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 such as target shooting, motorcycle or car racing, etc. 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 in environmental noise problems. 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. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level. Figure 5 shows the relation of quality of speech communication with respect to various noise levels.

Sleep Interference is a major noise concern in noise assessment and, of course, is most critical during nighttime hours. Sleep disturbance is one of the major causes of annoyance due to community noise. 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 space range from 25 to 45 dBA, with 35 to 40 dBA being the norm. Some years ago, the National Association of Noise Control Officials [11] published data on the probability of sleep disturbance with various single event noise levels. Based on laboratory experiments conducted in the 1970s, it was determined that a noise event with an interior noise exposure of 75 dBA interior will cause noise induced awakening in 30 percent of the cases.



Permissible Distance Between a Speaker and Listeners for Specified Voice Levels and Ambient Noise Levels
(Levels in parentheses refer to voice levels measured one meter from the mouth)

However, research first published in Britain in the 1990s [12][13] has shown that the probability for sleep disturbance, when measured in an in-home setting is much less than what had been reported in earlier research that was based on laboratory studies. This research showed that once a person was asleep, it is much more unlikely that they will be awakened by a noise. The significant difference in the British studies is the use of actual in-home sleep disturbance patterns as opposed to laboratory data that had been the historic basis for predicting sleep disturbance. Some of this research has been criticized because it was conducted in areas where subjects had become habituated to aircraft noise. On the other hand, some of the earlier laboratory sleep studies had been criticized because of the extremely small sample sizes of most laboratory studies and because the laboratory was not necessarily a representative sleep environment. A 1994 British sleep study compared the various causes of sleep disturbance using in-home sleep studies. This field study assessed the effects of nighttime aircraft noise on sleep in 400 people (211 women and 189 men; 20-70 years of age; one per household) habitually living at eight sites adjacent to four U.K. airports, with different levels of nighttime flying. The main finding was that only a minority of aircraft noise events affected sleep, and, for most subjects, that domestic and other non-aircraft factors had much greater effects. As shown in the Figure 6, aircraft noise was a minor contributor among a host of other factors that lead to awakening response.

The Federal Interagency Committee on Noise (FICON) in 1992, in a document entitled Federal Interagency Review of Selected Airport Noise Analysis Issues [14], recommended an interim dose-response curve for sleep disturbance based on laboratory studies of sleep disturbance. In June of 1997, the Federal Interagency Committee on Aviation Noise (FICAN) updated the FICON recommendation with an updated curve based on the more recent in-home sleep disturbance studies which show lower rates of awakening compared to the laboratory studies [15]. The FICAN recommended a curve based on the upper limit of the data presented and therefore considers the curve to represent the "maximum percent of the exposed population expected to be behaviorally awakened," or the "maximum awakened." The FICAN recommendation is shown on Figure 7.

In 2008, the American National Standards Institute (ANSI) published a standard method of estimating sleep disturbance [16], and this method was adopted by FICAN to replace the curve shown in Figure 7. The ANSI standard divided the population into 2 groups, based on their habituation to the noise source. For a population that has not been habituated to a nighttime noise, i.e., a new nighttime noise, the FICAN curve shown in Figure 7 is recommended for estimating awakenings due to noise. For communities habituated to a noise, the rate of awakening is considerably lower as shown in Figure 7. Figure 7 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. The awakening rate due to such nighttime operations would be much higher than for a population already living near an airport with nighttime operations. 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.

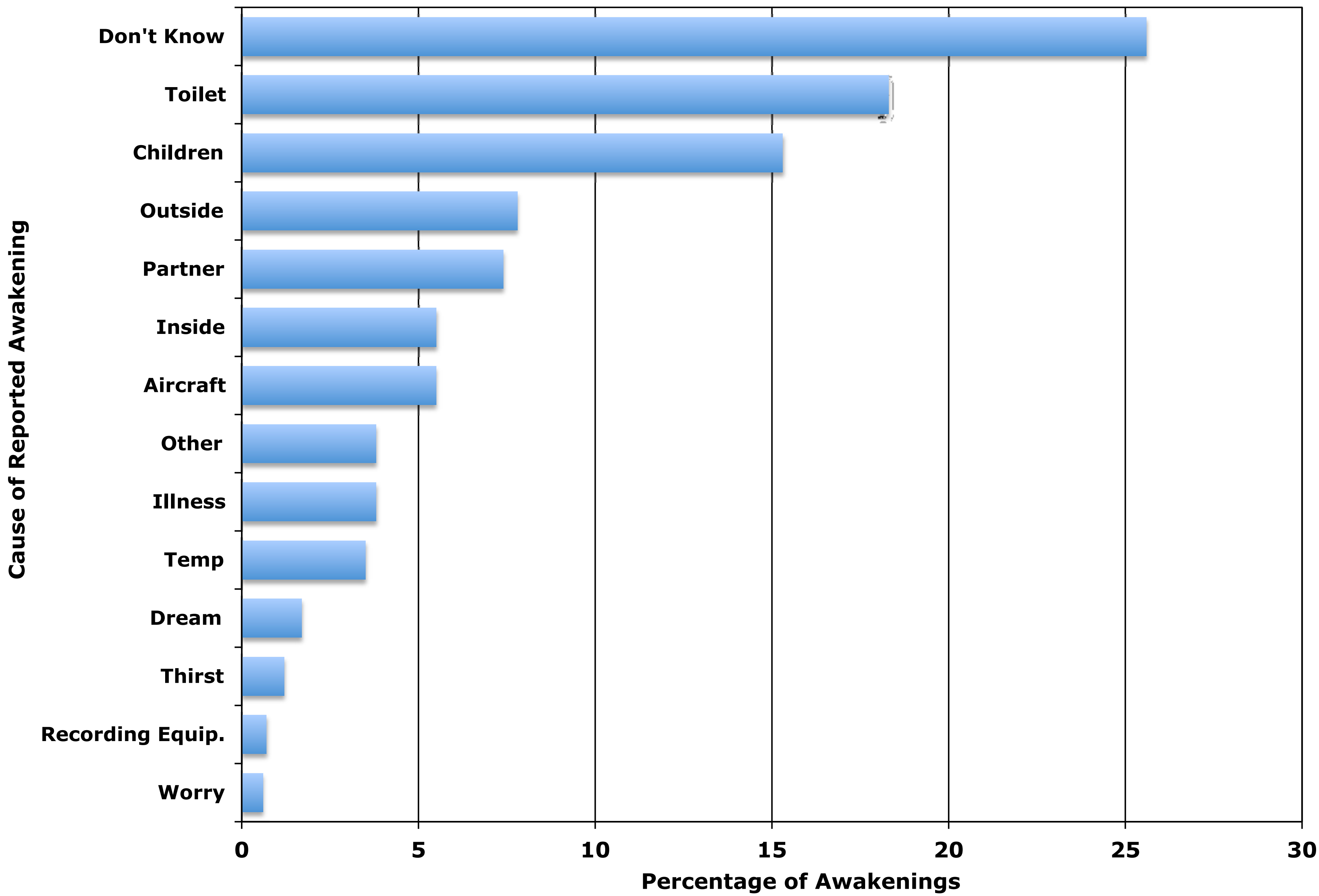
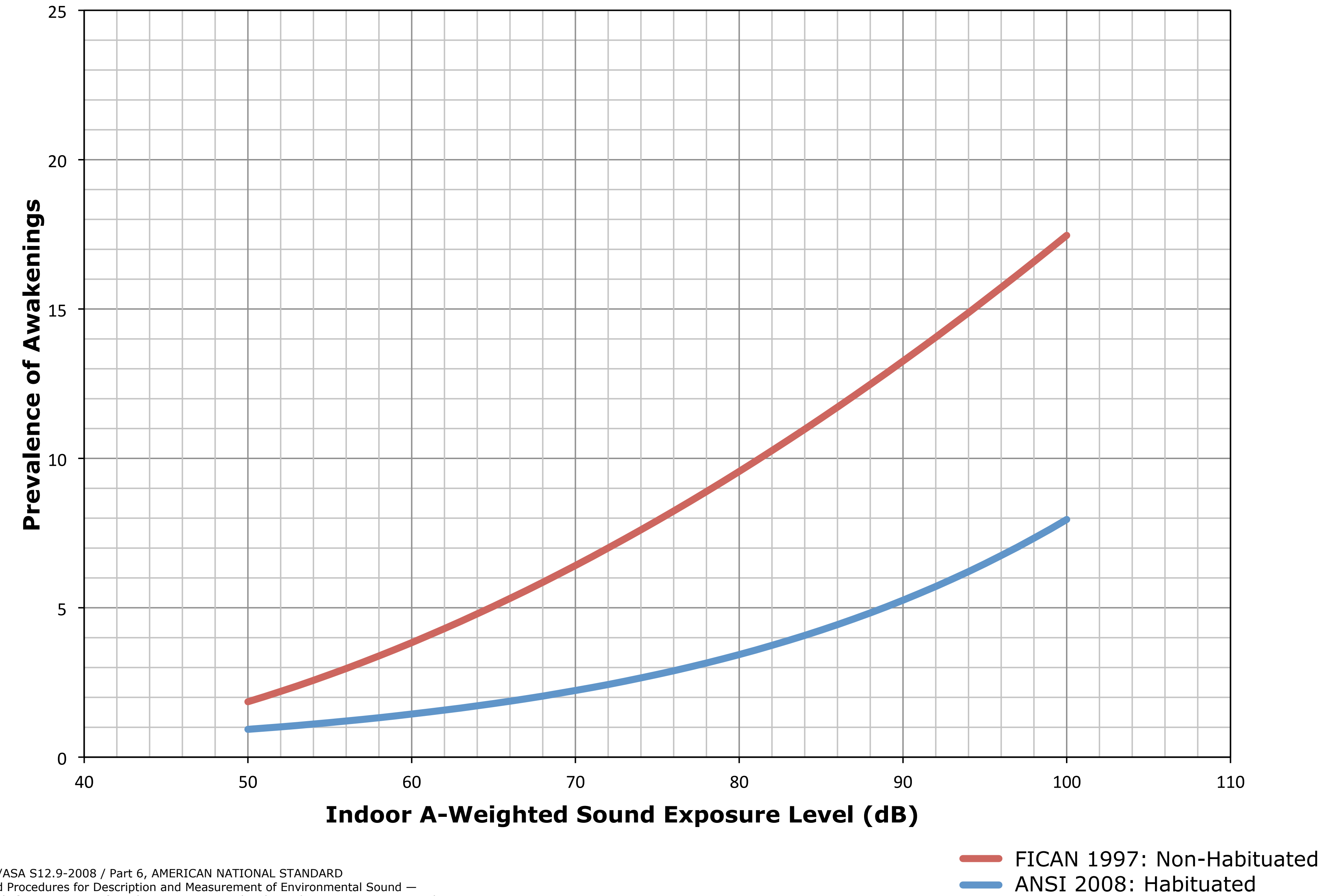


Figure 06
Causes and Prevelance of All Awakenings



Source: ANSI/ASA S12.9-2008 / Part 6, AMERICAN NATIONAL STANDARD
Quantities and Procedures for Description and Measurement of Environmental Sound —
Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes

Figure 7
Sleep Disturbance vs Noise Level

John Wayne Airport (JWA) Settlement Agreement Amendments

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

Health effects from noise have been studied around the world for nearly thirty years. Scientists have attempted to determine whether high noise levels can adversely affect human health—apart from auditory damage—which is amply understood. 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.

While annoyance and sleep/speech interference have been acknowledged, health effects are also associated with a wide variety of other environmental stressors, including air pollution. Isolating the effects of aircraft noise alone as a source of long-term physiological change has proved to be almost impossible as the effects associated with noise are also the same well-known effects of air pollution. In a review of 30 studies conducted worldwide between 1993 and 1998 [17], a team of international researchers concluded that, while some findings suggest that noise can affect health, improved research concepts and methods are needed to verify or discredit such a relationship. They called for more study of the numerous environmental and behavioral factors than can confound, mediate or moderate survey findings. In 2008, the Airport Cooperative Research Board (ACRP), a part of the National Academies, published a synthesis on the effects of aircraft noise [18]. The ACRP synthesis 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."

In October 2013, two studies on cardiovascular disease associated with aircraft noise were published in the British Medical Journal [19][20]. The first was done in the UK around Heathrow Airport in London, and the second was done in the US 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 US study focused on Medicare patients and the British study was based on the total population living around Heathrow.

The British study concluded in part:

> "**Main outcome measures** Risk of hospital admissions for, and mortality from, stroke, coronary heart disease, and cardiovascular disease, 2001-05." (Abstract, Page 1)

> " **Conclusion** High levels of aircraft noise were associated with increased risks of stroke, coronary heart disease, and cardiovascular

disease for both hospital admissions and mortality in areas near Heathrow airport in London. As well as the possibility of causal associations, alternative explanations such as residual confounding and potential for ecological bias should be considered." (Abstract, Page 2)

" 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." (Conclusions Section, Page 5)

The US study concluded:

" **Results** Averaged across all airports and using the 90th centile noise exposure metric, a zip code with 10 dB higher noise exposure had a 3.5% higher (95% confidence interval 0.2% to 7.0%) cardiovascular hospital admission rate, after controlling for covariates.

Conclusions Despite limitations related to potential misclassification of exposure, we found a statistically significant association between exposure to aircraft noise and risk of hospitalization for cardiovascular diseases among older people living near airports." (Abstract, Page 1)

" **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. …" (Limitations of this Study Section, Page 5)

" **Conclusions and future research** We found that aircraft noise, particularly characterized by the 90th centile 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." (Conclusions and Future Research Section, Page 6)

These very recent British and US studies provide more correlation linking noise to cardiovascular disease, but still fall short of providing the definitive noise dose, response relationship that defines at what noise level these effects start and what is the rate of increase in response as noise level increases.

The recent cardiovascular studies follow a series of reports from Europe that support the hypothesis that cardiovascular effects are linked to noise exposure. None of these studies, including the most recent, provides information on the level of noise at which such effects occur.

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. As such, no applicable regulatory agency has established standards specific to physiological response for the purpose of CEQA, 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.

Section 15145 of the 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 evaluation.

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." (Source: http://www.hsph.harvard.edu /news/press-releases/aircraft-noise-linked-with-heart-problems)

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 (Is it our dog barking or the neighbor's dog?). Whether we believe that someone is trying to abate the noise will also affect the level of annoyance.

Annoyance levels have been correlated to CNEL levels. Figure 8 relates DNL noise levels to community response from two of these surveys. One of the survey curves presented in Figure 8 is the well-known Schultz curve, developed by Theodore Schultz [14]. It displays the percent of a populace that can be expected to be annoyed by various DNL (CNEL in California) values for residential land use with outdoor activity areas. At 65 dB DNL, the Schultz curve predicts approximately 14% of the exposed population reporting themselves to be "highly annoyed." At 60 dB DNL, this decreases to approximately 8% of the population. However, Figure 8 shows that the data used to determine the Schultz curve and updates have a very wide range of scatter, with communities near some airports reporting much higher percentages of population highly annoyed at these noise exposure levels. Annoyance levels have never been correlated statistically to single event noise exposure levels in airport-related studies.

In recent years, there has been the suggestion in Europe and by researchers in the US that the noise dose, response curve for annoyance from aircraft noise is different for aviation noise than it is for road and rail noise [21][22][23]. In these studies, it has been suggested that the percentage of the population highly annoyed at 65 DNL is closer to 30% of the population and not the 14% as suggested by the Schultz curve. The US studies go on further to describe that communities form unique attitudes about noise and differing communities show a wide range of annoyance response for the same noise exposure that can be attributed to non-acoustic factors.

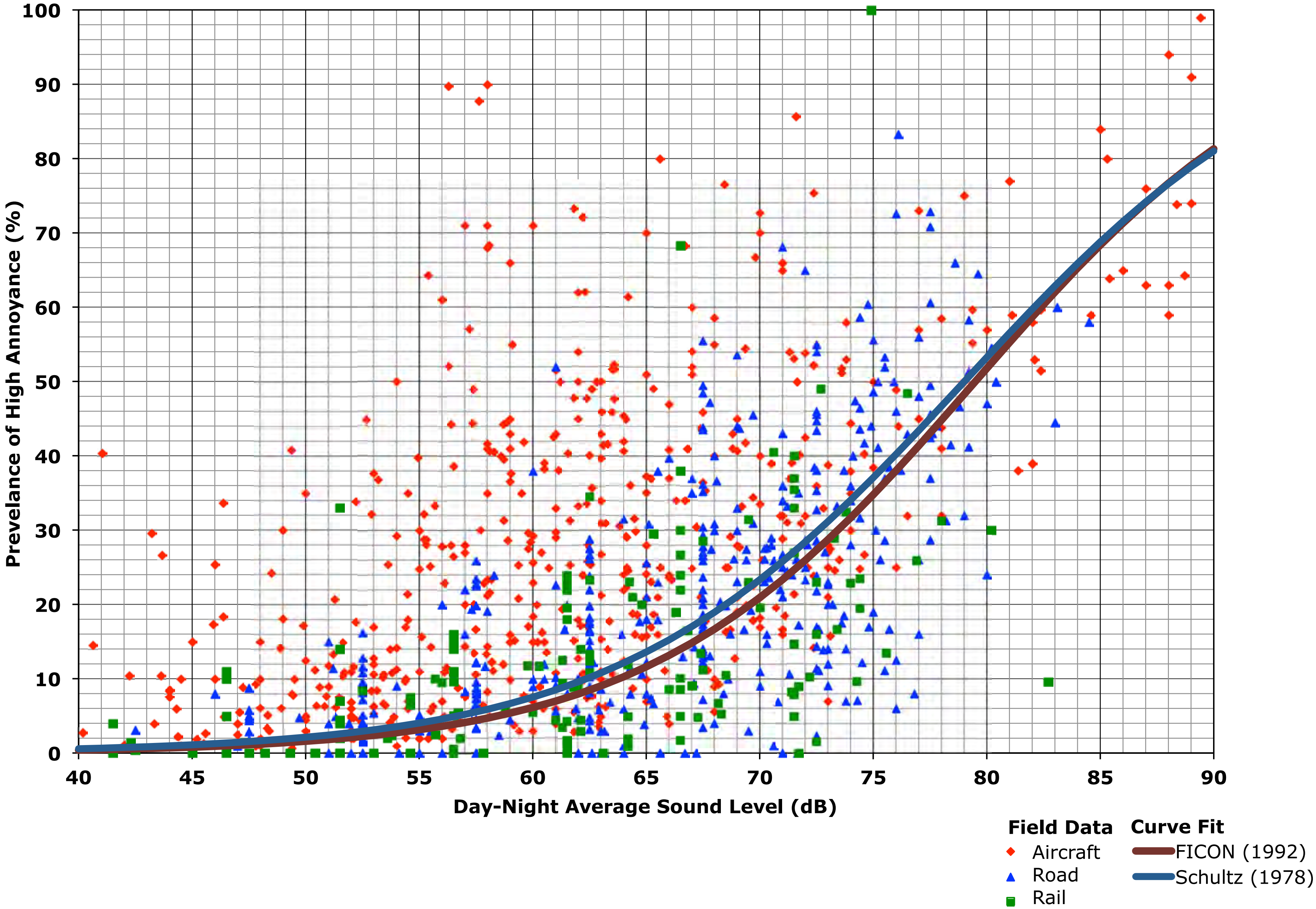


Figure 8

Percent of Population Highly Annoyed as a Function of DNL

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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 indicating 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 school room effects can be expected from interior noise levels equal to or exceeding 65 CNEL, and/or 85 dBA SEL.

Some interference with classroom activities can be expected with noise events that interfere with speech. As discussed in other sections of this report, speech interference 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 Time Above analysis performed as part of this study.

2.5 Noise/Land Use Compatibility Guidelines

Noise metrics quantify community response to various noise exposure levels. The public reaction to different noise levels has been estimated from extensive research on human responses to exposure of different levels of aircraft noise. Noise standards generally are expressed in terms of the DNL 24-hour averaging scale based on the A-weighted decibel. Utilizing these metrics and surveys, agencies have developed standards for assessing the compatibility of various land uses with the noise environment. There are no single event noise based noise/land use compatibility criteria that have been adopted by the Federal Government or the State of California.

This section presents information regarding noise and land use criteria useful in the evaluation of noise impacts. The FAA has a long history of publishing noise/land use assessment criteria for airports. These laws and regulations provide the basis for local development of airport plans, analyses of airport impacts, and the enactment of compatibility policies. Other agencies including the EPA, the Department of Defense, the State of California, the County of Orange and most cities have developed noise/land use compatibility criteria. A summary of some of the more pertinent regulations and guidelines are presented in the following paragraphs.

2.5.1 Federal Aviation Administration

Airport and Airway improvement Act of 1982, as amended
(Public Laws 91-258 and 94-353).

This act establishes the Federal requirements for funding of airport planning under the Planning Grant Program (PGP) and airport development under the Airport Development Aid Program (ADAP). An Airport and Airway Trust Fund is created to pay for these programs and operations of the Federal aviation system. The general types of projects eligible for Federal funding are indicated. Additionally, the act directs the preparation of a National Airport System Plan (NASP), which lists the location of airports in the national system of airports and the recommended development of each.

Among the conditions for Federal funding are two requirements involving airport/land use compatibility. As a condition to the receipt of ADAP funds, the airport sponsor (owner) must, among other things, give assurances regarding land uses in the airport environs that:

> " The aerial approaches to the airport will be adequately cleared and protected by removing, lowering, relocating, marking, lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards";

and that:

> " Appropriate action, including the adoption of zoning laws, has been or will be taken to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft."

Federal Aviation Regulations, Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification".

Originally adopted in 1960, FAR Part 36 prescribes noise standards for issuance of new aircraft type certificates. Part 36 prescribes limiting noise levels for certification of new types of propeller-driven, small airplanes as well as for transport category, large airplanes. Subsequent amendments extended the standards to certain newly produced aircraft of older type designs. Other amendments have at various times extended the required compliance dates. 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 are no longer permitted to operate in the U.S. Stage 2 aircraft are being phased out of the U.S. fleet as discussed in a later paragraph on the Airport Noise and Capacity Act of 1990. 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.

U.S. Department of Transportation/FAA Aviation Noise Abatement Policy.

This policy, adopted in 1976, sets forth the noise abatement authorities and responsibilities of the Federal Government, airport proprietors, State and Local governments, the 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 will give high priority in the allocation of 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 FAA develop an airport community noise metric which would 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. The law does not require any airport to develop a noise compatibility program.

Federal Aviation Regulations, Part 150, "Airport Noise Compatibility Planning".
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. As part of the FAR Part 150 Noise Control program, the FAA published noise and land use compatibility charts to be used for land use planning with respect to aircraft noise. An expanded version of this chart appears in Aviation Circular 150/5020-1 (dated August 5, 1983) and is reproduced in Table 2.

These guidelines represent recommendations to local authorities for determining acceptability and permissibility of land uses. The guidelines recommend a maximum amount of noise exposure (in terms of the cumulative noise metric 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."

Table 2
Federal Aviation Regulation Part 150 Land Use Guidelines

Land Use	Yearly Day-Night Average Sound Level (Ldn 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

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.

(Table Continued on Next Page)

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.

Federal Aviation Orders 5050.4 and 1050.1E for Environmental Analysis of Aircraft Noise Around Airports.

The FAA has developed guidelines (Order 5050.4B) for the environmental analysis of airports. Specific policies and procedures for evaluating environmental impacts are described in Order 1050.1E CHG 1 Effective Date March 20, 2006. The noise analysis related policies and procedures are presented in Section 14 of the Appendix A of the Order. The Significant Impact thresholds are presented in Section 14.3.

> *"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. "*

Section 14.4c specifies that impacts to receptors with noise exposures between 60 and 65 DNL should be examined in accordance with the 1992 FICON (Federal Interagency Committee on Noise) Recommendations.

> *"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 (FICON p.3-5). 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. (FICON p. 3-7)."

Section 14.5e specifies the supplemental analysis that should be performed for projects with study areas that are larger than the immediate vicinity of the airport.

"For air traffic airspace actions where the study area is larger than the immediate vicinity of an airport, incorporates more than one airport, or includes actions above 3,000 feet AGL, noise modeling will be conducted using Noise Integrated Routing System (NIRS). For those types of studies, NIRS will be used to determine noise impacts from the ground to 10,000 feet AGL. This noise analysis will focus on the change in noise levels as compared to populations and demographic information at population points throughout the study area. Noise contours will not be prepared for the NIRS analysis. However, NIRS will be used to produce change-of-exposure tables and maps at population centroids using the following criteria:

DNL 60-65 dB ± 3 dB

DNL 45-60 dB ± 5 dB"

Airport Noise and Capacity Act of 1990

The Airport Noise and Capacity Act of 1990 (PL 101-508, 104 Stat. 1388), also known as ANCA or the Noise Act, 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, FAA amended Part 91 and issued a new Part 161 of the Federal Aviation Regulations. 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 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, FAA has determined that Part 161 limitations on proprietors' authority applies to the smaller aircraft as well.

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 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, the existing noise regulations and access restrictions established by the County of Orange at John Wayne Airport were implemented prior to the 1990 deadline in ANCA and the amendments made to allow for the revised JWA noise abatement departure procedures have been approved by the FAA.

2.5.2 Environmental Protection Agency Noise Assessment Guidelines

Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety".

In March 1974, in response to a federal statutory mandate, the EPA published this document [1] describing 55 dB DNL as the requisite level with an adequate margin of safety for areas with outdoor uses, including residences and recreational areas. This document is intended to "provide State and Local governments as well as the Federal Government and the private sector with an informational point of departure for the purpose of decision-making". Note that these levels were developed for suburban type uses. In some urban settings, the noise levels will be significantly above this level, while in some wilderness settings, the noise levels will be well below this level. The EPA "levels document" does not constitute a standard, specification or regulation, but identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations. These EPA guidelines have not been adopted or recommended for use by the FAA, the State of California, or the County's Board of Supervisors.

Federal Interagency Committee on Noise (FICON) Report of 1992 [14]

The use of the CNEL or DNL metric and the 65 dB CNEL criteria have been reviewed by various interest groups in order to assess its usefulness in assessing aircraft noise impacts. At the direction of the EPA and the FAA, the Federal Interagency Committee on Noise (FICON) was formed to review specific elements of the assessment of airport noise impacts and to make recommendations regarding potential improvements. FICON includes representatives from the Departments of Transportation, Defense, Justice, Veterans Affairs, Housing and Urban Development, the Environmental Protection Agency, and the Council on Environmental Quality.

FICON was formed to review Federal policies used to assess airport noise impacts and on the manner in which noise impacts are determined. This included whether aircraft noise impacts are fundamentally different from other transportation noise impacts; the manner in which noise impacts are described; and the extent to which impacts outside of 65 DNL should be reviewed in federal environmental impact statements.

The committee determined that there are no new descriptors or metrics of sufficient scientific standing to substitute for DNL. The DNL noise exposure metric and the dose-response relationships used to determine noise impact were determined to be proper for assessing noise from civil and military aviation in the general vicinity of airports. The report supported agency discretion in the use of supplemental noise analysis. The report recommended improvement in public understanding of the DNL, supplemental methodologies and aircraft noise impacts.

The report endorsed and expanded traditional FAA environmental screening criteria for potential airport noise impacts. FICON recommended that if screening analysis determines noise-sensitive areas at or above 65 dB DNL show an increase of DNL 1.5 dB or more, then further analysis should be conducted of noise sensitive areas between DNL 60-65 dB having an increase of DNL 3 dB or more, consistent with the most recent FAA guidelines 1050.1D.

2.6 State of California

California Airport Noise Regulations are enforced by the Aeronautics Division of the California State Department of Transportation (Caltrans). 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 [24][25] apply to all multi-family dwellings built in the State. 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.

General Plan Noise Element. The State of California requires that all municipal General Plans contain a Noise Element [25]. 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 were created by State Law [26] 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 John Wayne Airport, 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.

2.6.1 County of Orange

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 Leq. These standards are reproduced here as Tables 3 and 4. 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. The County of Orange uses the 60 dB CNEL contour as a threshold for review of projects in order to screen projects and ensure that the 65 dB CNEL exterior and 45 dB CNEL interior criteria are met. In other words, projects located within the 60 dB CNEL contour are required to submit detailed acoustical studies ensuring compliance with the County noise standards.

Table 3
County of Orange Compatibility Matrix

Type of Use	> 65 dB CNEL	60 to 65 dB 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-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	2a, c, e
Hotels/Motels	2a, c	2a, c
Accessory Uses		
Executive Apartments	1a, b, e	2a, e
Caretakers	1a, b, c, e	2a, c, e

Table 4
County of Orange Compatibility Matrix – Explanations 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; allowed in other areas of 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 dB (habitable rooms only).
b=	Exterior Standard: CNEL of less than 65 dB from any source in outdoor living areas.
c=	Interior standard: Leq (H)=45 to 65 decibels interior noise level, depending on interior use.

Typical Use	Leq (h)*
Private Office, Church Sanctuary, College, Preschool, Schools (Grade K-12) Board Room, Conference Room, etc.	45
General Office, Reception, Clerical, etc.	50
Other Schools and Colleges	52
Bank Lobby, Retail Store, Restaurant, Typing Pool, etc.	55
Manufacturing, Kitchen, Warehousing, etc.	65

d=	Exterior Standard: Leq(h) of less than 65 dB 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.

Additionally, the County of Orange provides insurance that the 45 dB CNEL interior noise limit for habitable rooms of residential units is met with windows open or windows closed (not necessarily both). Specifically, homes 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 homes provide additional noise reduction). Homes 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 homes 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 homes 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 John Wayne Airport. Air carriers are not permitted to depart JWA before 7 am on Monday through Saturday, 8 am on Sundays, or after 10 pm on any day. Air carriers are not permitted to arrive at JWA before 7 am on Monday through Saturday, 8 am on Sundays, or after 11 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.

The Phase 2 Commercial Airline Access Plan and Regulation at John Wayne Airport [27] 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) [28] adopted by the County of Orange establishes noise limits and other restrictions for aircraft operating at John Wayne Airport. Generally, these operations are permitted 24 hours a day subject to daytime and nighttime noise limits.

2.6.2 General Plan for Adjacent Cities

The following paragraphs discuss the noise policies of cities adjacent to John Wayne Airport:

Newport Beach – The City of Newport Beach adopted their current General Plan on July 25, 2006. The City has established 65 and 45 CNEL as the outdoor and indoor noise compatibility criteria for residential land uses (See Table N2 of the Noise Element). This table also presents 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.

> **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. The CNEL increase is shown in the table below.

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

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 John Wayne Airport as provided in the City Council Airport Policy."

N 3.1 New Development; Ensure new development is compatible with the noise environment by using airport noise contours no larger than those contained in the 1985 JWA Master Plan, as guides to future planning and development decisions.

N 3.2 Residential Development; Require that residential development in the Airport Area be located outside of the 65 dBA CNEL noise contour no larger than shown in the 1985 JWA Master Plan and require residential developers to notify prospective purchasers or tenants of aircraft overflight and noise.

N 3.3 Avigation Easement; Consider requiring the dedication of avigation easements in favor of the County of Orange when noise sensitive uses are proposed in the JWA planning area, as established in the JWA Airport Environs Land Use Plan (AELUP).

N 3.4 Existing Noise Restrictions; Take any action necessary to oppose any attempt to modify the existing noise restrictions, including the existing curfew and the General Aviation Noise Ordinance.

N 3.5 Additional Facilities at John Wayne Airport; Take any action necessary to oppose any attempt to construct a second air carrier runway including the acquisition of land necessary to provide required separation of the existing air carrier runway and any proposed facility.

N 3.6 Existing Level of General Aviation Operations; Support any plan or proposal that maintains, and oppose any plan or project that proposes any significant changes to the existing level of general aviation operations and general aviation support facilities.

N 3.7 Remote Monitoring Systems; Support preservation or enhancement of the existing remote monitoring systems (RMS) and the public reporting of the information derived from the RMS.

N 3.8 Meeting Air Transportation Demand; Support means of satisfying some of Orange County's air transportation demand at airports other than John Wayne Airport or through alternative means of transportation.

N 3.9 John Wayne Airport Amended Settlement Agreement; Take all steps necessary to preserve and protect the validity of the John Wayne Airport Amended Settlement Agreement, including the following:

- Oppose, or seek protection from any federal legislative or regulatory action that would or could affect or impair the County's ability to operate John Wayne Airport consistent with the provisions of the John Wayne Airport Amended Settlement Agreement or the City's ability to enforce the Amended Settlement Agreement.

- Approving amendments of the John Wayne Airport Settlement Agreement to ensure continued validity provided amendments are consistent with the City Council Airport Policy, do not materially impair the quality of life, and are in the long-term best interests of Newport Beach residents.

- Continuing to monitor possible amendment of the Airport Noise and Capacity Act of 1990, as well as various FAA Regulations and Advisory Circulars that relate to aircraft departure procedures.

Costa Mesa – The Noise Element of the 2000 General Plan, dated January 2002 establishes 65 and 45 CNEL as the outdoor and interior noise compatibility for residential uses (See Tables N3 and N4 and Objective N-1A.2). The Noise Element also includes two policies related to John Wayne Airport;

> **Policy N-1A-7**; "Discourage sensitive land uses from locating in the 65 CNEL noise contour of the John Wayne Airport. Should it be deemed by the City as appropriate and/or necessary for a sensitive land use to locate in the 65 CNEL noise contour, ensure that appropriate interior noise levels are met and that minimal outdoor activities are allowed."

> **Policy N-1A.8**; "Support alternative methods for the reduction of noise impacts at John Wayne Airport while continuing to maintain safety and existing limitations on aircraft daily departures."

Irvine – The City of Irvine adopted their most recent General Plan on May 8, 2012 with a Supplement adopted on July 8, 2012 (Council Resolution 12-60). 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 (See Tables F-1 and F-2).

The City of Irvine has also adopted a single event noise standard that applies to the interior of residential units 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.

At the same time as the General Plan, the City also adopted a CEQA manual that 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:

> "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."

Laguna Beach – The City of Laguna Beach adopted the Noise Element of their General Plan on March 15, 2005. The noise/land use compatibility guidelines presented in the City's 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 (see Tables 2 and 3 of the Noise Element). The Noise Element identifies aircraft overflights from John Wayne Airport 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.

Tustin – The City of Tustin's Noise Element is dated June 17, 2008. The noise/land use compatibility guidelines presented in the City's 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 (see Tables N-2 and N-3 of the Noise Element). Aircraft noise is identified as a noise-related issue with three bullet points:

- Noise from John Wayne Airport, while generally below accepted CNEL guidelines for residential uses, produces annoyance among Tustin residents due to repetitive occurrence.
- The activities and opportunities at John Wayne Airport 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 John Wayne Airport needs to be encouraged.

The Noise Element contains four policies related to aircraft noise under Goal 1, "Use noise control measures to reduce the impact from transportation noise sources." These Policies are:

> **Policy 1.3:** Encourage John Wayne Airport to set up noise control procedures and to consider methods to reduce and minimize noise exposure due to aircraft flyovers within the Tustin Planning Area.
>
> **Policy 1.4:** Continue to monitor all John Wayne Airport activities to minimize noise impacts within the Tustin Planning Area resulting from airport operations, and oppose legislation promulgated by the FAA that could eliminate local flight restrictions.
>
> **Policy 1.5:** Work to reduce risks and noise impacts resulting from aircraft operations by (a) participating in and monitoring the planning process for John Wayne Airport and (b) continuing to discourage commercial or general aviation activities which increase noise exposure.
>
> **Policy 1.6:** Encourage Tustin citizen participation and City involvement on committees that would influence future aircraft operations in Orange County.

The City has included two implementation items related to aircraft noise from John Wayne Airport. Both are ongoing projects for the Community Development Department. These two items are:

4. Aviation Noise: Work to reduce noise impacts resulting from aircraft operations at John Wayne Airport by: (a) participating and monitoring the planning process for John Wayne Airport; (b) continuing to discourage general and commercial aviation activities which increase noise exposure to sensitive land uses.

5. Aviation Monitoring: The City shall continue to review and report on the noise reports received concerning John Wayne Airport to identify any of the areas of the City where negative impacts exist in order to implement mitigation efforts, which could include lobbying of the FAA and related agencies for tighter restrictions on aircraft types.

3.0 METHODOLOGY

The methods used here for describing existing noise and forecasting the future noise environment rely heavily on computer noise modeling. The noise environment is commonly depicted in terms of lines of equal noise levels, or noise contours. These noise contours are supplemented with specific noise data for selected points on the ground. The computer noise models used are described below.

3.1 Aircraft Noise Modeling

Noise contour modeling is a key element of this noise study. Generating accurate noise contours 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 and roadway noise impacts. The computer model can then be used to predict the changes to the noise environment as a result of any of the alternatives under consideration.

The FAA's Integrated Noise Model (INM) Version 7.0d was used to model aircraft operations at John Wayne Airport. The INM has an extensive database of civilian and military aircraft noise characteristics and this most recent version of INM incorporates advanced plotting features. Noise contour files from the INM were loaded into the ArcView™ Geographic Information System (GIS) software for plotting and land use analysis.

Airport noise contours were generated in this study using the INM Version 7.0d. [29] The original INM was released in 1977. The latest version, INM Version 7.0d, was released for use in May 2013 and is the state-of-the-art in airport noise modeling. 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.

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 include:

- 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

3.2 Traffic Noise Modeling

As discussed in Section 5.4 the significance of traffic noise impacts attributable to the proposed Project and its Alternatives is evaluated based on two criterion; (1) the change in traffic noise (increase or decrease) attributable to traffic generated by the Project or an Alternative, and (2) the absolute traffic noise level that results with inclusion of traffic from the Project or the Alternative being evaluated in combination with other vehicle traffic. Both criterion must be exceeded for a significant impact to occur.

With respect to criterion (1), changes in traffic noise levels resulting from traffic volume increases can be calculated exactly based on the changes in traffic volumes. The increase in traffic noise over existing conditions is calculated by taking ten times the base 10 logarithm of the ratio of the future traffic volume to the existing traffic volume. Similarly, the increase due to the proposed Project or Alternative can be calculated by taking ten times the base 10 logarithm of the ratio of the future traffic volume with the Project/Alternative to the future traffic volume without the Project/Alternative. In this case, traffic volumes used to calculate traffic noise level changes were provided by the traffic consultant for the Project, Fehr & Peers.

The calculation of relative noise levels contains an inherent assumption that the mix of traffic, autos and trucks, is the same in the two scenarios being compared. However, there is no reason to believe that future changes in the traffic mix would considerably affect the calculated traffic noise level changes. This is because automobiles dominate the traffic noise along arterials when calculated using the standard vehicle mix developed by the County based on traffic surveys at 22 arterial intersections. Relative truck volumes would need to change by more than a factor of two 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. This difference is much less than the expected accuracy of the standard traffic noise model. Therefore, the noise levels changes calculated with this assumption are accurate within noise level prediction tolerances.

With respect to criterion (2), absolute noise levels can be difficult to predict accurately over a wide area because it is not only dependent on the roadway characteristics (width, posted speed limit, traffic volume) but it is also dependent on intervening structures and topography between the road and the receptor. Nonetheless, noise modeling software is available to allow for accurate predictions in this regard.

As discussed later in Section 6.8, there are no road segments that are anticipated to have noise level increases with the Proposed Project or any of its Alternatives over existing conditions that would exceed the change in noise level thresholds presented in Section 5.4. Therefore, there is no need to calculate absolute traffic noise levels in this case.

4.0 EXISTING NOISE ENVIRONMENT

4.1 Existing John Wayne Airport Noise

John Wayne Airport (JWA) serves both general aviation and scheduled commercial passenger airline and cargo operations. The use of JWA is heavily regulated as a result of its limited area and facilities, environmental sensitivity of the local area, and because of a long history of airport related litigation extending back at least to 1969. For example, JWA may not serve more than 10.8 million annual passengers (MAP) through December 31, 2015, owing to a limitation incorporated into the settlement stipulation and confirming judgment of the U.S. District Court for the Central District of California entered in 1985. The level of service for calendar year 2013 is expected to be 9.17 MAP.

JWA has a long history of noise analysis. Extensive data from its noise monitoring system and from a myriad of other studies relating to aircraft operations and noise levels enables precise modeling and prediction of noise levels. Radar tracings and sophisticated use of noise monitoring stations has produced very accurate depictions of flight tracks. The noise levels of all commercial aircraft operations and many general aviation operations are recorded at 10 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 fourth quarter report. Noise complaint data is also meticulously recorded and analyzed. The aircraft operational data, noise measurements and contours for JWA are among the most accurate of any in the world. 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.

4.1.1 Existing 2013 JWA Operations Data

The 2013 level of service at JWA, which is based on operations through September of 2013, is expected to be 9.17 Million Annual Passengers (MAP). 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, 85,011 were jet air carriers, 5,297 were commercial propeller aircraft, and 22,036 were general aviation jets. The remaining 151,146 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 ADD's is simply 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 two 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 ADD's was just over 30 and the number of propeller aircraft ADDs was just over 214 with 207 of these being general aviation aircraft ADDs.

4.1.2 Existing JWA Fleet Mix Data

The type and number of air carrier aircraft using JWA during 2013 are summarized below in Table 5. The table presents the average daily departures by airline and aircraft type, both of which were used to generate CNEL contours.

4.1.3 Existing JWA 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 typically depart to the south and arrive from the north about 95% of the time with slight variations from year to year. Only during Santa Ana wind conditions does the flow reverse with departures to the north. During the existing conditions, the Airport operated in south flow 95.7% 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 the Riverside Freeway. Figure 9 shows the flight tracks for John Wayne Airport used approximately 95% of the time by air carrier and other jet aircraft. Figure 10 shows the combined flight tracks for general aviation and air carrier aircraft.

Figure 11 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.

Table 5
Existing (2013) Aircraft Average Daily Departures (ADDs)

Category **Aircraft**	**ADD**
Commercial Jets	
A300-622R	0.70
A319-131	14.65
A320-211	10.24
A321-232	0.90
737400	0.10
737700	62.97
737800	15.21
757PW	5.06
CRJ9-ER	6.62
Business Jets	
CIT3	1.62
CL601	4.49
CNA500	4.92
CNA510	1.19
CNA750	1.85
ECLIPSE500	0.33
GIIB	0.33
GIV	2.51
GV	1.27
IA1125	0.65
LEAR35	5.50
MU3001	5.53
Commercial Propeller	
DHC6	6.44
SD330	0.82
General Aviation Prop.	
BEC58P	4.72
CNA172	16.63
CNA182	3.84
CNA206	2.81
CNA208	2.08
CNA441	2.19
GASEPF[1]	66.97
GASEPF[2]	96.38
GASEPV	10.06
PA28	1.39

1. Itinerant
2. Local

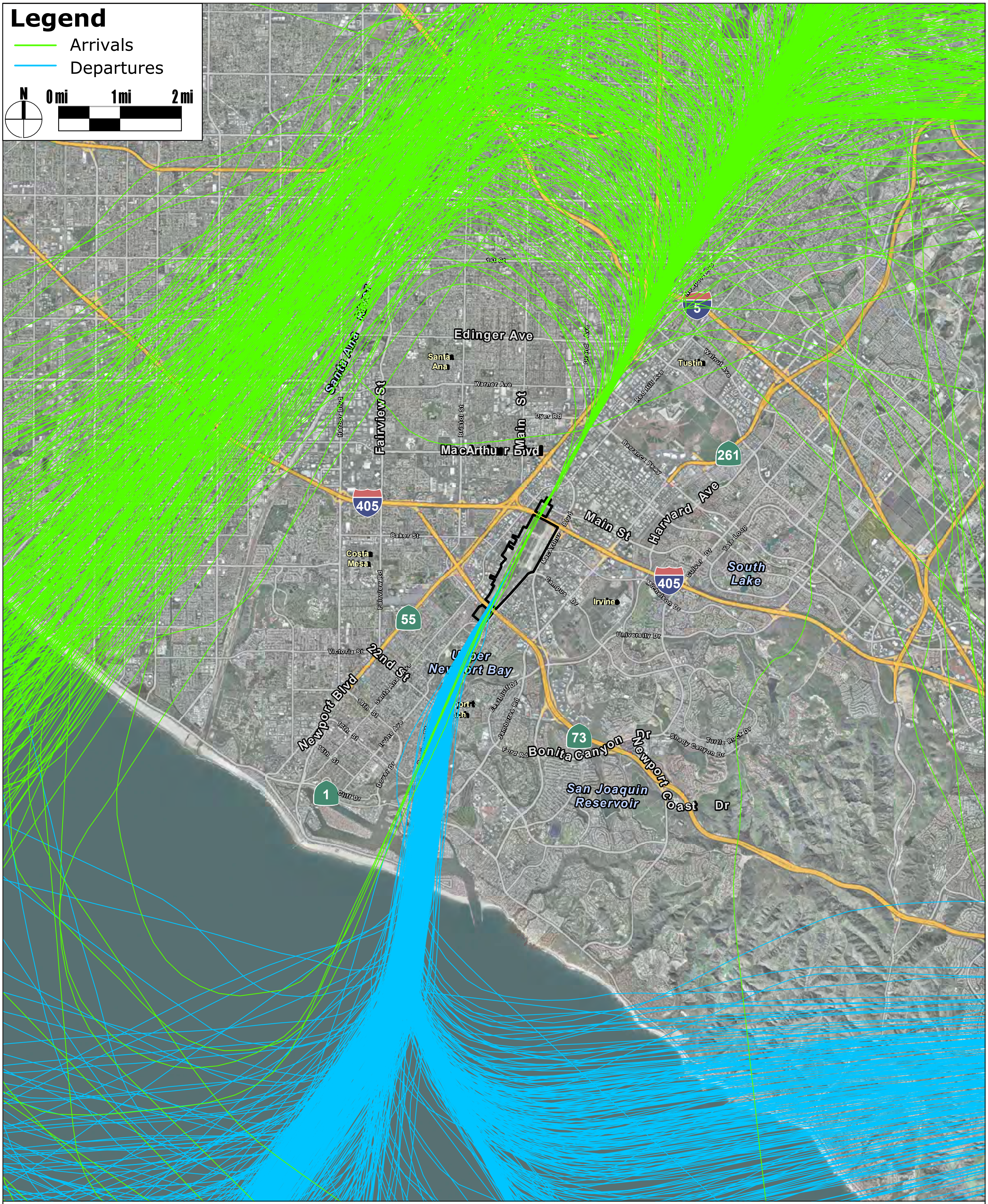
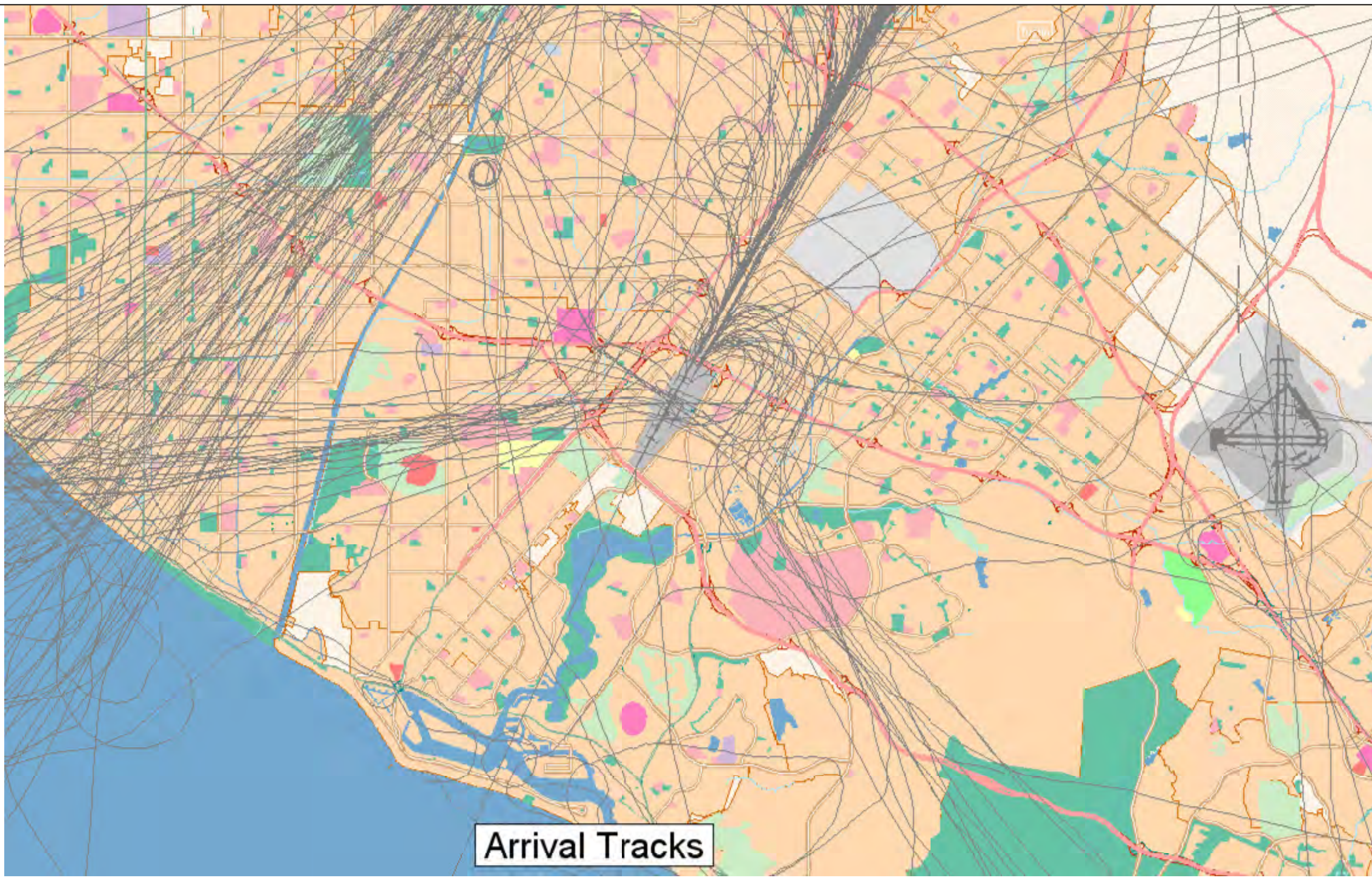


Figure 9
Typical Air Carrier Flight Tracks
John Wayne Airport (JWA) Settlement Agreement Amendments



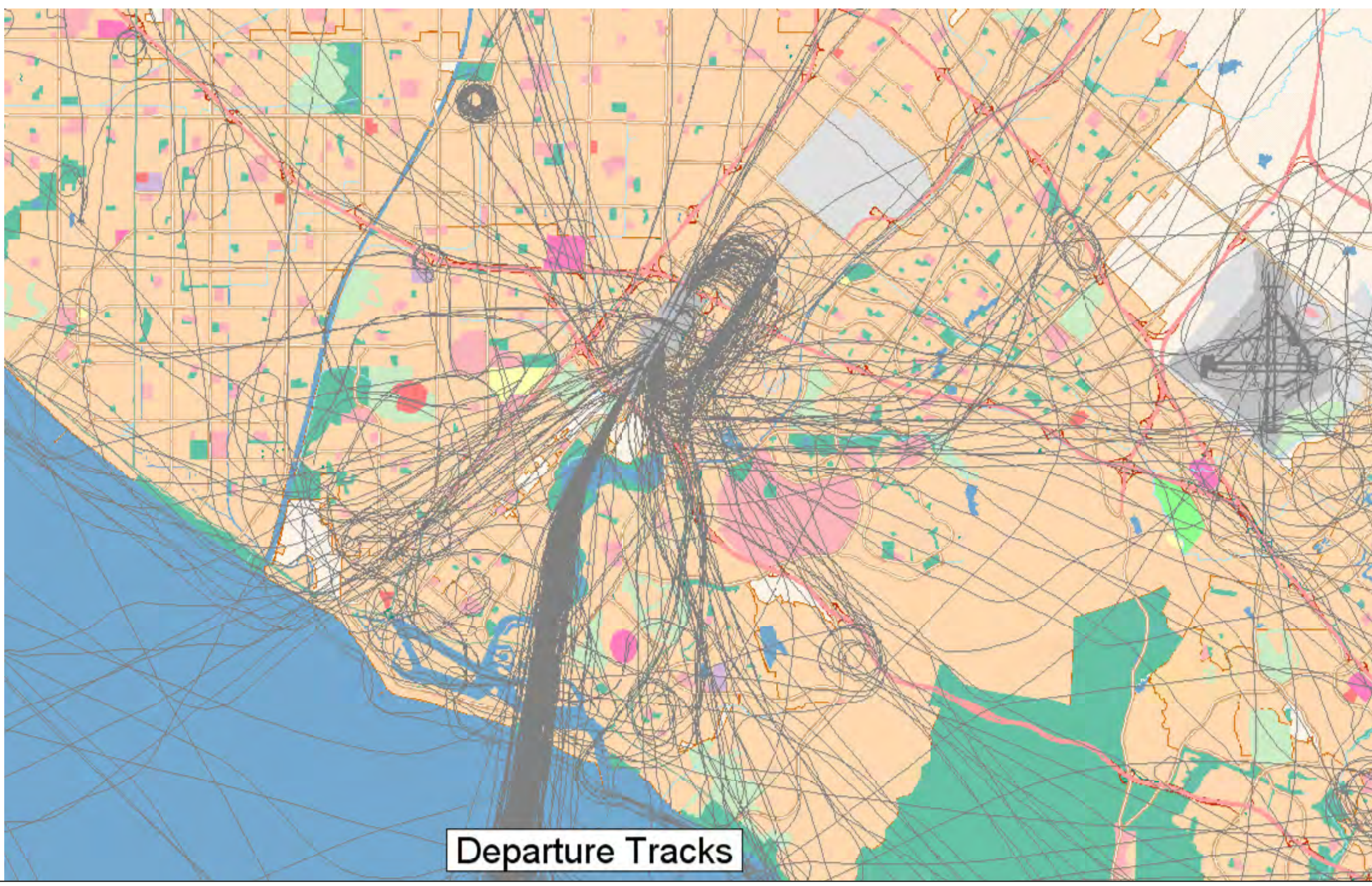


Figure 10

Radar Tracks for Air Carrier & General Aviation Aircraft

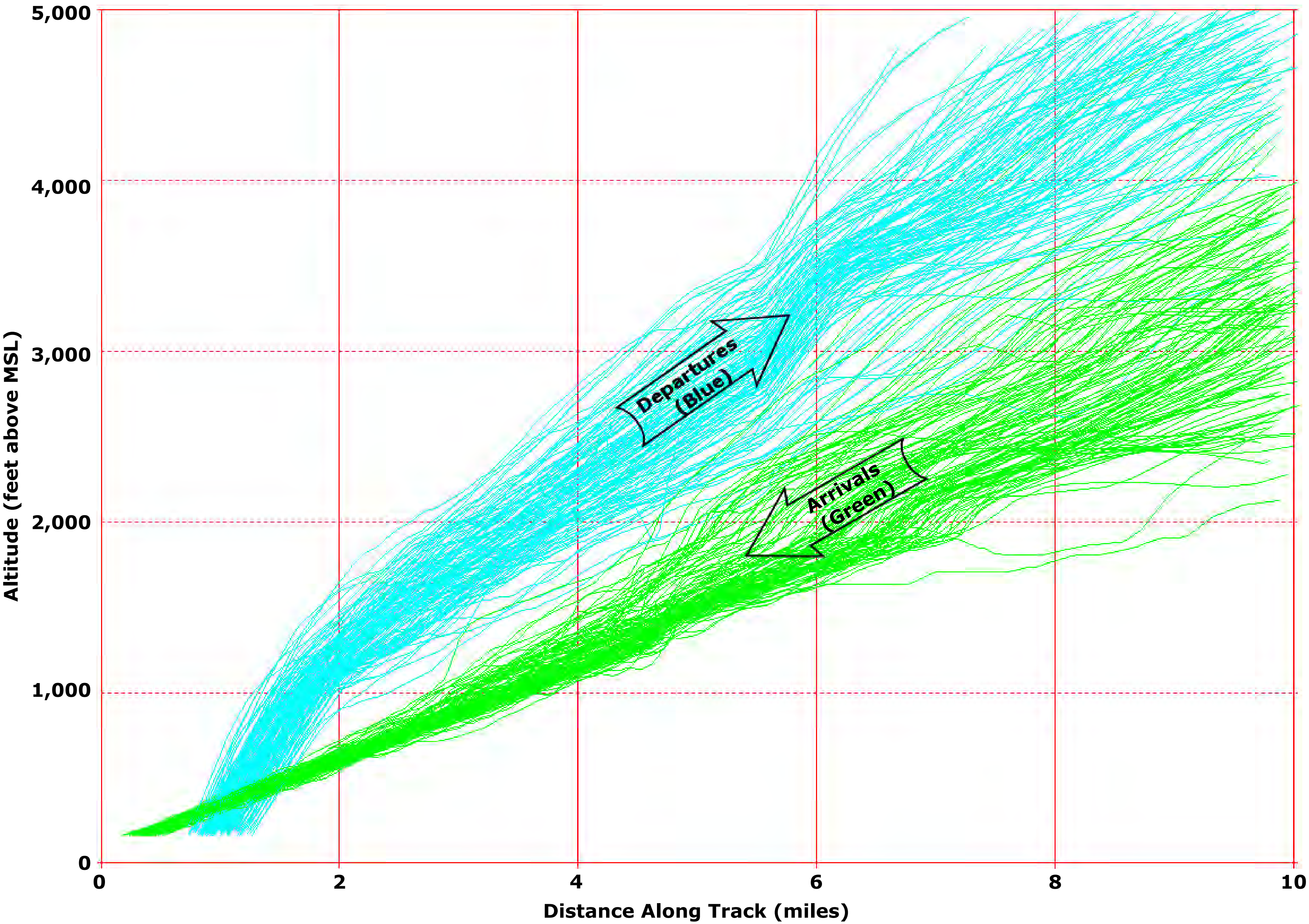


Figure 11
Typical Aircraft Arrival and Departure Altitudes

4.1.4 Existing John Wayne CNEL Contours and Land Use Impacts

The CNEL contours used to depict existing noise exposure at JWA are derived from the 2013 Baseline conditions. They are depicted on Figure 12. The contours were developed by calibrating the results of INM modeling to the measurements from the ten permanent noise monitoring stations (NMS). The locations of the ten permanent NMS locations are shown in Figure 13. This figure 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 in Irvine (8N), one in Santa Ana (9N), and one in Tustin (10N).

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 miles, including one place of worship but no other noise sensitive land uses.
- 65 to 70 CNEL contour: 561 acres/0.88 square miles, including 86 residential dwellings with approximately 215 residents and two places of worship but no other noise sensitive land uses.
- 60 to 65 CNEL contour: 1,313 acres/2.05 square miles, including 907 residences with approximately 2,628 residents, six places of worship, and six schools.

In addition to the CNEL contours, specific CNEL values are calculated for each permanent NMS shown on Figure 13. Table 6 displays CNEL values at each of the NMS from the noise modeling of existing conditions.

Table 6
2013 CNEL at Noise Monitoring Stations (NMS)

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

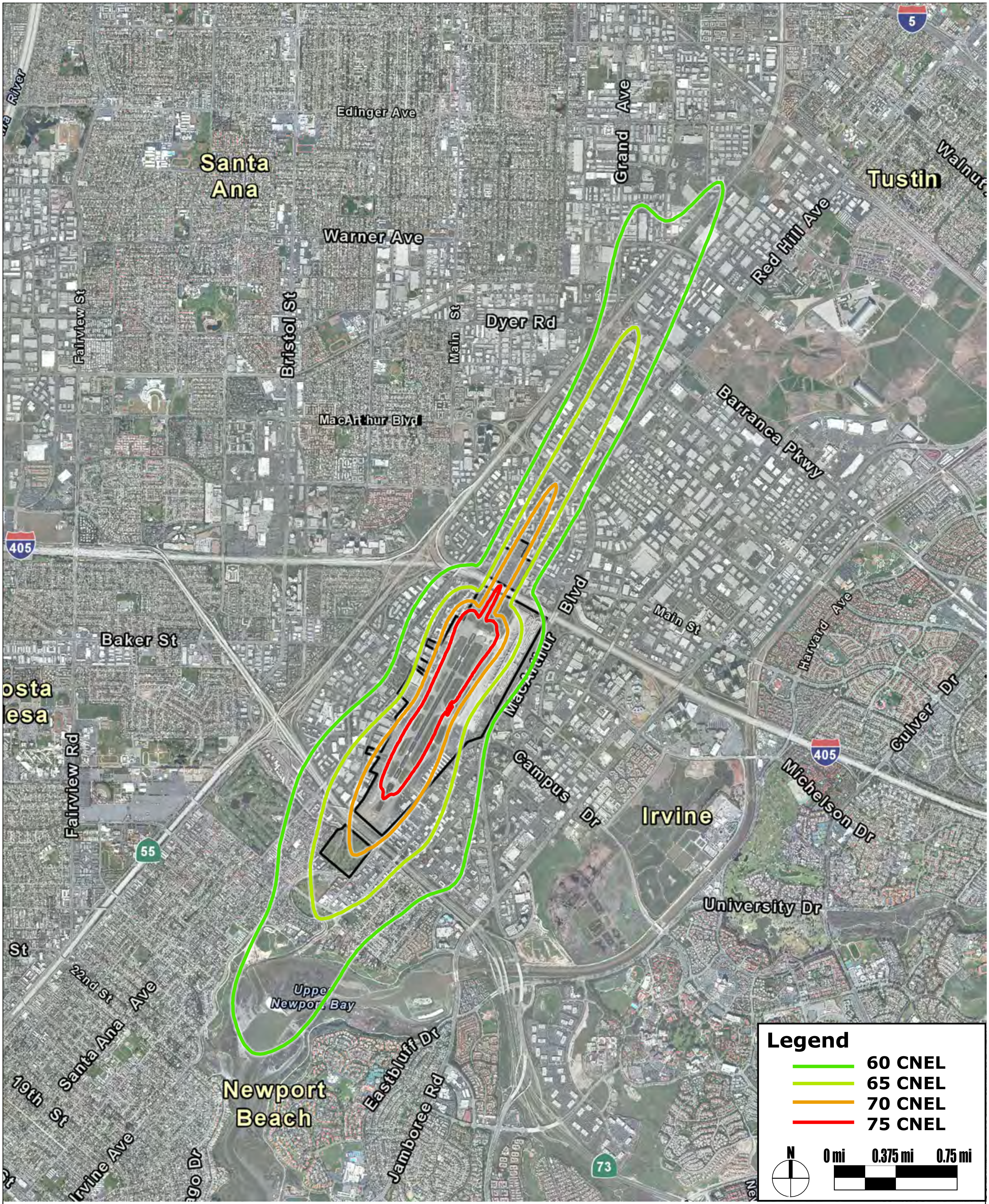


Figure 12
CNEL Contours - Existing Conditions
John Wayne Airport (JWA) Settlement Agreement Amendments

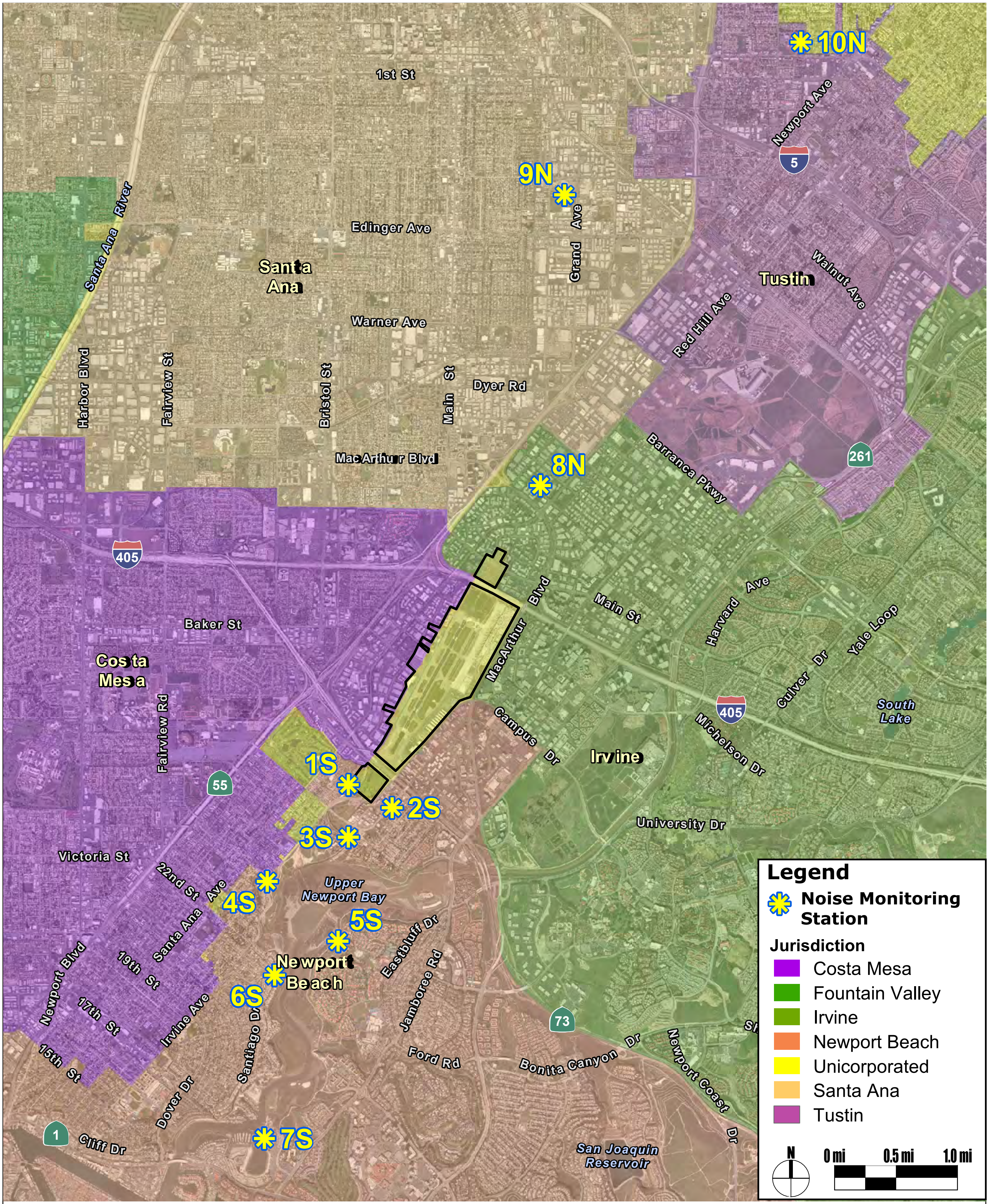


Figure 13
Permanent Noise Monitoring Stations
John Wayne Airport (JWA) Settlement Agreement Amendments

4.1.5 Existing John Wayne Aircraft 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. This data was used to calculate the average SENEL for each year from 2003 to 2013 for each airline and aircraft type by class from these data. This data is presented in Appendix A. Note that the values presented in Appendix A are energy average SENEL data. Energy average means that the data are averaged on a logarithmic scale that is very different from a linear scale. The energy average of 50 dB and 60 dB, for example, is 57.4. The energy average of 50 dB and 100 dB is 97 dB. The energy average is skewed towards the higher valued noise levels, where the more typical average is toward the middle. In actuality, some aircraft will be louder than the energy average shown and some will be lower.

Histograms of SENEL data for the 10 NMS were developed to show the distribution of noise levels at each Station. Air carrier SENEL histograms are shown for the 10 NMS in Figure 14.

Table 7 presents the number of daily air carrier noise events 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 then at the more distant monitoring stations.

Table 7
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

Figure 15 displays typical 85 dB SENEL departure contours for the six aircraft most common to JWA; an Airbus A300-600 (FedEx), a Boeing 737-700, a Boeing 737-800, a Boeing 757, and Airbus A320 and CRJ9 (the largest regional jet). Figure 16 shows SENEL for arrivals for these same aircraft.

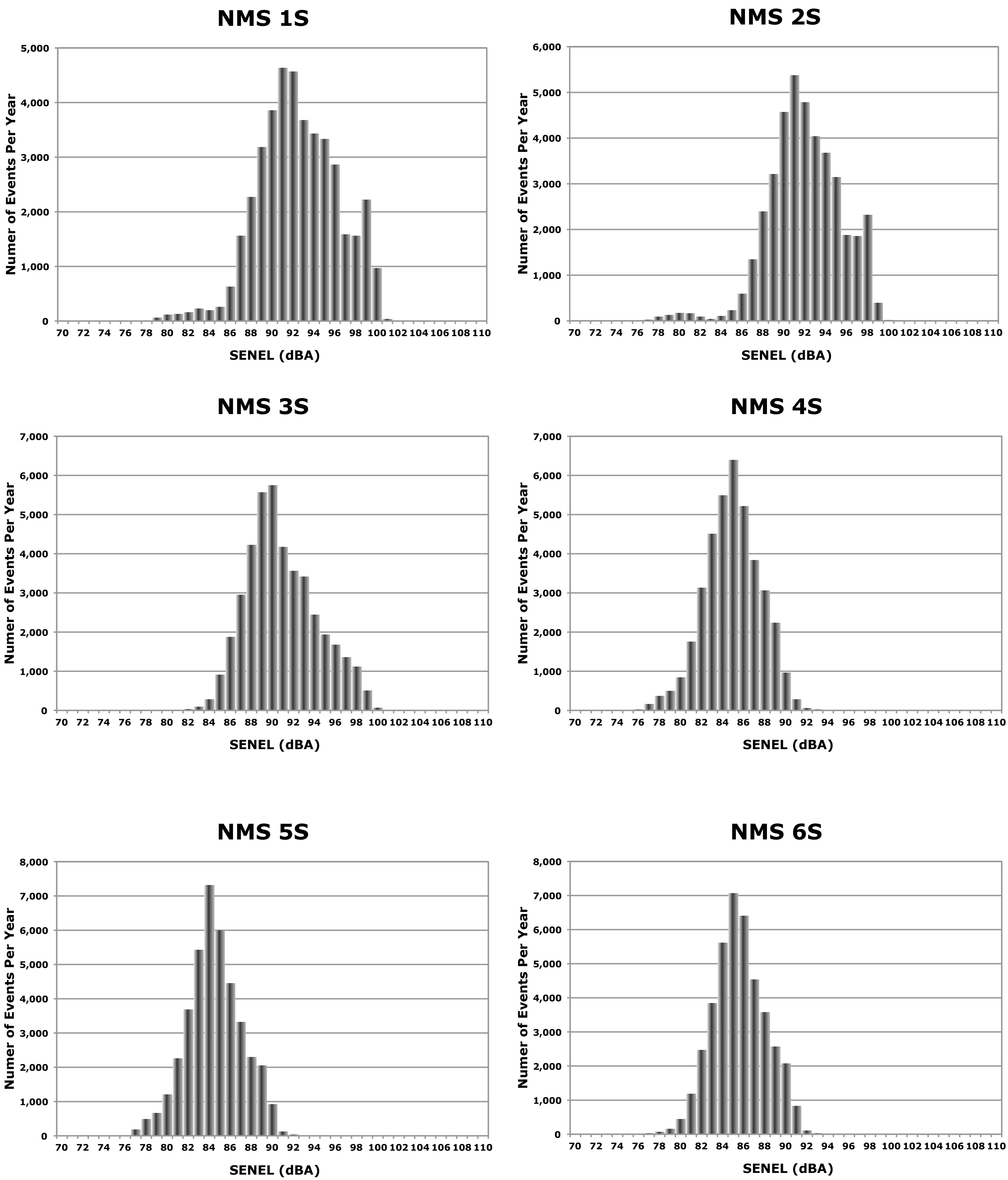
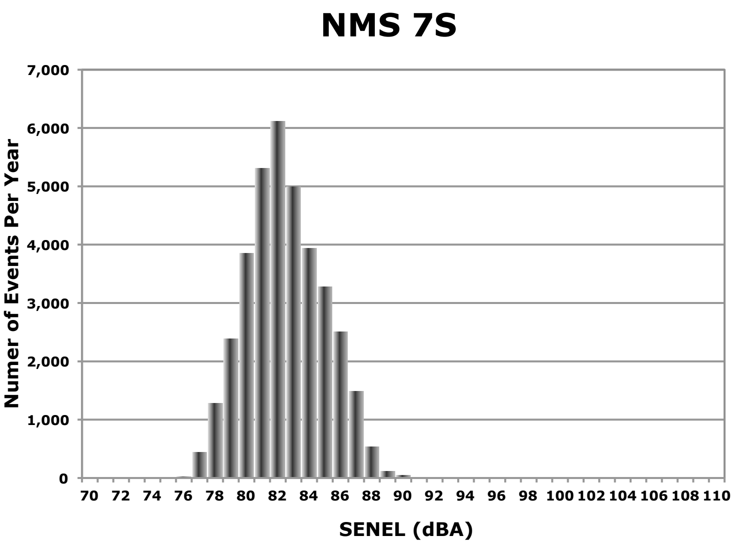
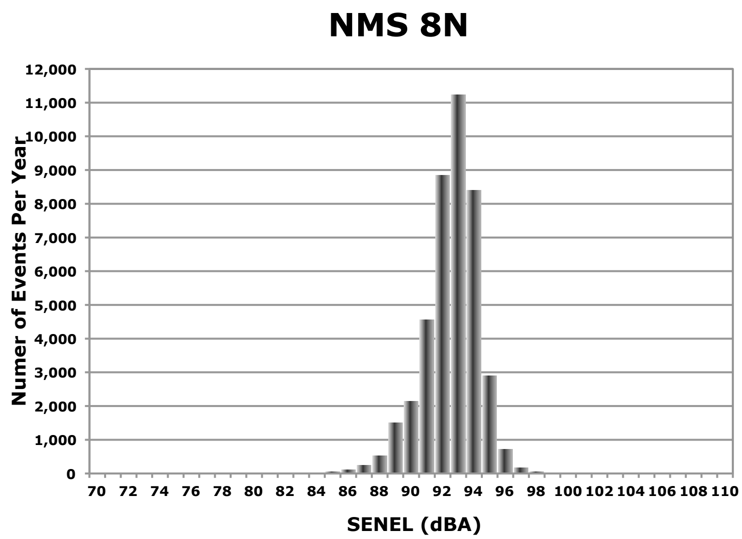
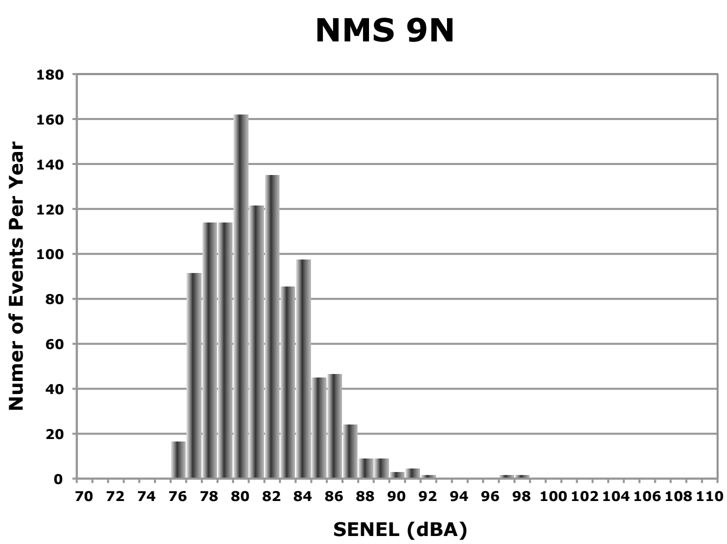


Figure 14A
Air Carrier SENEL Histograms







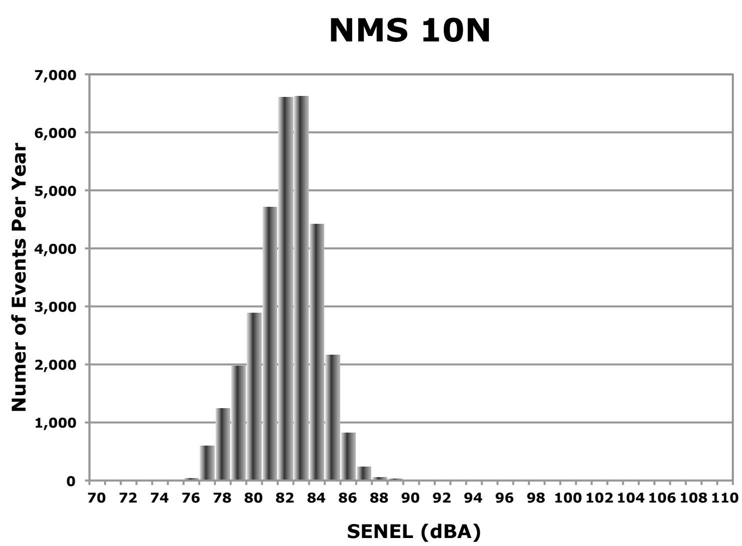


Figure 14B
Air Carrier SENEL Histograms

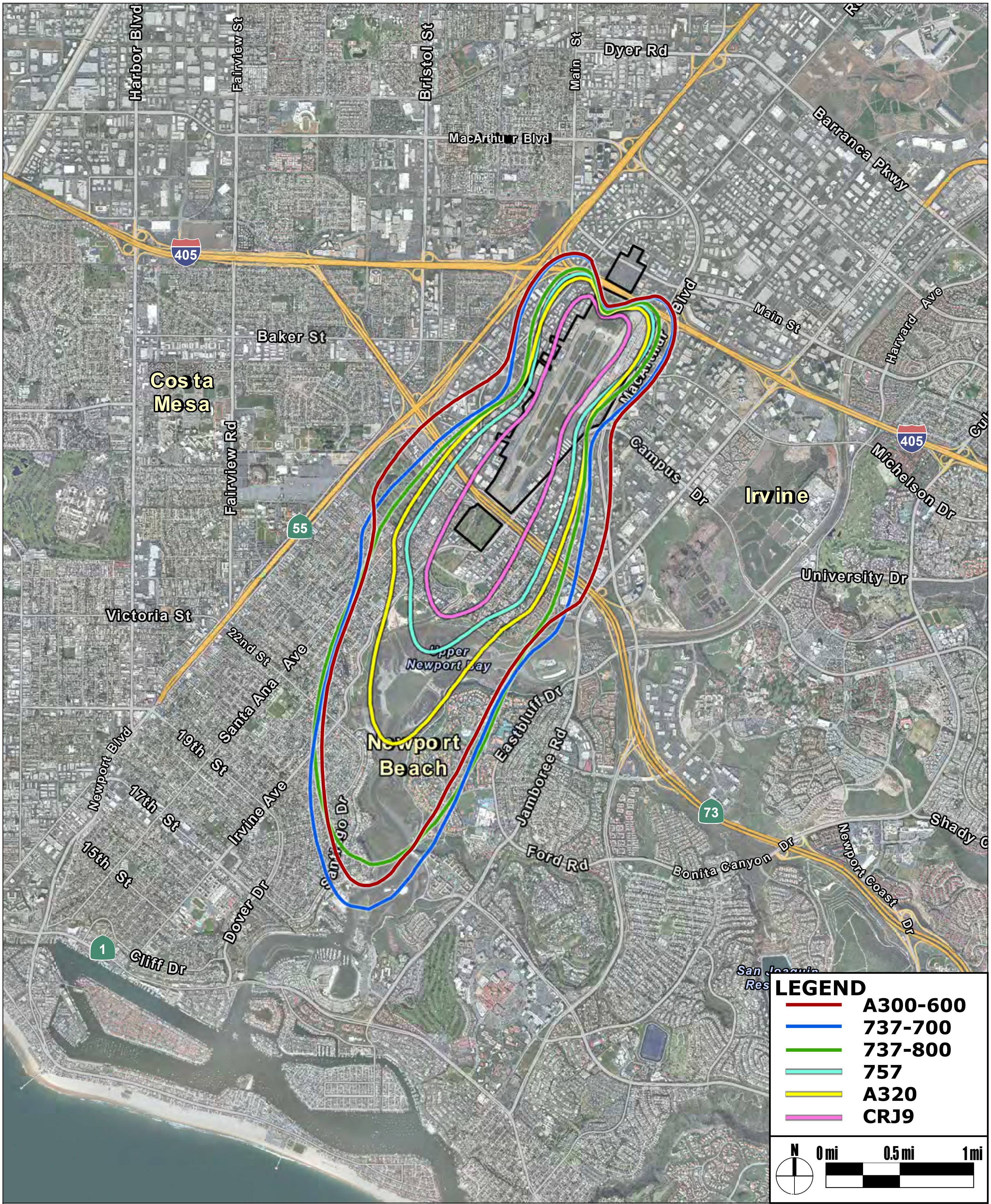


Figure 15

Typical 85 dB SENEL Departure Contours

John Wayne Airport (JWA) Settlement Agreement Amendments

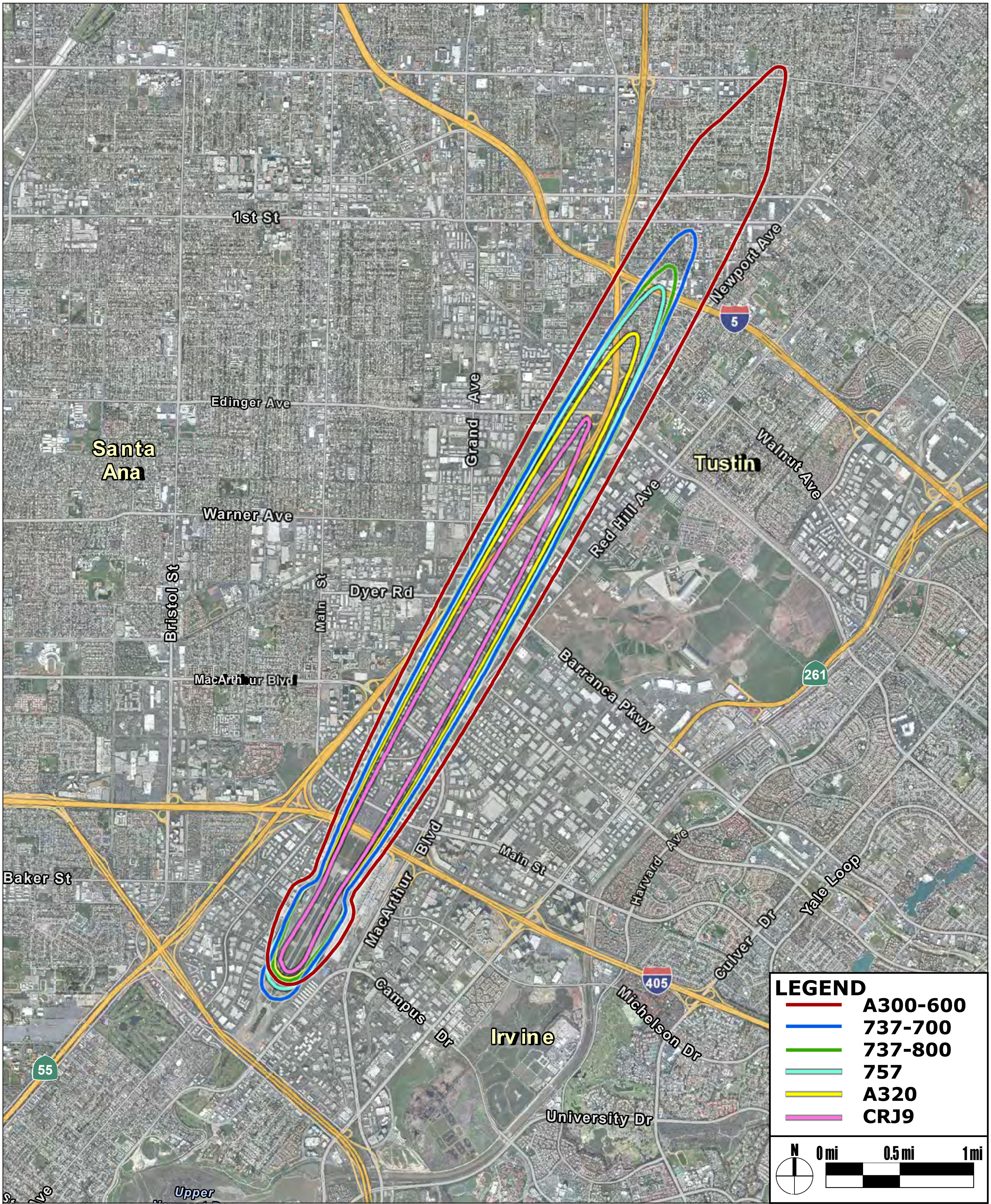


Figure 16
Typical 85 dB SENEL Arrival Contours

John Wayne Airport (JWA) Settlement Agreement Amendments

4.1.6 Existing John Wayne Aircraft Time of Day of Operations

John Wayne Airport operates under a nighttime restriction. That restriction prohibits air carrier operations before 7 am in the morning Monday through Saturday and before 8 am on Sundays, prohibits air carrier departures after 10 pm and prohibits air carrier arrivals after 11 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.

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 as used in computing CNEL. Table 8 shows the number of operations by aircraft type in each of the time periods. Note that the air carrier night departures is greater than zero due to aircraft departing just prior to 7 am or just after 10 pm. An examination of the database shows that most occurred between 10 pm and 10:01 pm. The rules at John Wayne Airport use the time of the noise event measured at the NMS to determine compliance with the nighttime prohibitions, not the time of the departure. For example, an aircraft may depart the Airport a few seconds before 10 pm and generate a noise event after 10 pm. That is a violation of the Airport's nighttime restriction and the airline would be subject to sanctions.

Table 8
Day, Evening and Night Operations by Aircraft Type & Class

	Operations				% of Operations		
Aircraft	**Day**	**Eve.**	**Night**	**Total**	**Day**	**Eve.**	**Night**
Class A Departures							
A300	--	159	--	159	--	100.0%	--
A306	--	95	--	95	--	100.0%	--
A310	--	2	--	2	--	100.0%	--
A318	6	8	--	14	44.4%	55.6%	--
A319	4,823	509	3	5,334	90.4%	9.5%	0.1%
A320	3,626	113	--	3,738	97.0%	3.0%	--
A321	326	3	--	329	99.1%	0.9%	--
B733	--	2	--	2	--	100.0%	--
B734	26	11	--	36	70.8%	29.2%	--
B737	9,476	2,247	51	11,774	80.5%	19.1%	0.4%
B738	5,414	135	2	5,550	97.5%	2.4%	0.0%
B757	1,605	243	--	1,848	86.9%	13.1%	--
CRJ9	219	92	3	314	69.9%	29.2%	1.0%
Subtotal	*25,518*	*3,615*	*59*	*29,192*	*87.4%*	*12.4%*	*0.2%*
Class E Departures							
B737	9,315	1,886	9	11,210	83.1%	16.8%	0.1%
B738	2	--	--	2	100.0%	--	--
CL60	--	2	--	2	--	100.0%	--
CRJ2	--	2	--	2	--	100.0%	--
CRJ7	863	224	--	1,086	79.4%	20.6%	--
CRJ9	1,002	15	--	1,017	98.5%	1.5%	--
E120	2	--	--	2	100.0%	--	--
Subtotal	*11,183*	*2,127*	*9*	*13,319*	*84.0%*	*16.0%*	*0.1%*
Arrivals							
A300	158	--	--	158	100.0%	--	--
A306	93	2	--	95	98.4%	1.6%	--
A310	2	--	--	2	100.0%	--	--
A318	5	8	--	12	37.5%	62.5%	--
A319	4,296	680	366	5,342	80.4%	12.7%	6.9%
A320	2,514	917	315	3,746	67.1%	24.5%	8.4%
A321	150	167	14	330	45.5%	50.5%	4.1%
B733	--	2	--	2	--	100.0%	--
B734	24	11	--	35	69.6%	30.4%	--
B737	17,037	4,380	1,467	22,884	74.4%	19.1%	6.4%
B738	3,839	1,133	584	5,555	69.1%	20.4%	10.5%
B757	1,149	603	99	1,851	62.1%	32.6%	5.3%
CL60	2	--	--	2	100.0%	--	--
CRJ2	--	2	--	2	--	100.0%	--
CRJ7	947	132	2	1,080	87.6%	12.2%	0.1%
CRJ9	932	393	6	1,331	70.0%	29.5%	0.5%
E120	2	--	--	2	100.0%	--	--
Subtotal	*31,146*	*8,426*	*2,852*	*42,423*	*73.4%*	*19.9%*	*6.7%*
Total	**67,847**	**14,168**	**2,919**	**84,933**	**79.9%**	**16.7%**	**3.4%**

Note: Daytime is from 7:00 a.m. to 7:00 p.m., Evening is from 7:00 p.m. to 10:00 p.m., and Night is from 10:00 p.m. to 7:00 a.m.

4.1.7 Existing John Wayne Aircraft Time Above Threshold (TA)

Time Above values were computed using INM 7.0d for existing noise at JWA at each of the NMS. 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. Year 2013 JWA TA values at the 10 NMS are presented on Table 9.

Table 9
Time Above Values (TA) 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

Table 9 shows that the NMS nearest the departure end of the runway (NMS 1S, 2S and 3S) are exposed to the highest noise levels for the longest periods of time. These are the only NMS where 85 dBA is exceeded for any period of time 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 2S and 3S and for 2.1 minutes each day at NMS 1S.

The table also shows that aircraft noise does not exceed 77 dBA at NMS 4S, 5S, 9N and 10N. Aircraft noise exceeds 77 dBA for less than a minute at NMS 6S and 7S, between 17 and 23 minutes per day at NMS 1S, 2S and 3S, and for 19 minutes per day at NMS 8N. This is the amount of time that aircraft noise could interfere with indoor speech communication in a building with open windows. Note that NMS 8N 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 9 shows that this occurs for between 78 and 91 minutes per day at NMS 1S, 2S and 3S, 58 minutes per day at NMS 8, between 37 and 45 minutes at NMS 4S, 5S, 6S, and 7S and between 7 and 17 minutes per day at NMS 9N and 10N.

4.1.8 John Wayne Airport 1985 Master Plan

The current plan for use of John Wayne 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. EIR 508 was certified to address the Master Plan, and the Settlement Agreement was essentially a mitigation measure to the Master Plan Project. The CNEL contours contained in EIR 508 and which reflect the impact from the Master Plan Project are displayed on Figure 17.

The Master Plan noise contours are considerably larger than the existing noise contours presented previously in Figure 12. This is due to a quieter fleet of commercial aircraft and a dramatic reduction in the number of general aviation operations. The existing condition contours (Figure 12) also are contained within the Master Plan contours (Figure 17), except for the 65 and 60 CNEL contours to the north, below the primary approach corridor. This area is shown in Figure 18. There are no noise sensitive uses located within the area of the existing 65 CNEL contour that is outside of the 1985 Master Plan 65 CNEL contour. There are two places of worship and one school that are located within the existing 60 CNEL contour but outside of the Master Plan 60 CNEL contour.

The reason the existing approach noise contours did not shrink as much as the departure noise and extend beyond the Master Plan contours 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, 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.

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

- 60 and 65 CNEL contour: Master Plan contours are 114% larger than the Existing Condition contours. The area outside of the Airport boundaries exposed to this range of noise levels also is 125% larger with the Master Plan.

- 65 and 70 CNEL contour: Master Plan contours are almost 50% larger than the Existing Condition contours. The area outside of the Airport boundaries exposed to this range of noise levels also is 80% larger with the Master Plan.

- 70+ CNEL contour: Master Plan contours are 80% larger than the Existing Condition contours. The area outside of the Airport boundaries exposed to this range of noise levels also is 311% larger with the Master Plan.

Table 22 in Section 6.4 provides detailed information on the size of the Master Plan and Existing Condition contours and the impacted land uses.

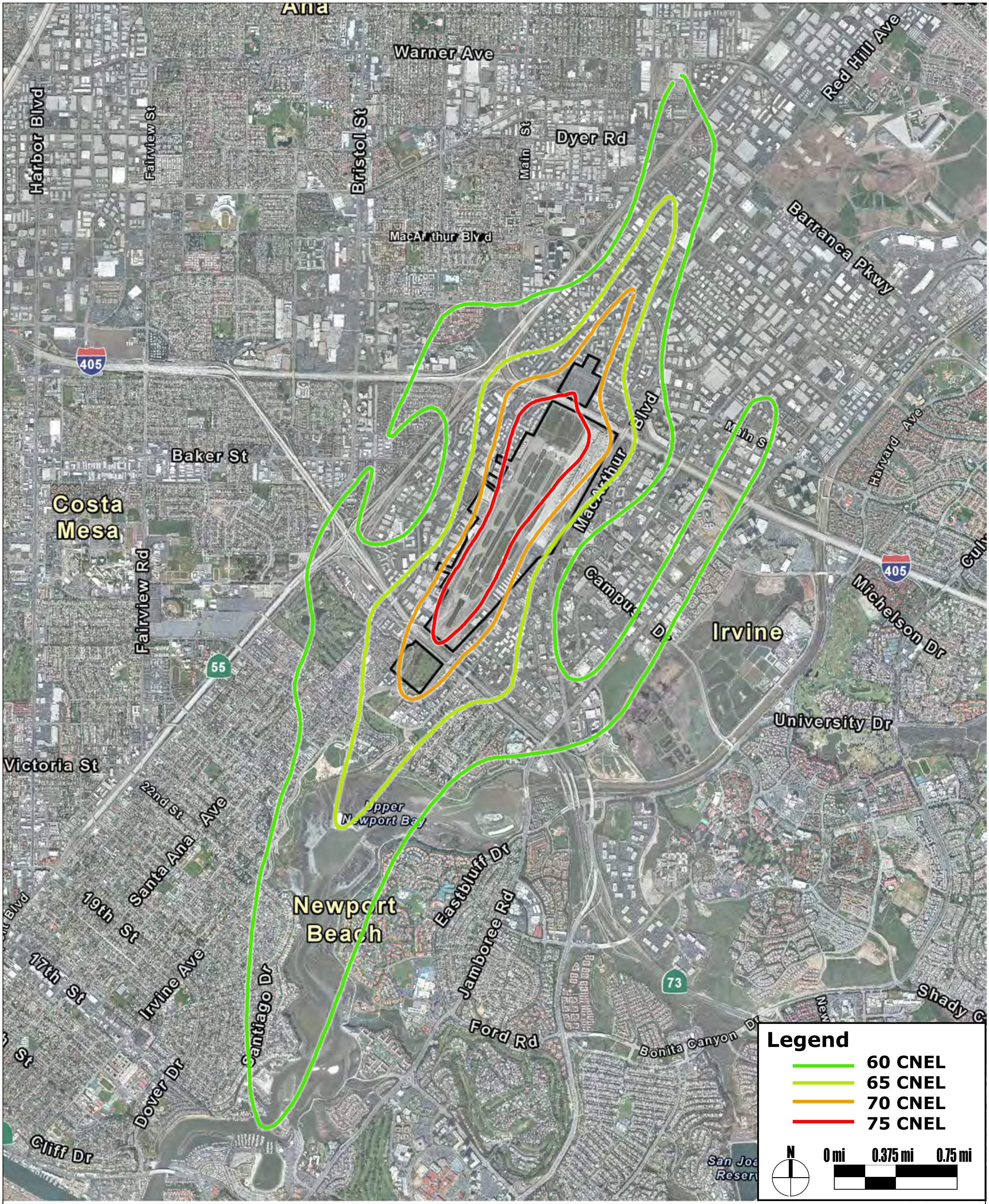


Figure 17

CNEL Contours - Airport Master Plan (EIR 508)

John Wayne Airport (JWA) Settlement Agreement Amendments

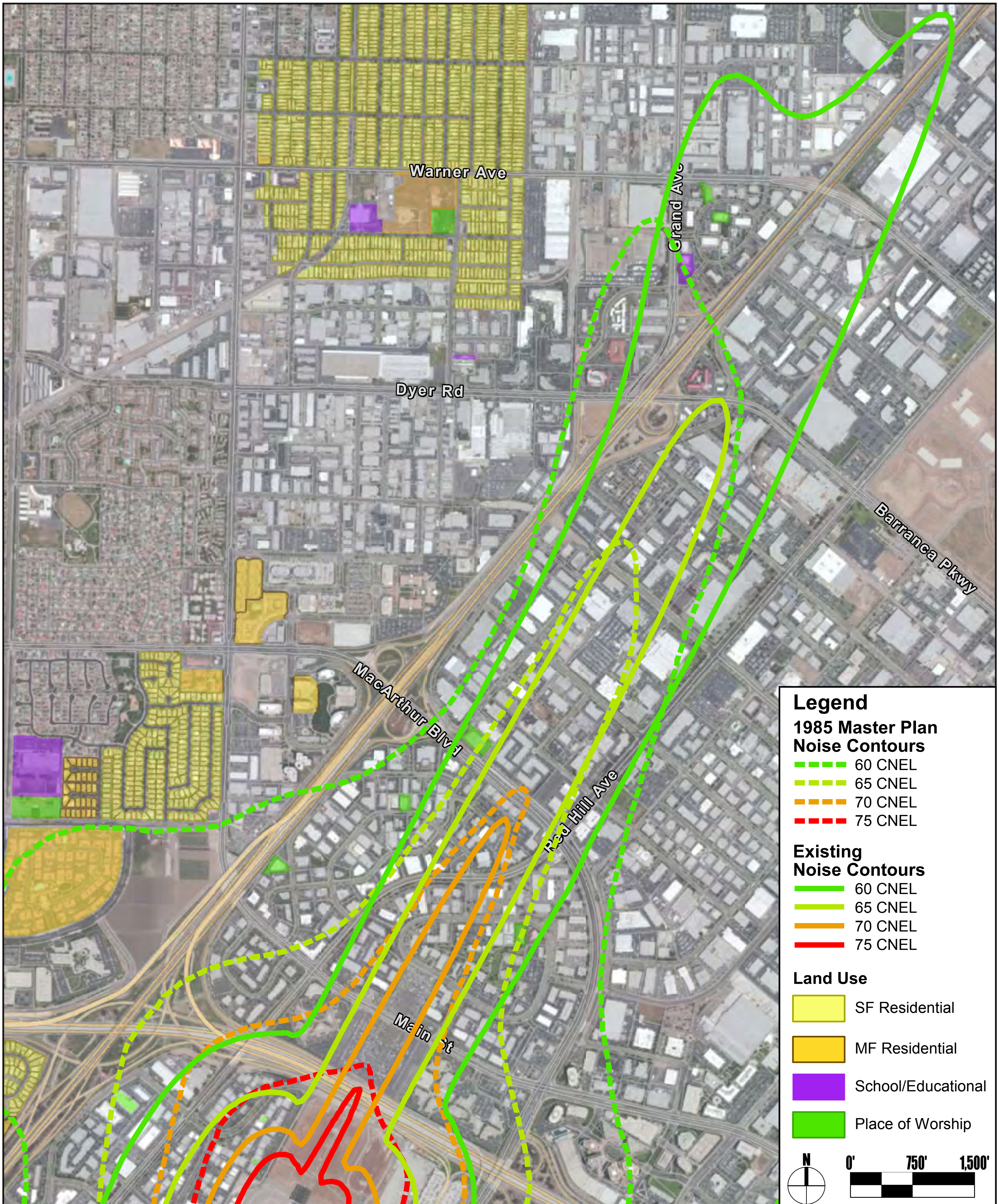


Figure 18A Comparison of 1985 Master Plan and Existing Noise Contours

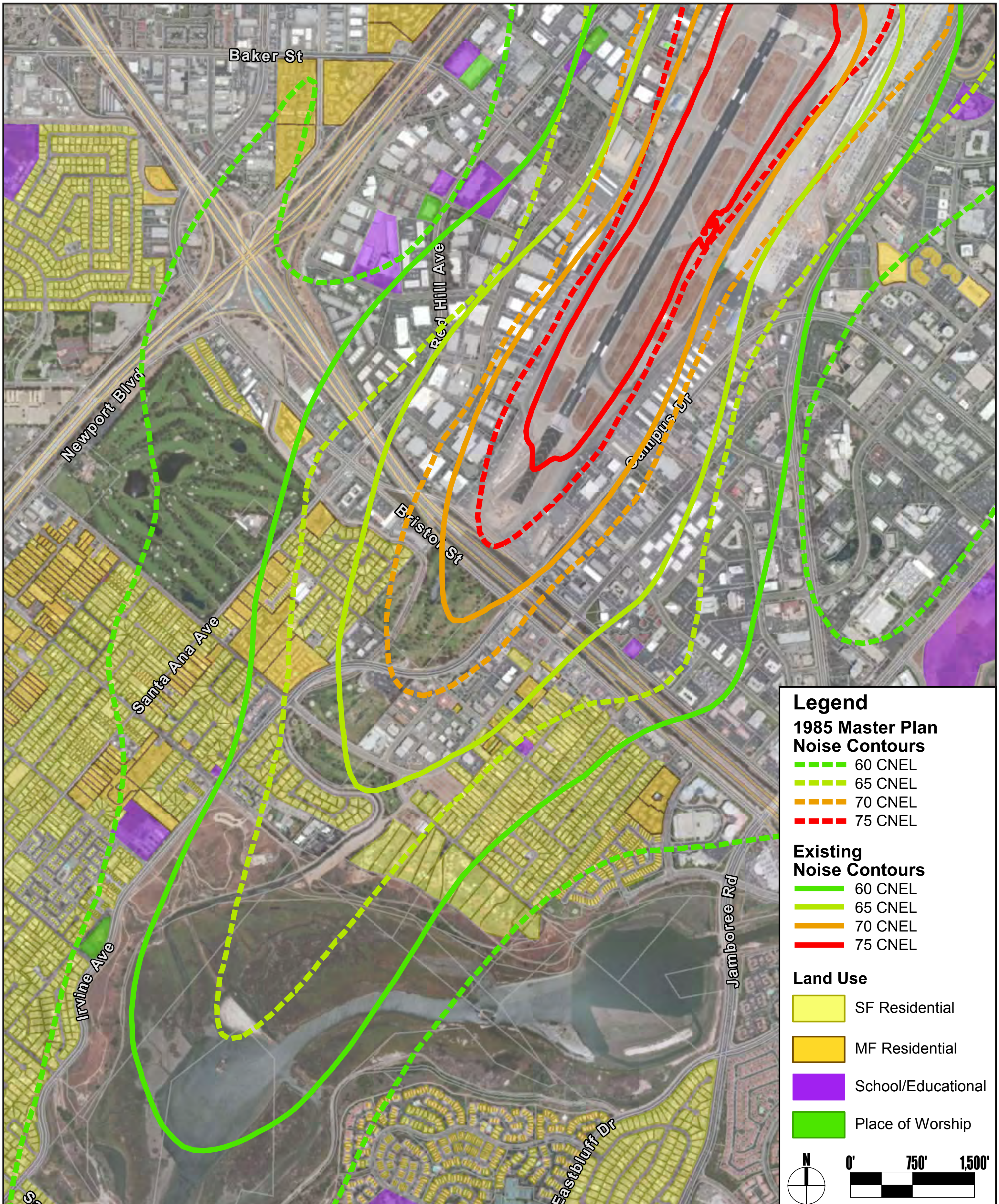


Figure 18B Comparison of 1985 Master Plan and Existing Noise Contours

John Wayne Airport (JWA) Settlement Agreement Amendments

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5.0 THRESHOLDS OF SIGNIFICANCE

5.1 Introduction

The significance of noise impacts are determined by the increase in noise due to the project or alternative over existing conditions, and the resulting noise level with the project or alternative. Areas with higher noise exposure levels are more sensitive to noise level increases; therefore, the allowable increase in noise is lower in these areas than in areas with lower noise exposures.

The County of Orange's aircraft noise increase significance thresholds, presented below in Section 5.2, are based on the land use compatibility standards described in the Orange County General Plan Noise Element, as augmented by the thresholds of significance used by the FAA on airport environmental analysis. The FAA significance thresholds are specified in Order 1050.1E, which was discussed previously in Section 2.5.1.

As discussed above in Section 2.6.2, the City of Newport Beach has established significance thresholds that are more stringent than the County/FAA significance thresholds. The City's approval of the Project will require the City to take certain discretionary actions requiring CEQA compliance. In order to facilitate the City's utilization of this analysis, as a responsible agency, the significance of the noise impacts from the Project are assessed based on the County/FAA significance thresholds, as well as the City of Newport Beach thresholds. The City of Newport Beach's significance threshold is presented in Section 5.3.

The primary difference between the County of Orange and City of Newport Beach's significance thresholds is that the County's threshold requires at least a 1.5 dB increase in the CNEL noise level for a significant impact to occur. The City's threshold considers any sensitive used exposed to noise levels of 75 CNEL or greater to be significantly impacted. However, as discussed in Section 6.2.2 there are no sensitive uses in the City of Newport Beach exposed noise levels greater than 75 CNEL. Below 75 CNEL, the significance threshold requires at least a 1 dB increase in CNEL levels for a significant impact to occur.

Traffic noise impact significance is determined using the same increase thresholds for aircraft presented below in Section 5.2 for the County of Orange and in Section 5.3 for the city of Newport Beach. Traffic noise impact significance thresholds are discussed in detail in Section 5.4.

As discussed in Section 2.4.3, there are no established significance thresholds for the Time Above (TA) noise metric. The TA values are presented below for informational purposes only and are not used to determine significance of the Proposed Project or Project Alternatives.

5.2 County of Orange Aircraft Noise Level Increase Significance Threshold

Table 10 summarizes the County's aircraft noise level increase significance threshold. Sensitive receptors with noise exposures exceeding 65 CNEL with the project (or alternative under consideration) will be considered significantly impacted if the noise level with the project increases by 1.5 dB or more over the existing noise exposure. Sensitive receptors with noise exposures between 60 and 65 CNEL will be considered significantly impacted if the noise level with the project is 3.0 dB or more than the existing noise level. Sensitive receptors with noise exposures between 45 and 60 CNEL will be considered significantly impacted if the noise level with the project is 5.0 dB or more than the existing noise level.

Table 10
County CNEL Increase Significance Threshold

Noise Exposure With Project	CNEL Increase Over Existing Conditions
>65 CNEL	1.5 dB or greater
60-65 CNEL	3.0 dB or greater
45-60 CNEL	5.0 dB or greater

In the case of aircraft noise, there are no other cumulatively considerable noise sources and therefore no cumulative noise impacts.

5.3 City of Newport Beach Aircraft Noise Level Increase Significance Threshold

As discussed above in Section 2.6.2, the City of Newport Beach has established significance thresholds that are more stringent than the County/FAA significance thresholds. These thresholds are presented in Table 11. The City's approval of the Project will require the City to take certain discretionary actions requiring CEQA compliance. In order to facilitate the City's utilization of this analysis, as a responsible agency, the significance of the noise impacts from the Project are assessed based on the County/FAA significance thresholds, as well as the City of Newport Beach thresholds.

Table 11
City of Newport Beach CNEL Increase Significance Threshold

Noise Exposure With Project	CNEL Increase Over Existing Conditions
55 CNEL	3 dB or greater
60 CNEL	2 dB or greater
65 CNEL	1 dB or greater
70 CNEL	1 dB or greater
>75 CNEL	Any increase is considered significant

5.4 Traffic Noise Significance Threshold

In the case of traffic noise, future noise levels will increase as a result of the additional traffic generated by project as well as general growth in the project area. Traffic noise impacts from the project are assessed by comparing the existing traffic noise levels with noise levels that would occur with the implementation of the project without any other changes (i.e., existing plus project). Sensitive receptors projected to experience existing plus project traffic noise levels and increases over existing traffic noise levels greater than shown in Table 10 will be significantly impacted under the County of Orange Significance Thresholds. Sensitive receptors exposed to in traffic noise level increases greater than shown in Table 11 will be significantly impacted under the City of Newport Beach Significance Thresholds.

Cumulative traffic noise impacts will be assessed by comparing the future with project (or alternative under consideration) traffic noise level with the existing traffic noise levels. Sensitive receptors projected to experience future with project traffic noise levels and increases over existing traffic noise levels greater than shown in Table 10 will be significantly cumulatively impacted under the County's significance threshold. Table 11 will be used to determine the significance of cumulative traffic noise impacts for the City of Newport Beach. If the project's contribution to the overall noise level increase is less than 1 dB (i.e. the minimum perceptible noise level difference) then it will not be considered cumulatively considerable. If the project's contribution to the cumulative increase is less than cumulatively considerable then the project will not result in a significant cumulative noise impact (see CEQA Guidelines Section 15064(h)).

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6.0 PROPOSED PROJECT AND PROJECT ALTERNATIVES NOISE IMPACTS

This section analyzes noise impacts for the Proposed Project, three Project Alternatives, and the CEQA-mandated No Project Alternative. These alternatives are summarized in Table 12. Please refer to the project description in the main EIR document for a full and complete description of the Proposed Project and Project Alternatives. Phase 1 of the Proposed Project represents operation of the Airport at the limits of the current Settlement Agreement and, therefore, also is representative of no-project conditions. As the No Project Alternative would limit aircraft operations to the current capacity and operational restrictions presently in place for the reasonably foreseeable future, the No Project Alternative analysis presented in this report accurately reflects no-project conditions through the horizon year (i.e., 2030) contemplated by the Proposed Project.

Table 12
Aviation Alternatives by Annual Aircraft Operations and Million Annual Passengers (MAP)

Alternative Phase	Years	MAP	Class A ADDs	Notes:
No Project				
	2016-2030	10.8	85.0	With Curfew
Proposed Project				
1	2016 - 2020	10.8	85.0	With Curfew
2	2021 - 2025	11.8	95.0	With Curfew
3	2026 - 2030	12.5	95.0	With Curfew
Alternative A				
1	2016 - 2020	10.8	107.0	With Curfew
2	2021 - 2025	11.4	120.0	With Curfew
3	2026 - 2030	12.8	135.0	With Curfew
Alternative B				
1	2016 - 2020	10.8	100.0	With Curfew
2	2021 - 2025	13.0	110.0	With Curfew
3	2026 - 2030	15.0	115.0	With Curfew
Alternative C[1]				
1	2016 - 2020	16.9	228.0	With Curfew
2	2021 - 2020	16.9	228.0	No Curfew[1]
3	2026 - 2030	16.9	228.0	No Curfew[1]

1. 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.

Section 6.1 presents the assumptions used to model aircraft noise levels. Section 6.2 presents the results of the aircraft modeling at each of the Noise Monitoring Stations operated by the Airport. This information was used to determine the significance of the aircraft noise impacts associated with the Project Alternatives. Section 6.2.1presents the results of the aircraft noise modeling in graphical form. This section presents noise contours overlaid on aerial mapping. Section 6.4 discusses the land use impacts associated with the Project Alternatives. The areas of the contours presented in Section 6.5 Care presented and compared along with the number of residences and persons within each contour. Further, the number of schools, places of worship, and hospitals within each contour are presented. Section B discusses the changes in single event aircraft noise levels associated with the Project Alternatives. Section 6.6 presents the results of the aircraft noise modeling in terms of the amount of time noise levels will exceed specific noise levels associated with speech interference. Section 6.7 assesses the short-term noise impacts, i.e., construction noise, associated with the project. Section 6.8 examines potential noise impacts from increased traffic volumes and noise levels along roads in the vicinity of the airport. Section 6.9 discusses cumulative noise impacts.

6.1 JWA Noise Modeling Assumptions

The Proposed Project and each of the Project Alternatives have unique operational and capacity elements. Key assumptions used to assess noise include number of operations, types of aircraft, flight tracks and operating procedures. Previously presented sections on Sound Rating Scales and Methodology explain the various metrics and related computer modeling. The computer model used for this analysis was the FAA Integrated Noise Model (INM) Version 7.0d that was described earlier. The following sections summarize and explain the assumptions used in this analysis.

6.1.1 Operations, Fleet Mix, Stage Length and Load Factors

Aircraft operations by type of aircraft, time of day, stage length and runway were used to estimate noise levels. The following paragraphs describe the operations data used.

Time of Day of Operations

The day/evening/night mix for existing operations was presented in Table 8. It was assumed for this analysis that these percentages do not change for any alternative, except for Alternative C Phases 2 and 3.

Under Phases 2 and 3 of Alternative C, the Agreement to have a curfew at the Airport would be removed. 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. 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. Airports were selected for the survey based on two criteria: (1) the airport must be a regional airport in the vicinity of a large hub airport; and (2) the airport must currently not have a nighttime curfew (voluntary or otherwise).

Based on the survey results, shown in Table 13 below, the average day/evening/night mix is 71% day, 15% evening, and 14% night. However, two of the airports evaluated in the survey are not representative of what may happen at JWA in the event the curfew was lifted. Specifically, ONT and OAK have major cargo hubs located at their facilities, even though they are not major hub airports for their respective regions. In addition, the cargo operations at ONT and OAK occur predominately during the evening and nighttime hours. Here, JWA does not have the physical space to support and accommodate a major cargo hub operation.

Excluding ONT and OAK for the basis set forth in the prior paragraph (i.e., major cargo hub activity), the average of the remaining airports is 75% day operations, 14% evening operations, and 11% night operations. This is a more realistic estimate of what would happen at JWA if the curfew were not in place and has been used for noise modeling of Alternative C, Phases 2 and 3.

Table 13
Survey of Day/Evening/Night Mix at Regional Airports

	Percent of Operations		
Airport	**Day**	**Eve**	**Night**
Phoenix (PHX)	72%	16%	12%
Palm Beach (PBI)	77%	11%	11%
Tucson (TUS)	76%	12%	12%
Chicago Midway (MDW)	74%	18%	8%
Average[1]	75%	14%	11%
Ontario (ONT)	68%	14%	18%
Oakland (OAK)	55%	20%	25%
Average[2]	71%	15%	14%

1. This average accounts for operations at PHX, PBI, TUS and MDW, and was utilized for purposes of modeling Alternative C because of the operational similarities of these airports relative to JWA.
2. This average also accounts for operations at ONT and OAK, but was not utilized for modeling Alternative C due to ONT's and OAK's status as major cargo hubs.

Operations Data Summaries

Tables 14 through 18 summarize the total daily departures by aircraft type (fleet mix) for the No Project Alternative, the Proposed Project and Alternatives A through C respectively. Phase 1 of the Proposed Project represents conditions where the Airport operates at the limits of the current Settlement Agreement. Without approval of this project, it is expected that the Airport operations would reach this level in the future. Therefore, Project Phase 1 is equivalent to the No Project Alternative.

Table 14
Average Daily Departures – No Project Alternative

Category Aircraft	Average Daily Departures
Commercial Jets	
A300-622R	2.22
A319-131	15.65
A320-211	10.54
A321-232	1.17
737400	0.11
737700	76.09
737800	18.74
757PW	6.42
CRJ9-ER	15.08
Business Jets	
CIT3	1.12
CL601	3.09
CNA500	3.39
CNA510	0.82
CNA750	1.28
ECLIPSE500	0.23
GIIB	0.23
GIV	1.73
GV	0.88
IA1125	0.45
LEAR35	3.79
MU3001	3.82
Commercial Propeller	
DHC6	4.44
SD330	0.57
General Aviation Propeller	
BEC58P	3.98
CNA172	14.02
CNA182	3.24
CNA206	2.37
CNA208	1.43
CNA441	1.51
GASEPF[1]	56.47
GASEPF[2]	89.73
GASEPV	8.48
PA28	1.17

1. Itinerant
2. Local

Table 15
Average Daily Departures – Proposed Project

Category Aircraft	Phase 1	 2	 3
Commercial Jets			
A300-622R	2.22	2.22	2.22
A319-131	15.65	17.58	17.58
A320-211	10.54	12.52	16.94
A321-232	1.17	1.17	1.40
737400	0.11	0.12	0.12
737700	76.09	82.15	90.74
737800	18.74	19.12	20.31
757PW	6.42	7.57	6.99
CRJ9-ER	15.08	16.94	11.84
Business Jets			
CIT3	0.93	1.05	1.04
CL601	3.09	3.24	3.39
CNA500	3.39	3.55	3.72
CNA510	0.82	0.86	0.90
CNA750	1.28	1.34	1.22
ECLIPSE500	0.23	0.24	0.25
GIIB	0.23	0.24	0.25
GIV	1.73	1.81	1.89
GV	0.88	0.92	0.96
IA1125	0.45	0.47	0.49
LEAR35	3.79	3.97	4.15
MU3001	3.82	4.00	4.18
Commercial Propeller			
DHC6	4.44	4.65	4.86
SD330	0.57	0.59	0.62
General Aviation Propeller			
BEC58P	3.98	3.55	3.16
CNA172	14.02	11.84	11.13
CNA182	3.24	2.89	2.57
CNA206	2.37	2.11	1.88
CNA208	1.43	1.50	1.57
CNA441	1.51	1.58	1.65
GASEPF[1]	56.47	50.44	44.83
GASEPF[2]	89.73	80.14	71.23
GASEPV	8.48	6.99	6.73
PA28	1.12	1.04	0.93

1. Itinerant
2. Local

Table 16
Average Daily Departures – Alternative A

Category Aircraft	Phase 1	2	3
Commercial Jets			
A300-622R	2.22	2.22	2.22
A319-131	19.17	21.59	24.38
A320-211	13.40	15.09	17.04
A321-232	1.18	1.33	1.50
737400	0.13	0.15	0.17
737700	62.43	61.73	69.59
737800	19.90	22.41	25.31
757PW	7.67	8.42	9.27
CRJ9-ER	15.83	15.14	15.54
Business Jets			
CIT3	1.12	1.17	1.22
CL601	3.09	3.24	3.39
CNA500	3.39	3.55	3.72
CNA510	0.82	0.86	0.90
CNA750	1.28	1.34	1.40
ECLIPSE500	0.23	0.24	0.25
GIIB	0.23	0.24	0.25
GIV	1.73	1.81	1.89
GV	0.88	0.92	0.96
IA1125	0.45	0.47	0.49
LEAR35	3.79	3.97	4.15
MU3001	3.82	4.00	4.18
Commercial Propeller			
DHC6	4.44	4.65	4.86
SD330	0.57	0.59	0.62
General Aviation Propeller			
BEC58P	3.98	3.55	3.16
CNA172	14.02	12.52	11.13
CNA182	3.24	2.89	2.57
CNA206	2.37	2.11	1.88
CNA208	1.43	1.50	1.57
CNA441	1.51	1.58	1.65
GASEPF[1]	56.47	50.44	44.83
GASEPF[2]	89.73	80.14	71.23
GASEPV	8.48	7.57	6.73
PA28	1.17	1.05	0.93

1. Itinerant
2. Local

Table 17
Average Daily Departures – Alternative B

Category Aircraft	Phase 1	 2	 3
Commercial Jets			
A300-622R	2.22	2.22	2.22
A319-131	17.87	19.73	20.66
A320-211	12.49	13.79	14.44
A321-232	1.10	1.21	1.27
737400	0.13	0.14	0.15
737700	66.78	87.56	109.00
737800	18.54	20.48	21.44
757PW	7.27	7.85	8.13
CRJ9-ER	16.76	19.18	21.92
Business Jets			
CIT3	1.12	1.17	1.22
CL601	3.09	3.24	3.39
CNA500	3.39	3.55	3.72
CNA510	0.82	0.86	0.90
CNA750	1.28	1.34	1.40
ECLIPSE500	0.23	0.24	0.25
GIIB	0.23	0.24	0.25
GIV	1.73	1.81	1.89
GV	0.88	0.92	0.96
IA1125	0.45	0.47	0.49
LEAR35	3.79	3.97	4.15
MU3001	3.82	4.00	4.18
Commercial Propeller			
DHC6	4.44	4.65	4.86
SD330	0.57	0.59	0.62
General Aviation Propeller			
BEC58P	3.98	3.55	3.16
CNA172	14.02	12.52	11.13
CNA182	3.24	2.89	2.57
CNA206	4.73	4.22	3.76
CNA208	2.87	3.00	3.14
CNA441	3.02	3.16	3.31
GASEPF[1]	56.47	50.44	44.83
GASEPF[2]	89.73	80.14	71.23
GASEPV	8.48	7.57	6.73
PA28	1.17	1.05	0.93

1. Itinerant
2. Local

Table 18
Average Daily Departures – Alternative C

Category Aircraft	Phase 1	2	3
Commercial Jets			
A300-622R	2.22	2.22	2.22
A319-131	41.69	41.69	41.69
A320-211	29.14	29.14	29.14
A321-232	2.56	2.56	2.56
737400	0.29	0.29	0.29
737700	91.79	91.79	91.79
737800	43.27	43.27	43.27
757PW	1.79	14.59	14.59
CRJ9-ER	2.44	2.44	2.44
Business Jets			
CIT3	1.12	1.17	1.22
CL601	3.09	3.24	3.39
CNA500	3.39	3.55	3.72
CNA510	0.82	0.86	0.90
CNA750	1.28	1.34	1.40
ECLIPSE500	0.23	0.24	0.25
GIIB	0.23	0.24	0.25
GIV	1.73	1.81	1.89
GV	0.88	0.92	0.96
IA1125	0.45	0.47	0.49
LEAR35	3.79	3.97	4.15
MU3001	3.82	4.00	4.18
Commercial Propeller			
DHC6	4.44	4.65	4.86
SD330	0.57	0.59	0.62
General Aviation Propeller			
BEC58P	3.98	3.55	3.16
CNA172	14.02	12.52	11.13
CNA182	3.24	2.89	2.57
CNA206	2.37	2.11	1.88
CNA208	1.43	1.50	1.57
CNA441	1.51	1.58	1.65
GASEPF[1]	56.47	50.44	44.83
GASEPF[2]	89.73	80.14	71.23
GASEPV	8.48	7.57	6.73
PA28	1.17	1.05	0.93

1. Itinerant
2. Local

Table 19 is presented to summarize the number of air carrier departures. Table 19 is an important table because it is the simplest comparison of the Proposed Project and all Project Alternatives. There were 116 air carrier jet departures per day in the year 2013 (80 Class A and 36 Class E).

Table 19
Alternative Comparison

	No Proj.	Proposed Project			Alternative A			Alternative B			Alternative C		
		1	2	3	1	2	3	1	2	3	1	2	3
MAP	10.8	10.8	11.8	12.5	10.8	11.4	12.8	10.8	13	15	16.9	16.9	16.9
Average Daily Departures													
Class A	85.0	85.0	95.0	95.0	107.0	120.0	135.0	100.0	110.0	115.0	228.0	228.0	228.0
Class E	60.8	60.8	63.0	72.8	34.9	28.1	30.0	43.2	62.2	84.2	0.0	0.0	0.0
Total	145.8	145.8	158.0	167.8	141.9	148.1	165.0	143.2	172.2	199.2	228.0	228.0	228.0

Runway Use and Flight Tracks

The flight tracks and runway use developed for the existing condition (2013) case described in Section 4.1.3 were used for all future scenarios. Runway use at John Wayne 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 John Wayne Airport are well established, particularly with the Airport's noise abatement procedures. There is no reason to believe that the flight paths will change substantially in the future, especially within the 60 CNEL noise contour.

As the FAA implements the NextGen air traffic control system, which is based on GPS, it is likely that the dispersion of the aircraft over the established departure flight paths will become smaller. The GPS capabilities will allow planes to fly the established flight tracks more precisely and consistently, which will reduce variations in individual aircraft flight paths. This would tend to result in concentrating the aircraft noise along the flight path, raising cumulative noise level directly under the flight path but reducing noise levels to either side of the flight path. Because the standard commercial jet departure occurs over Back Bay, assuming more aircraft dispersion results in a worst-case estimate of noise impacts as the sensitive uses are located to either side of the flight track and there are no uses directly underneath the flight tracks.

There are sensitive uses under the flight paths between the Airport and Back Bay. However, because of the short distance from the Airport, there is very little variation in flight paths over these sensitive uses and no considerable changes would be expected with the implementation of the NextGen air traffic control system in this area. NextGen advancements are being implemented by the FAA, are subject to NEPA requirements that the FAA must meet, and are not a part of this project, nor are they under the control of the County except as a commenter to the FAA process.

It should be noted that there is some controversy regarding the level of NEPA analysis that will be required to implement NextGen, and specifically implementation of RNAV and RNP that would result in changes in local flight tracks around an airport. The "FAA Modernization and Reform Act of 2012" (Public Law 112-95) legislated two new Categorical Exclusions (CatEx) applicable to implementing RNAV and RNP. Section 213(c)(1) mandates that RNAV and RNP procedures at 35 Operational Evolution Partnership (OEP) airports or any medium or small hub airport located within the same metroplex area will be presumed to be covered by a categorical exclusion unless the FAA Administrator determines that extraordinary circumstances exist with respect to the procedure. John Wayne Airport is not one of the OEP airports. However, Los Angeles International is and John Wayne is considered to be located within the same metroplex.

Note that this does not mean that a CatEx would be used to satisfy NEPA for any and all RNAV and RNP procedures. Section 304 of FAA Order 1050.1e Change 1 provides a list of circumstances that are considered be extraordinary. In these cases, additional analysis considering requirements applicable to the specific resource is required to determine if an Environmental Assessment or Environmental Impact Report should be prepared for the action. One of the circumstances where the CatEx would not be applicable would be where the effects on the quality of the human environment that are likely to be highly controversial on environmental grounds.

Section 213(c)(2) mandates that proposed RNP or RNAV would be categorically excluded from preparing an Environmental Assessment or Environmental Impact Statement at all other airports if the FAA determines that the procedure results in "measureable reduction in fuel consumption, carbon dioxide emissions, and noise, on a per flight basis, as compared to aircraft operations that follow existing instrument flight rules procedures in the same airspace." As with the first CatEx this would not be applicable if the Administrator determines that extraordinary circumstances exist.

Because the meaning of a "measurable reduction in noise on a per flight basis" was not clear, the FAA asked the NextGen Advisory Committee for recommendations for implementing this new CatEx. This group reviewed Congressional language, associated reports, met with key congressional staff regarding the intent of the CatEx language, and considered several approaches to determine if the CatEx applied. In June 2013, the NextGen Advisory Committee published their recommendation [30].

The advisory committee recommended the use of the "Net Noise Reduction Method" to determine if this CatEx is applicable to proposed RNAV or RNP. Under this method, the number of persons exposed to noise levels greater than 45 dB DNL and subject to a increase in DNL as a result of the project is compared to the number of persons subject to a noise level of 45 dB DNL or greater and subject to a decrease in noise level due to the project. If the number of persons subject to a decrease as a result of the proposed RNAV or RNP is greater than the number of persons subject to an increase, the CatEx is applicable.

In July 2013, the FAA published a draft update to Order 1050.1 "Environmental Impacts: Policies and Procedures" for public review. The public review period ended on November 8, 2013 and no further action has been taken since that time. In addition to adding the mandated CatEx, this document also updated the agency's policy regarding the documentation required when a CatEx is used as well as public notification when a CatEx is used. Use of the mandated CatEx would require documentation be prepared to demonstrate "a measureable reduction in noise on a per flight basis." While not specifically discussed, this documentation would need to present an analysis consistent with the Net Noise Reduction Method or other method deemed appropriate by the FAA. There is no requirement in NEPA for public notification when a CatEx is used. However, as discussed in the Order, FAA normally notifies the public when a CatEx is applied to a proposed action consistent with the recommendations from the Council on Environmental Quality (CEQ). During arrivals, most commercial aircraft utilize their Instrument Landing System, which limits amount of arrival flight track dispersion, and implementation of NextGen would not change this. The flight tracks included in the noise model developed for JWA account for the various points where the aircraft align themselves with the runway on final approach.

6.2 CNEL at Noise Monitoring Stations

In addition to the CNEL contours, specific CNEL values are calculated for each Noise Monitoring Station (NMS) shown on Figure 13. Table 20 presents CNEL values at each of the NMS for existing conditions, and all Phases of the Proposed Project and Project Alternatives. NMS with noise levels equal to or above 65 CNEL are shown in bold type. Only the close-in NMS 1S, 2S, 3S located in the Santa Ana Heights community in the City of Newport Beach and NMS 8N located in the City of Irvine show noise levels above 65 CNEL for any case. Note that NMS 8N is located in a commercial area with no nearby residences.

Table 21 presents the change in noise level in terms of CNEL relative to existing year 2013 conditions. Colored cells with values shown in bold type are greater than the significance threshold. Red shaded cells are projected to experience noise levels of 65 CNEL or greater for that scenario and a noise level increase of 1.5 dB or greater over existing conditions. Orange shaded cells are projected to experience noise levels between 60 and 65 CNEL and noise level increases of 3.0 dB or greater over existing conditions. (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.)

Table 20
CNEL Levels at NMS For All Alternatives

NMS[1]	Existing	No Project	Project P1	Project P2	Project P3	Alternative A P1	Alternative A P2	Alternative A P3	Alternative B P1	Alternative B P2	Alternative B P3	Alt. C P1	Alt. C P2	Alt. C P3
1S	**66.2**	**66.6**	**66.6**	**66.9**	**67.1**	**66.5**	**66.7**	**67.2**	**66.5**	**67.3**	**67.9**	**68.6**	**71.2**	**71.2**
2S	**65.4**	**65.8**	**65.8**	**66.1**	**66.4**	**65.7**	**65.9**	**66.4**	**65.8**	**66.5**	**67.1**	**67.8**	**70.3**	**70.3**
3S	64.7	64.7	64.7	65.0	**65.1**	64.8	**65.1**	**65.4**	64.8	**65.3**	**65.7**	**66.7**	**69.1**	**69.1**
4S	57.5	57.8	57.8	58.1	58.4	57.6	57.8	58.2	57.7	58.4	59	59.5	61.9	62.0
5S	57.3	57.4	57.4	57.7	57.9	57.4	57.6	58.0	57.4	58.0	58.5	59.3	61.7	61.7
6S	58.2	58.2	58.2	58.5	58.6	58.6	58.9	59.2	58.5	58.9	59.2	60.6	63.0	63.0
7S	55.8	55.9	55.9	56.2	56.4	56.1	56.3	56.7	56	56.6	57.0	58.0	60.5	60.5
8N	**68.8**	**69.5**	**69.5**	**69.9**	**70.1**	**69.4**	**69.5**	**70.0**	**69.4**	**70.2**	**70.8**	**71.2**	**72.0**	**72.0**
9N	51.5	52.3	52.3	52.6	52.9	52.1	52.3	52.7	52.2	53.0	53.6	54.0	54.8	54.8
10N	54.1	54.8	54.8	55.1	55.3	54.7	54.9	55.3	54.7	55.4	56.0	56.5	57.5	57.5

1. 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.

Table 21
Change in Noise Level Over Existing Conditions

NMS	No Project	Proposed Project P1	Proposed Project P2	Proposed Project P3	Alternative A P1	Alternative A P2	Alternative A P3	Alternative B P1	Alternative B P2	Alternative B P3	Alternative C P1	Alternative C P2	Alternative C P3
1S	0.4	0.4	0.7	0.9	0.3	0.5	1.0	0.3	1.1	**1.7**	**2.4**	**5.0**	**5.0**
2S	0.4	0.4	0.7	1.0	0.3	0.5	1.0	0.4	1.1	**1.7**	**2.4**	**4.9**	**4.9**
3S	0.0	0.0	0.3	0.4	0.1	0.4	0.7	0.1	0.6	1.0	**2.0**	**4.4**	**4.4**
4S	0.3	0.3	0.6	0.9	0.1	0.3	0.7	0.2	0.9	1.5	2.0	**4.4**	**4.4**
5S	0.1	0.1	0.4	0.6	0.1	0.3	0.7	0.1	0.7	1.2	2.0	**4.4**	**4.4**
6S	0.0	0.0	0.3	0.4	0.4	0.7	1.0	0.3	0.7	1.0	2.4	**4.8**	**4.8**
7S	0.1	0.1	0.4	0.6	0.3	0.5	0.9	0.2	0.8	1.2	2.2	**4.7**	**4.7**
8N	0.7	0.7	1.1	1.3	0.6	0.7	1.2	0.6	1.4	**2.0**	**2.4**	**3.2**	**3.2**
9N	0.8	0.8	1.1	1.4	0.6	0.8	1.2	0.7	1.5	2.1	2.5	3.3	3.3
10N	0.7	0.7	1.0	1.2	0.6	0.8	1.2	0.6	1.3	1.9	2.4	3.4	3.4

Boldface type indicates increases greater than the significance threshold. **RED** shaded cells experience more than a 1.5 dB increase and will be exposed to noise levels exceeding 65 CNEL. **ORANGE** shaded cells experience a 3.0 dB or greater increase and will be exposed to noise levels between 60 CNEL and 65 CNEL.

6.2.1 County of Orange Significance Thresholds

Table 21 shows that the No Project Alternative, Proposed Project and Alternative A are not projected to result in a significant noise impact at any NMS. During Phases 1 and 2 of Alternative B, there are no significant noise impacts. However, during Phase 3 of Alternative B, Table 21 shows that NMS 1S and 2S located in the Santa Ana Heights community of Newport Beach and NMS 8N located in the City of Irvine are projected to be significantly impacted. There are no noise sensitive uses in the immediate vicinity of NMS 8N. Significant impacts are projected at NMS 1S, 2S and 3S in the Santa Ana Heights community of Newport Beach and NMS 8N in the City of Irvine for all three Phases of Alternative C. Additionally, NMS 4S, 5S, 6S, and 7S located in the City of Newport Beach are shown to be significantly impacted during Phases 2 and 3 of Alternative 3.

To summarize, the following alternatives are projected to result in significant noise impacts to homes near the NMS listed. Note that there are no homes located near NMS 8 and, therefore, no impacts.

Alternative B Phase 3: NMS 1S and 2S located in the Santa Ana Heights community of Newport Beach

Alternative C Phase 1: NMS 1S, 2S, and 3S located Santa Ana Heights community of Newport Beach.

Alternative C Phase 2: NMS 1S, 2S, and 3S located in the Santa Ana Heights community of Newport Beach and NMS 4S, 5S, 6S, and 7S located in the City of Newport Beach.

Alternative C Phase 3: NMS 1S, 2S and 3S located in the Santa Ana Heights community of Newport Beach and NMS 4S, 5S, 6S, and 7S located in the City of Newport Beach.

6.2.2 City of Newport Beach Significance Thresholds

As discussed in Section 2.6.2, the City of Newport Beach has adopted significance thresholds for noise impacts in its Noise Element. Under the City's thresholds, any increase in any area exposed to noise levels in excess of 75 CNEL is significant independent of the increase. However, there are no noise sensitive uses in the City exposed to this level of noise.

When the resulting noise level is between 65 and 75 CNEL, a 1 dB increase results in a significant impact. Tables 20 and 21 show that the this threshold will be exceeded at homes around the NMS listed as follows:

Proposed Project Phase 3: NMS 2S located in the Santa Ana Heights community of Newport Beach.

Alternative A Phase 3: NMS 1S and 2S located in the Santa Ana Heights community of Newport Beach.

Alternative B Phase 2: NMS 1S and 2S located in the Santa Ana Heights community of Newport Beach.

Alternative B Phase 3: NMS 1S, 2S and 3S located in the Santa Ana Heights community of Newport Beach.

Alternative C Phase 1: NMS 1S, 2S and 3S located in the Santa Ana Heights community of Newport Beach.

Alternative C Phase 2: NMS 1S, 2S and 3S located in the Santa Ana Heights community of Newport Beach.

Alternative C Phase 3: NMS 1S, 2S and 3S located in the Santa Ana Heights community of Newport Beach.

When the resulting noise level is between 60 and 65 CNEL, a 2 dB increase results in a significant impact. Tables 20 and 21 show that the this threshold will be exceeded at homes around the NMS listed as follows:

Alternative C Phase 1: NMS 6S located in the City of Newport Beach.

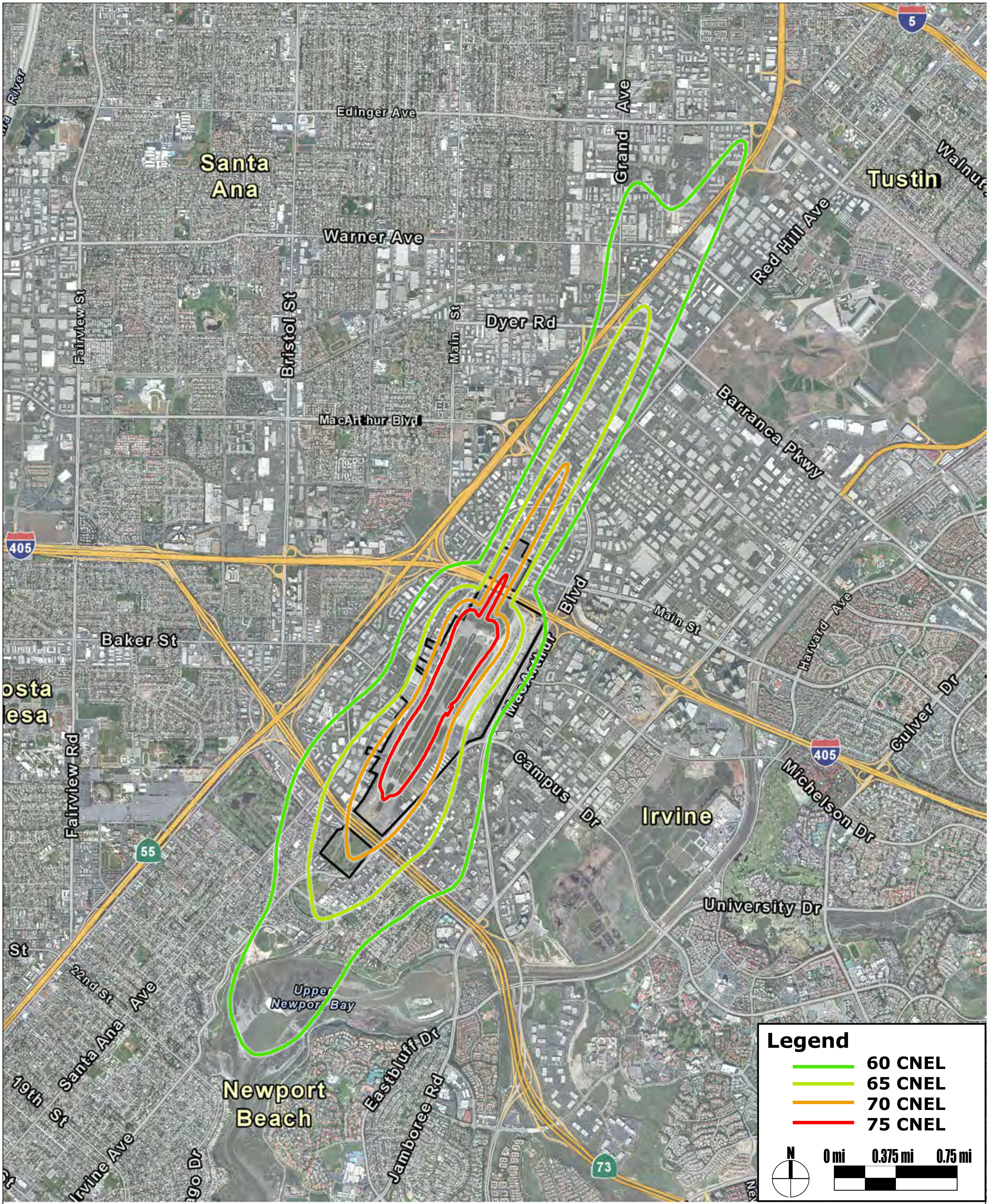
Alternative C Phase 2: NMS 4S, 5S, 6S, and 7S located in the City of Newport Beach.

Alternative C Phase 3: NMS 4S, 5S, 6S, and 7S located in the City of Newport Beach.

When the resulting noise level is between 55 and 60 CNEL, a 3 dB increase results in a significant impact. There were no NMS exposed to noise levels between 55 and 60 CNEL that are projected to experience a 3 dB or greater increase.

6.3 CNEL Contours

Figures 19 through 31 show the CNEL contours for John Wayne Airport for all Phases of the Proposed Project and Project Alternatives. Figure 19 shows the contours for the No Project Alternative. Figures 20, 21 and 22 show the contours for each of the Proposed Project Phases. Figures 23, 24 and 25 show the contours for each of the Alternative A Phases. Figures 26, 27 and 28 show the contours for each of the Alternative B Phases. Figures 29, 30 and 31 show the contours for each of the Alternative C Phases. It should be noted that the contours on Figures 20 through 29 are presented at the same scale but the Phase 2 and 3 contours for Alternative C presented in Figures 30 and 31 are shown at a larger scale due to their size resulting from the elimination of the nighttime curfew. The existing condition contours were presented previously in Figure 12.



L&B

Figure 19

CNEL Contours - No Project

John Wayne Airport (JWA) Settlement Agreement Amendments

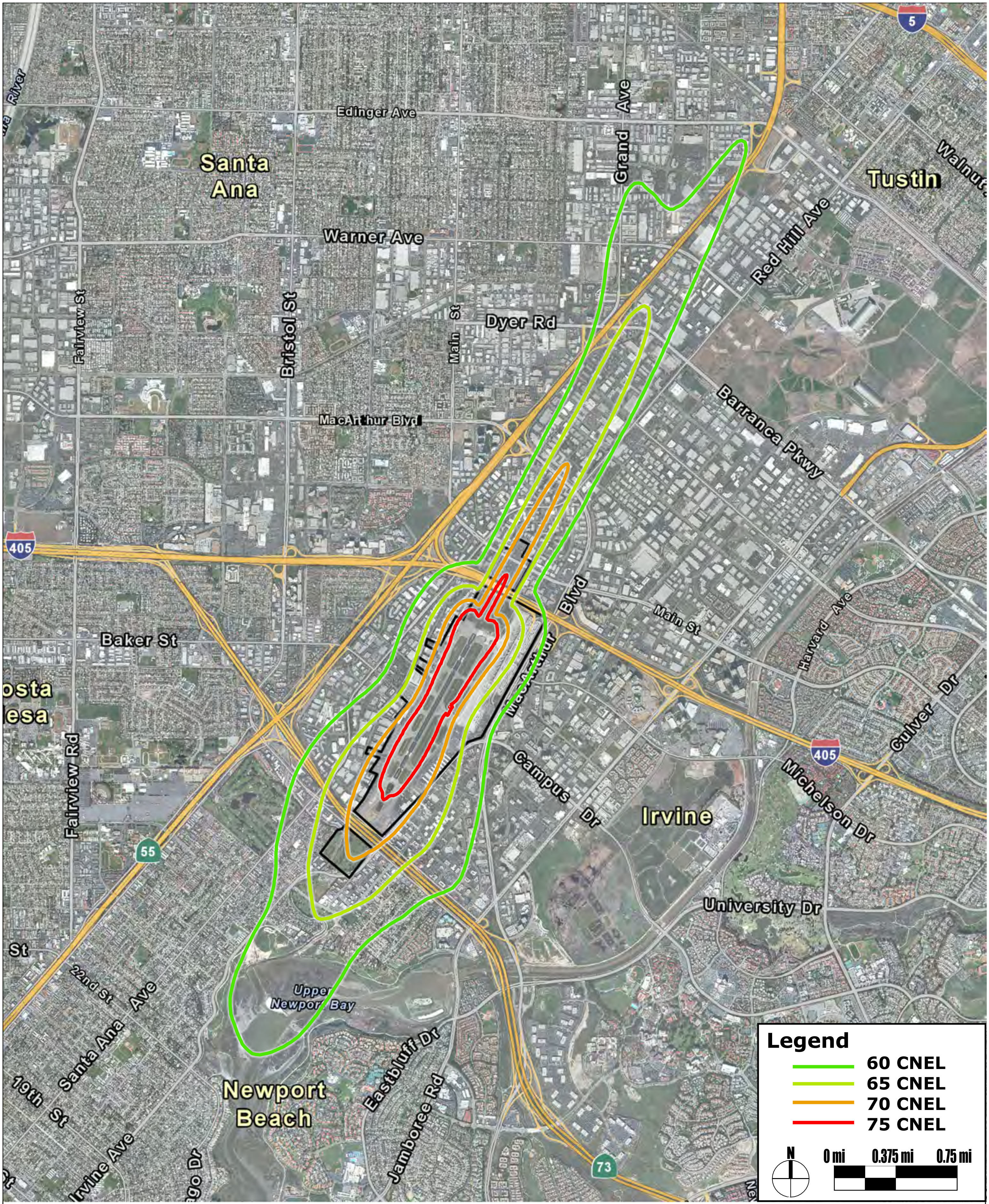


Figure 20
CNEL Contours - Proposed Project Phase 1

John Wayne Airport (JWA) Settlement Agreement Amendments

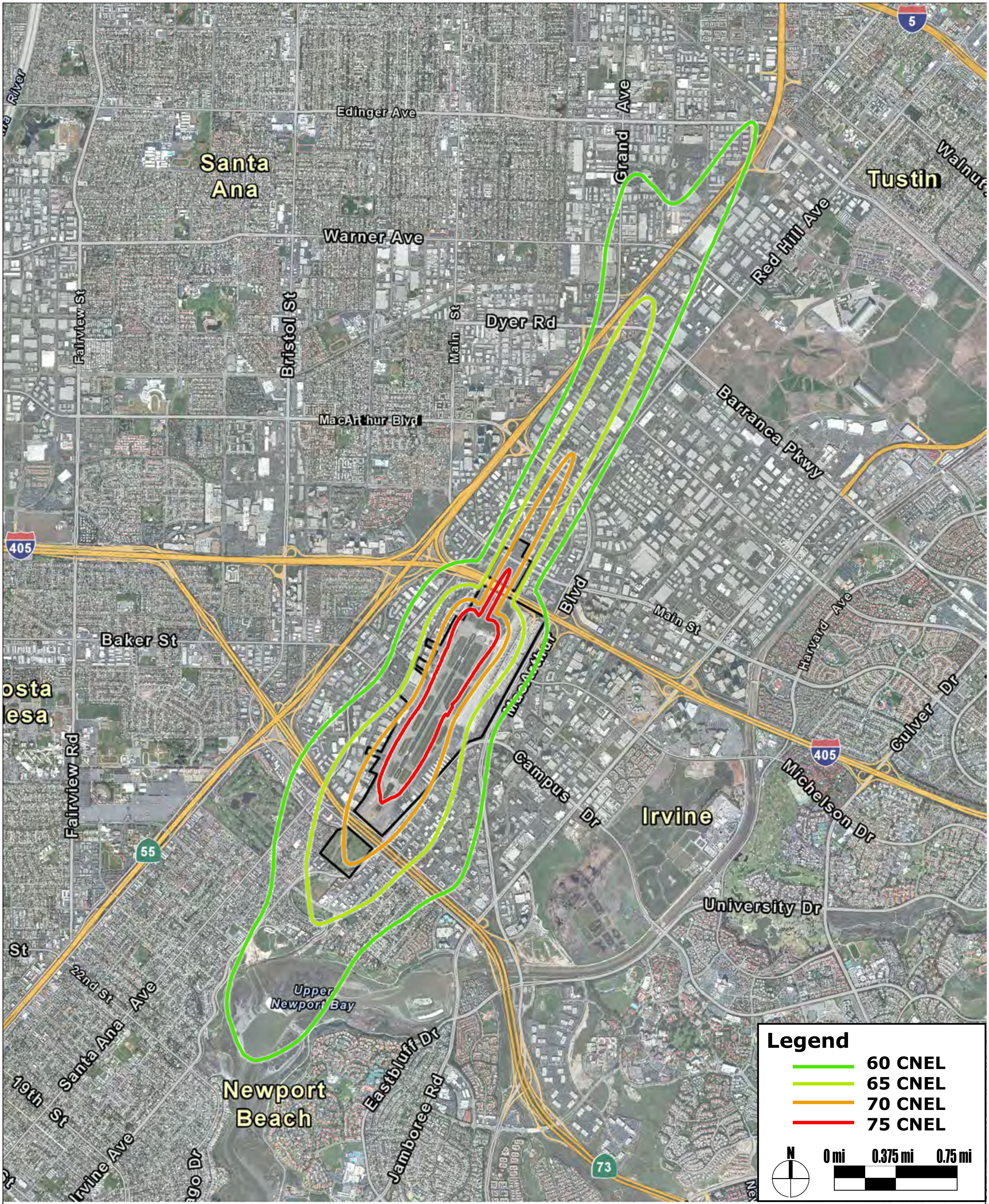


Figure 21
CNEL Contours - Proposed Project Phase 2

John Wayne Airport (JWA) Settlement Agreement Amendments

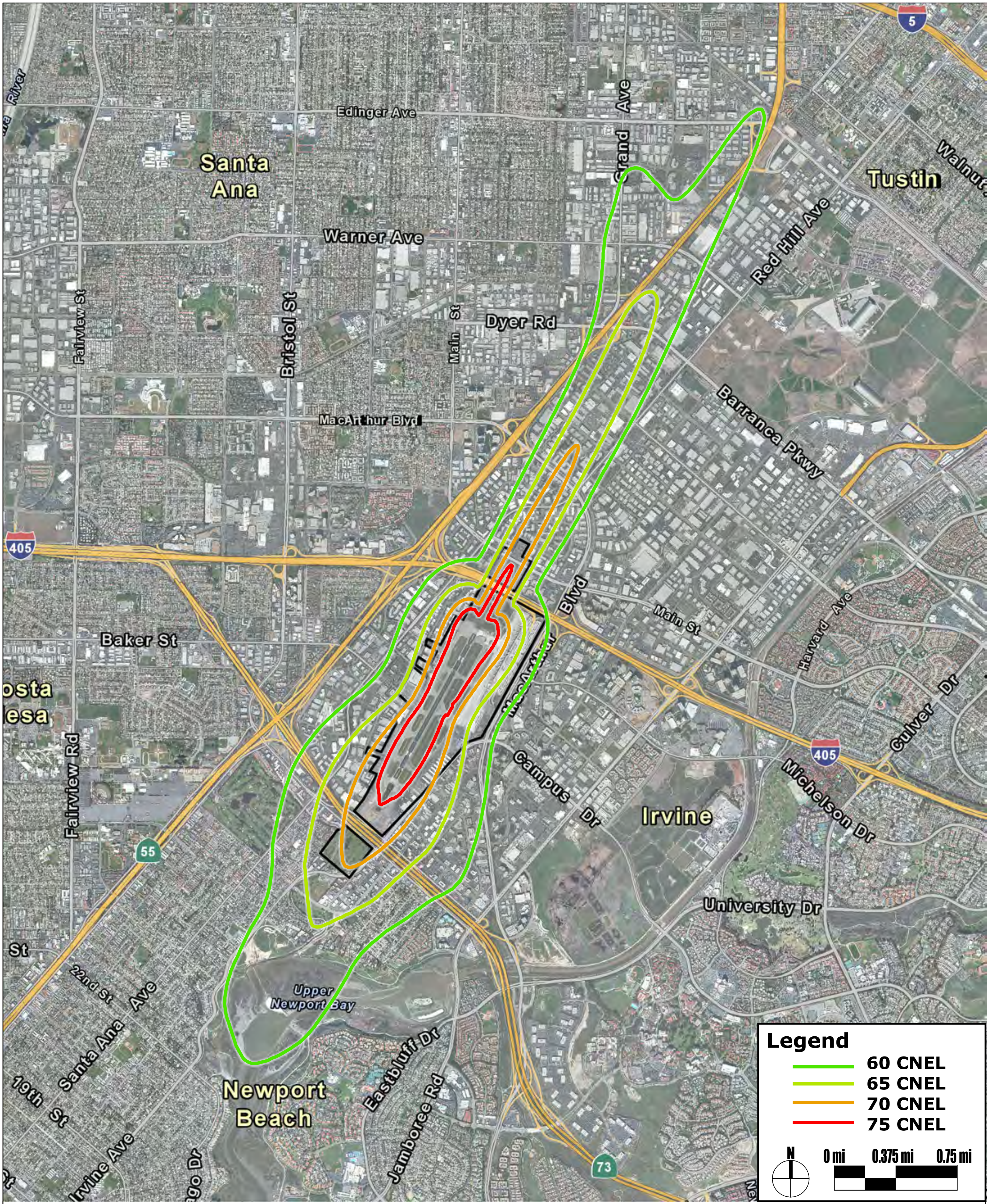


Figure 22
CNEL Contours - Proposed Project Phase 3
John Wayne Airport (JWA) Settlement Agreement Amendments

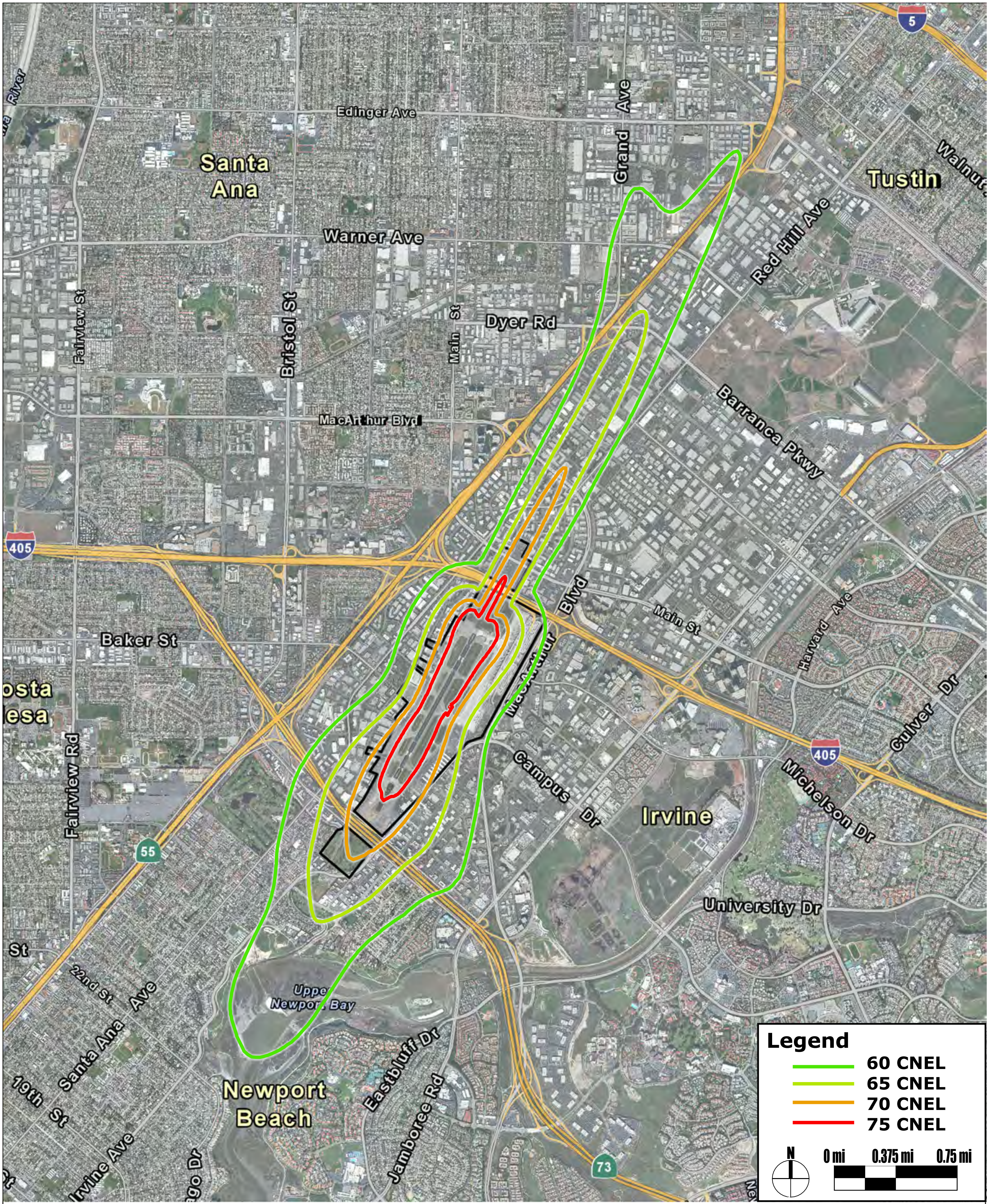


Figure 23
CNEL Contours - Alternative A Phase 1
John Wayne Airport (JWA) Settlement Agreement Amendments

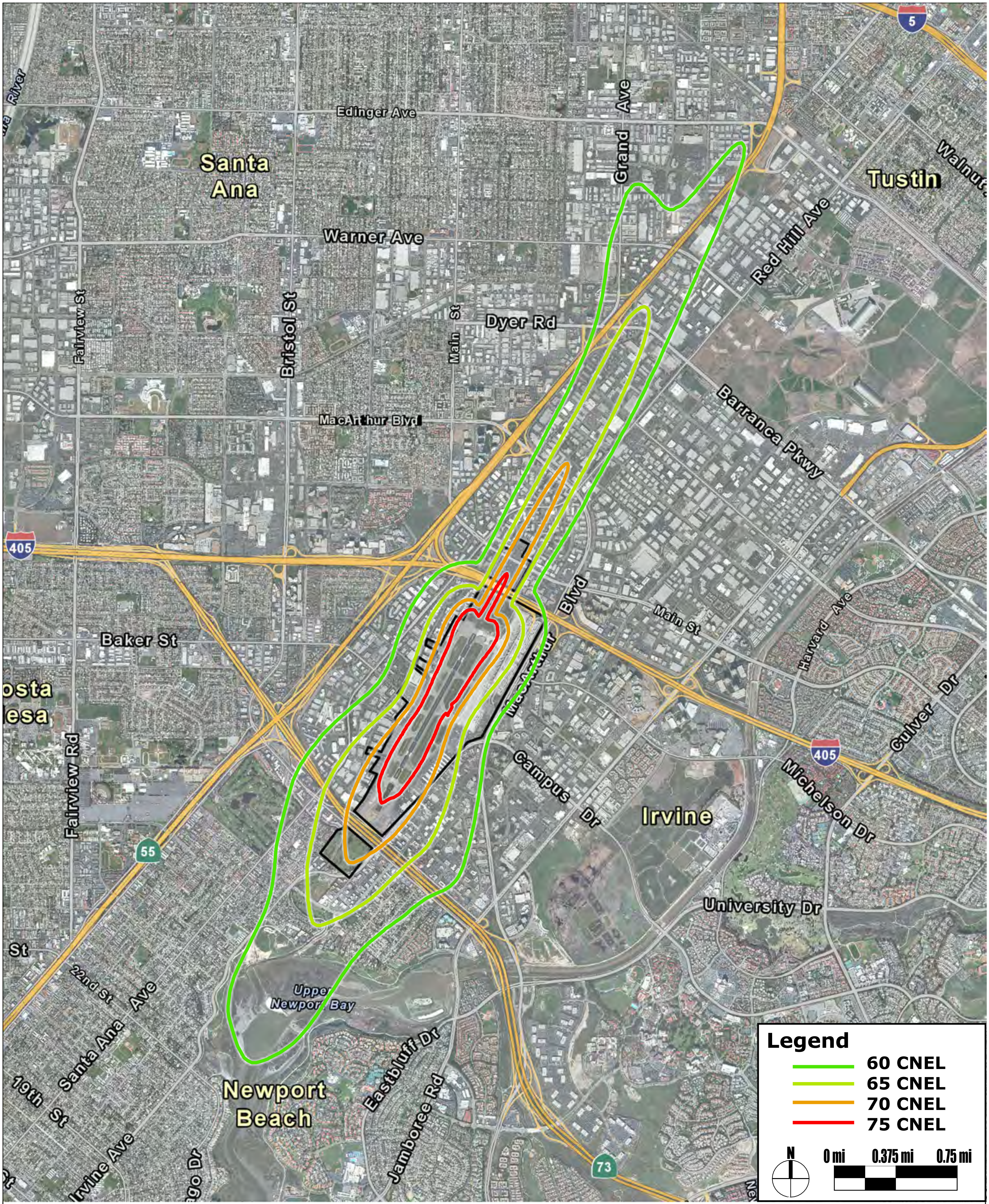


Figure 24
CNEL Contours - Alternative A Phase 2

John Wayne Airport (JWA) Settlement Agreement Amendments

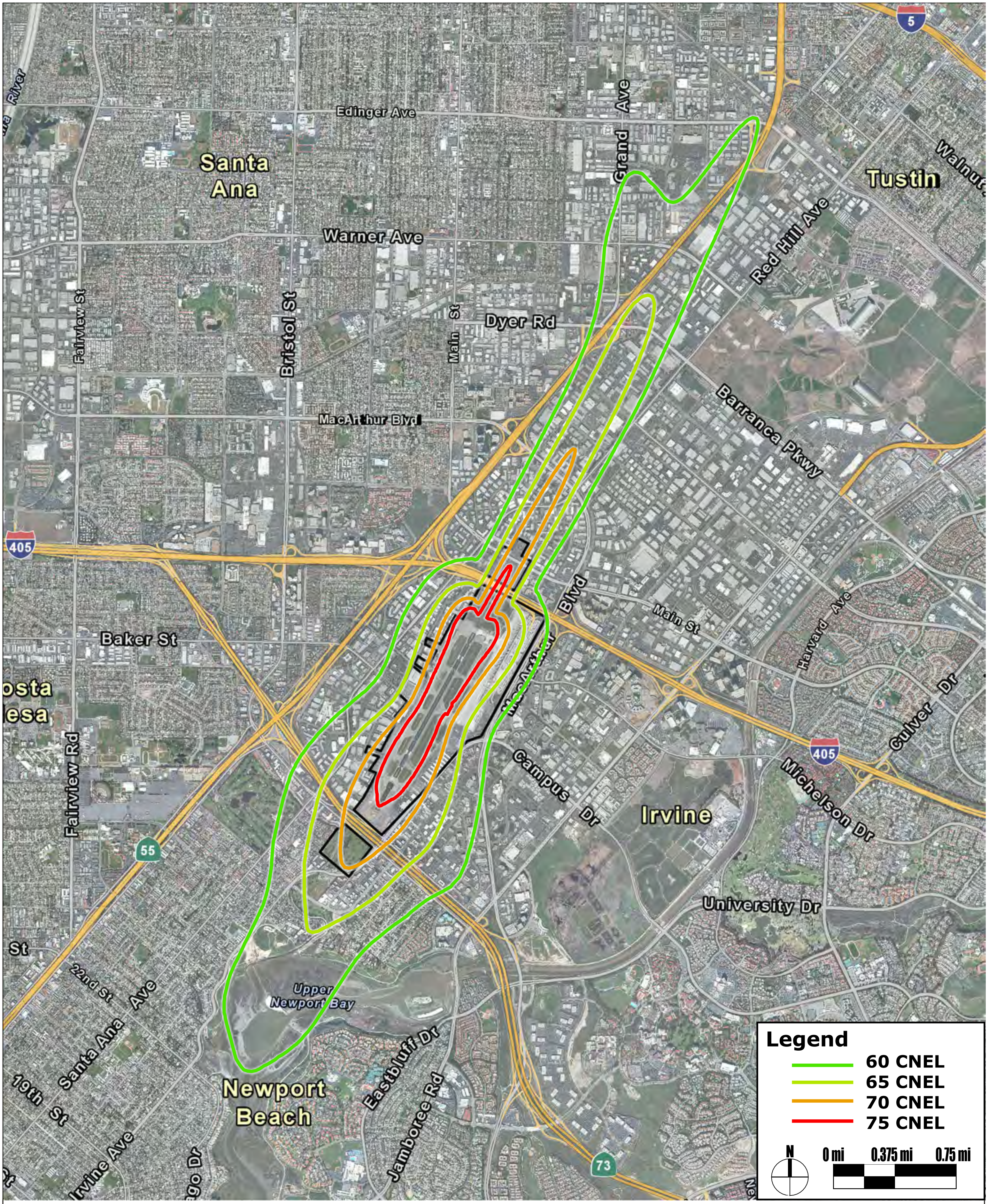


Figure 25
CNEL Contours - Alternative A Phase 3

John Wayne Airport (JWA) Settlement Agreement Amendments

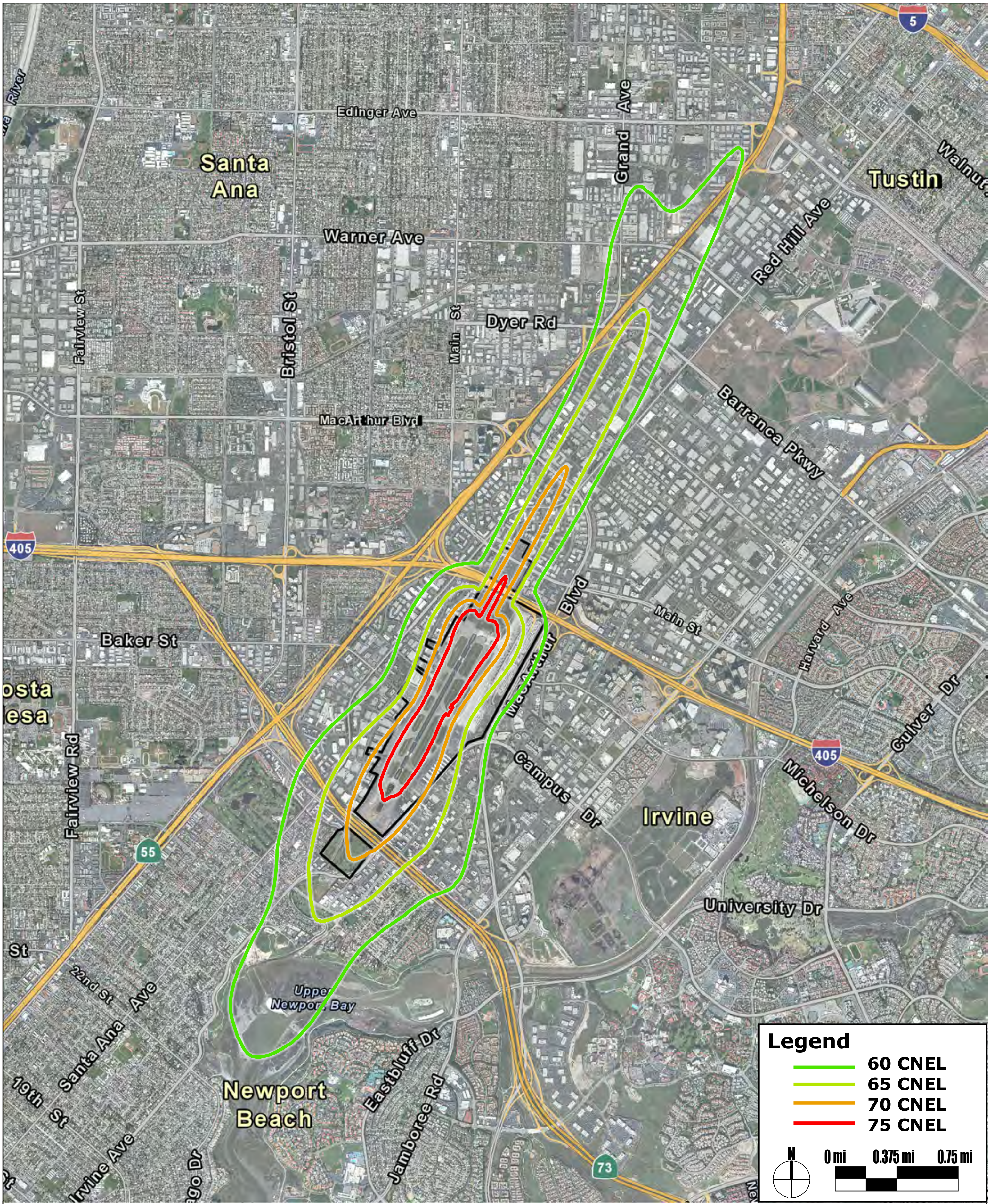


Figure 26
CNEL Contours - Alternative B Phase 1

John Wayne Airport (JWA) Settlement Agreement Amendments

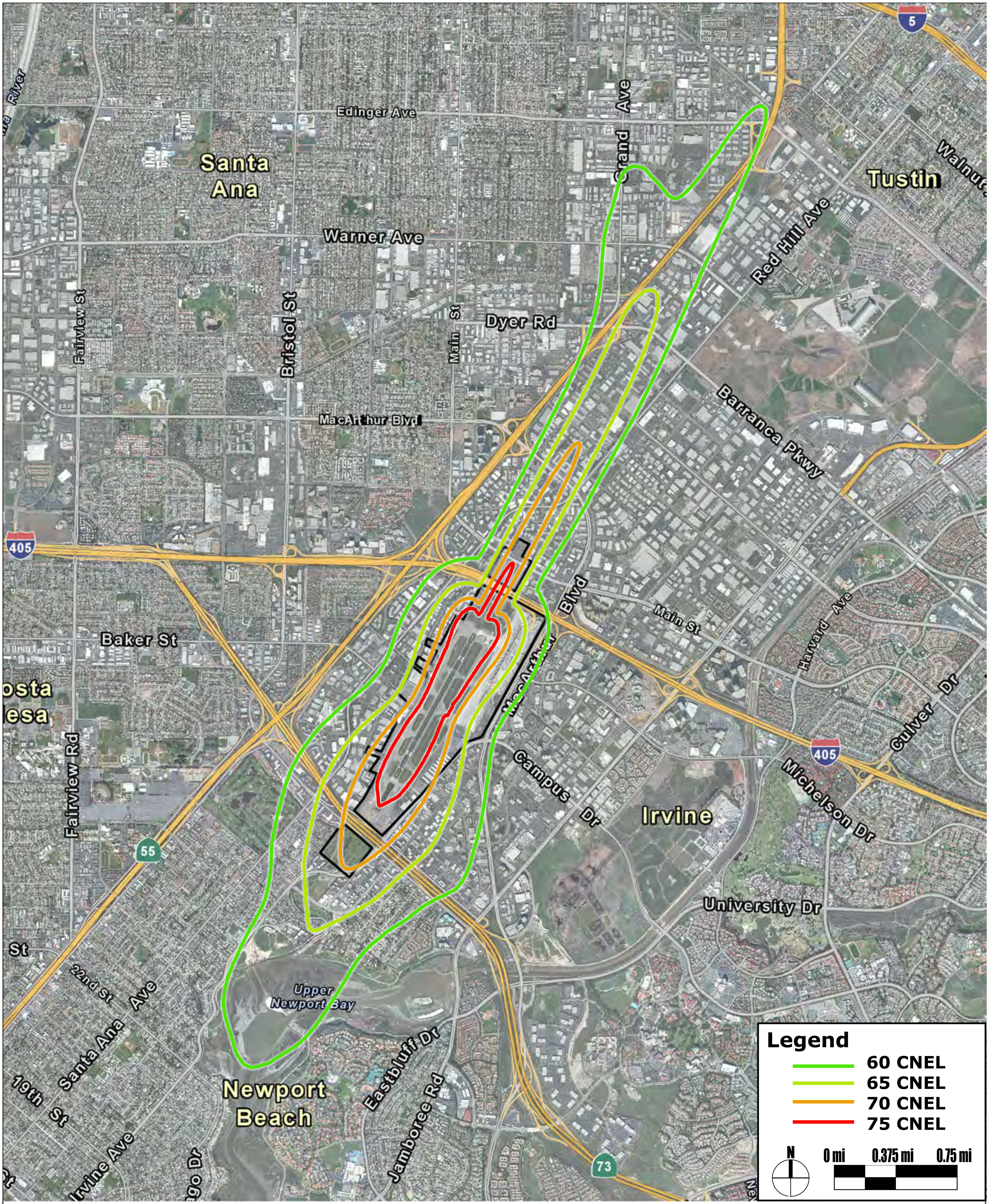


Figure 27

CNEL Contours - Alternative B Phase 2

John Wayne Airport (JWA) Settlement Agreement Amendments

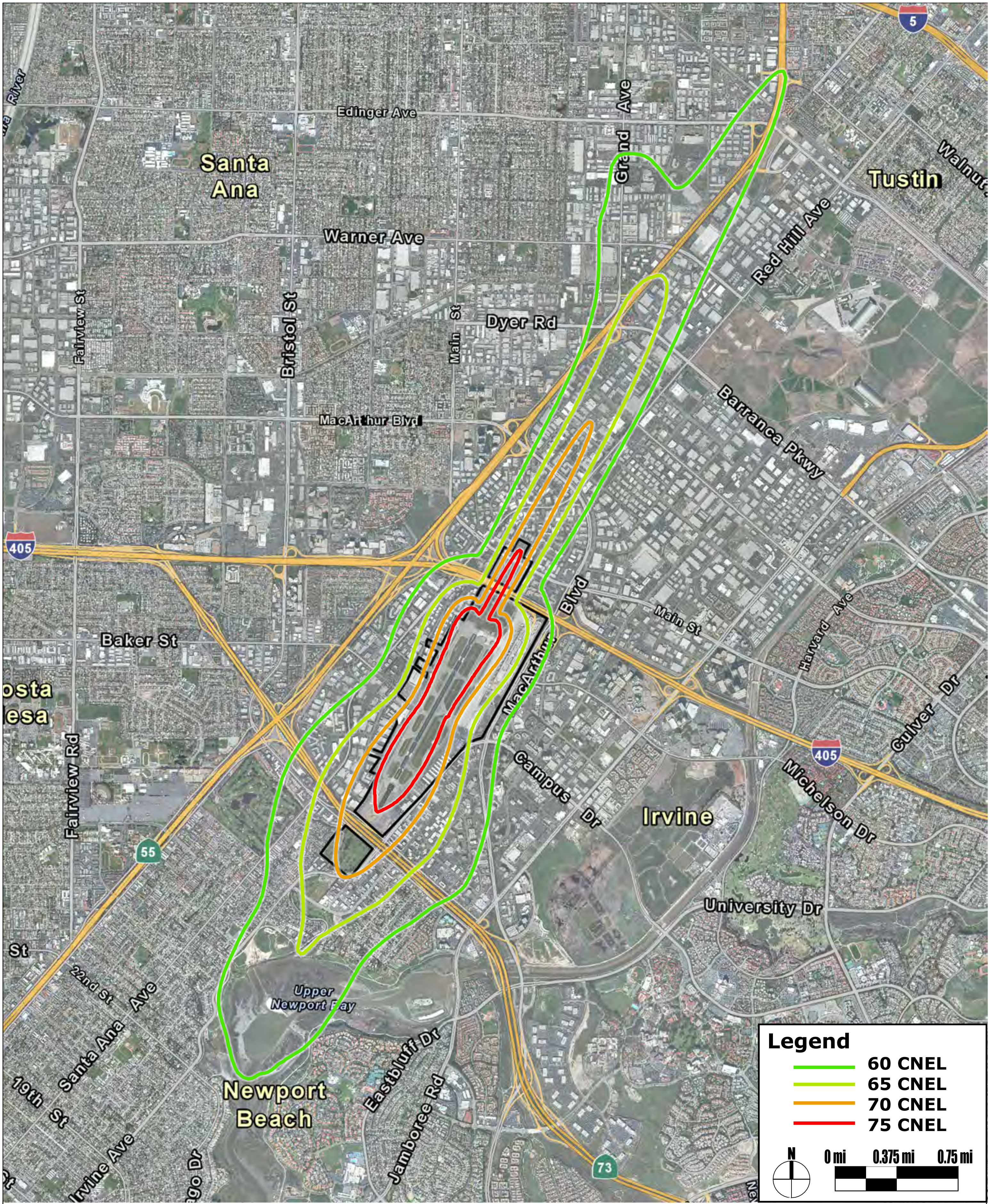


Figure 28
CNEL Contours - Alternative B Phase 3

John Wayne Airport (JWA) Settlement Agreement Amendments

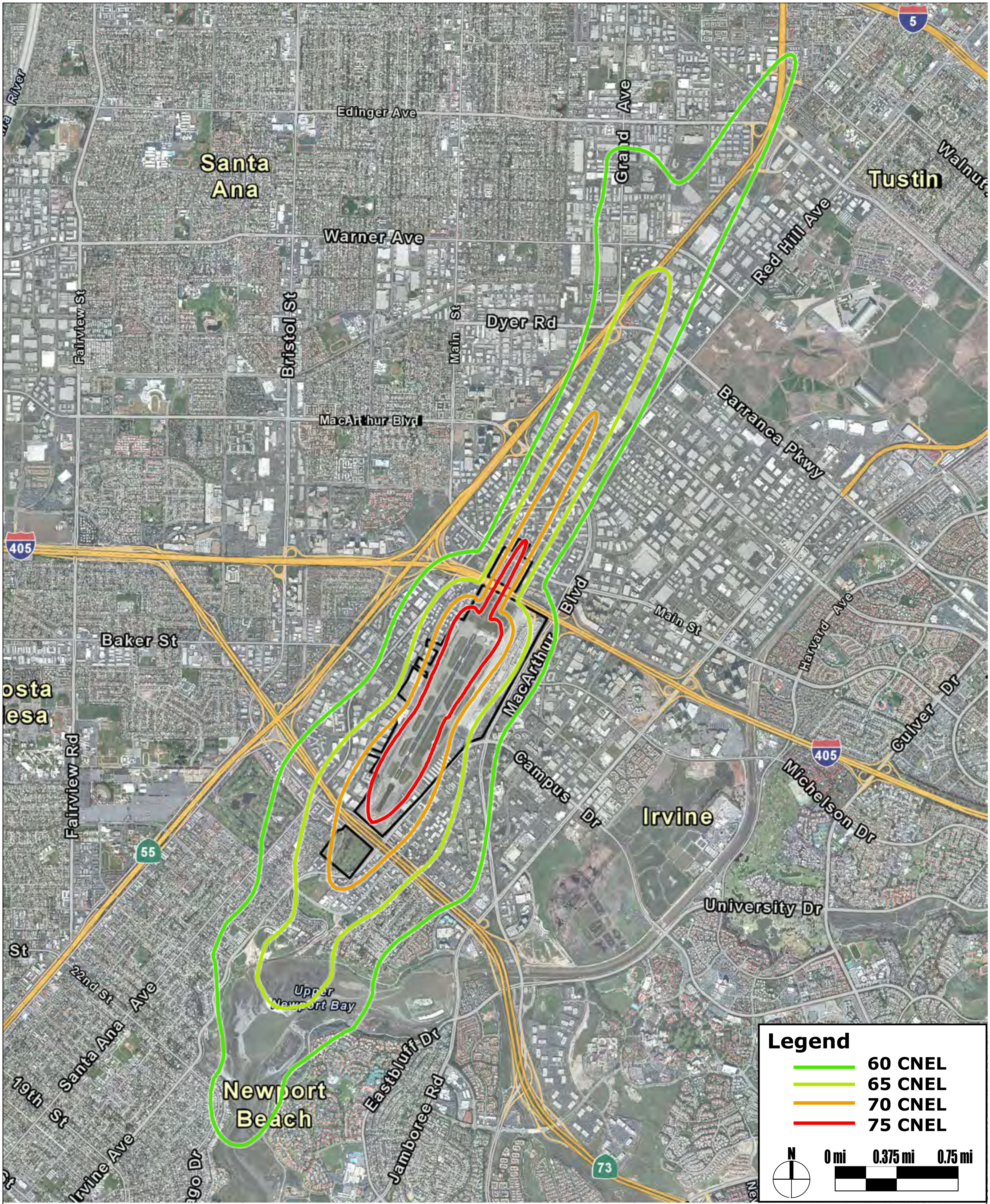


Figure 29
CNEL Contours - Alternative C Phase 1

John Wayne Airport (JWA) Settlement Agreement Amendments

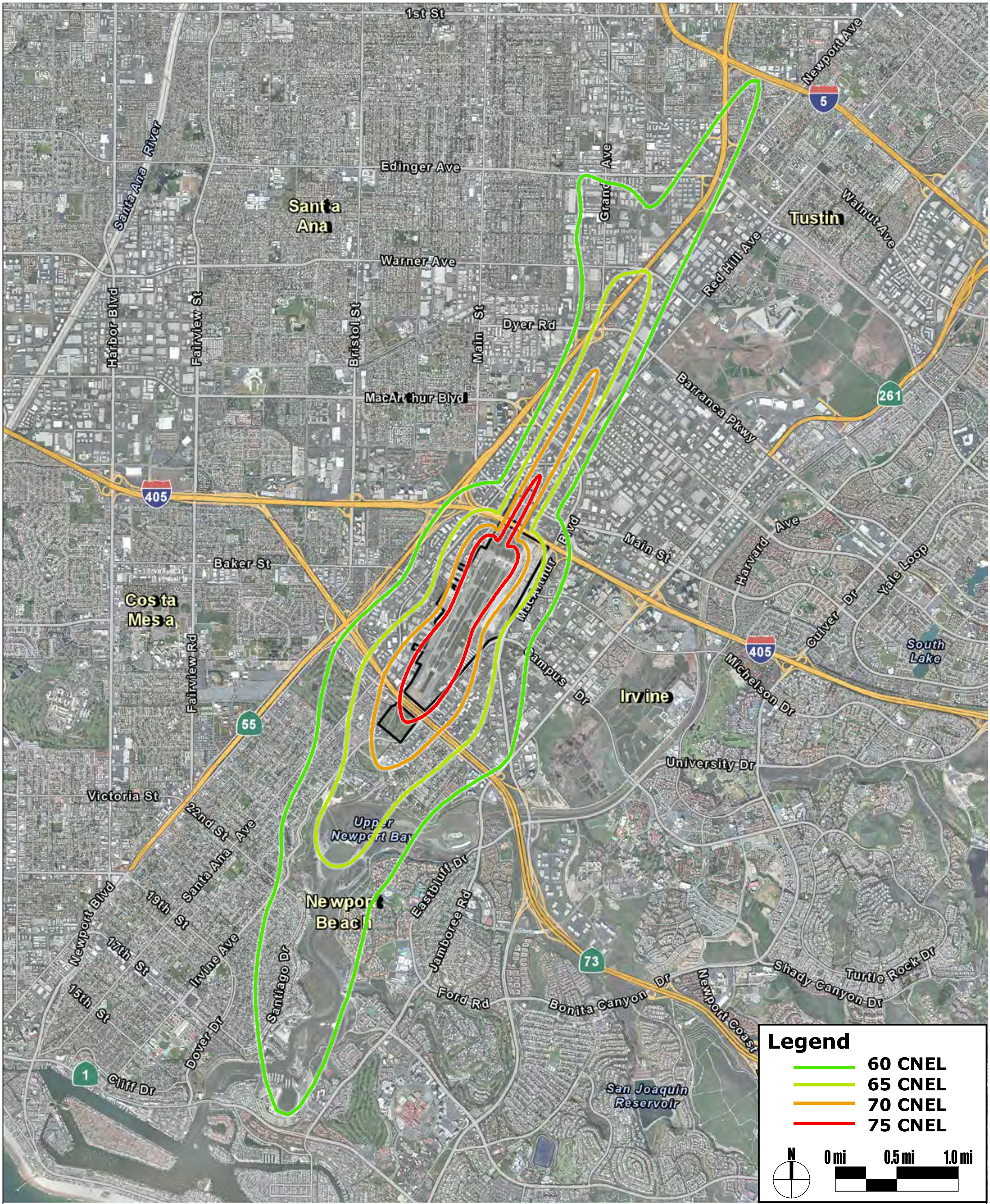


Figure 30

CNEL Contours - Alternative C Phase 2

John Wayne Airport (JWA) Settlement Agreement Amendments

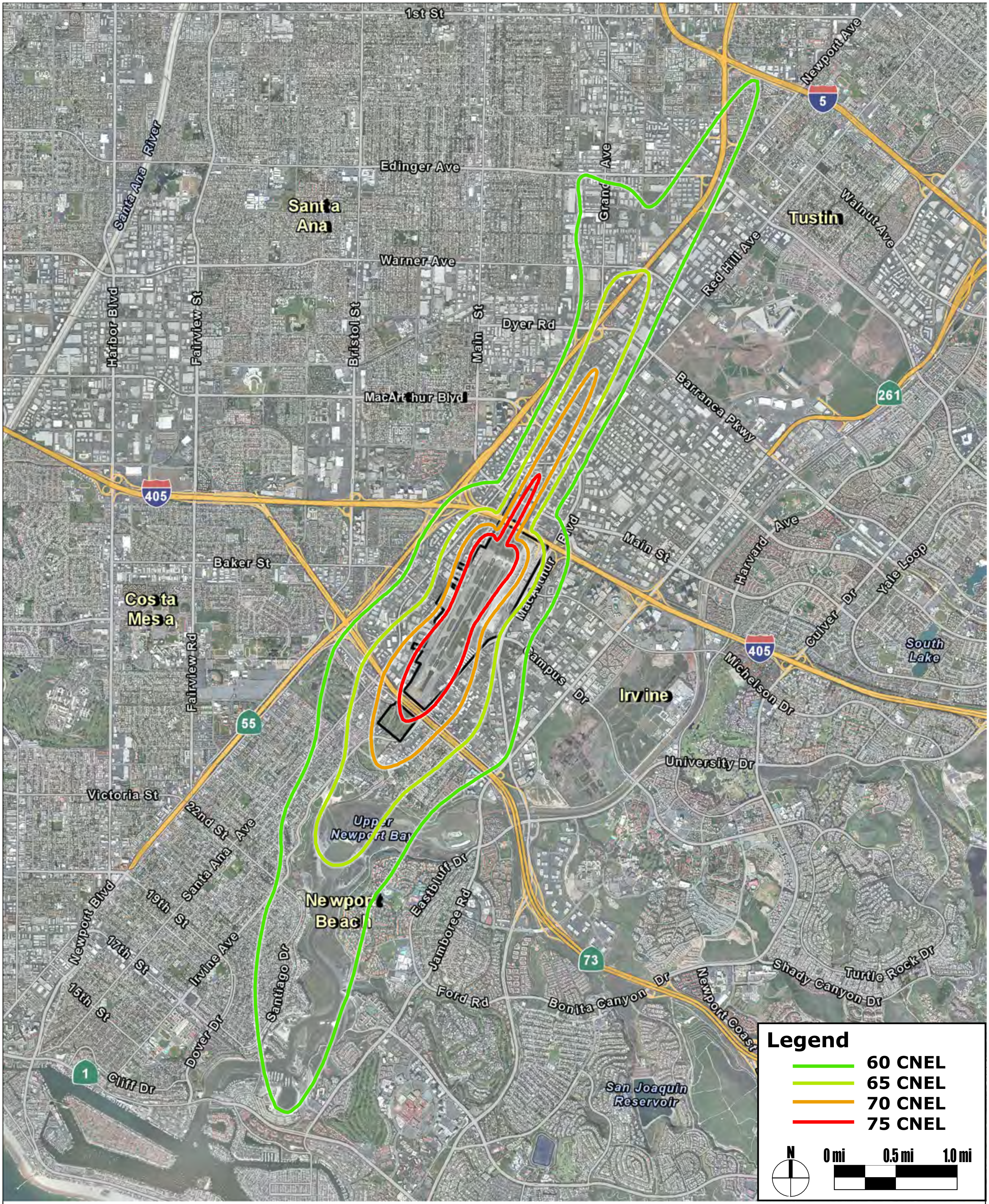


Figure 31

CNEL Contours - Alternative C Phase 3

John Wayne Airport (JWA) Settlement Agreement Amendments

6.4 CNEL Land Use Impacts

Table 22 provides a comparison of the land uses located within the CNEL contours for the existing year 2013 conditions, 1985 JWA Master Plan, No Project Alternative, Proposed Project, and each of the Alternatives. There are no accepted thresholds of significance for these values and this analysis is presented for informational purposes only.

The total number of dwelling units within each contour band is shown along with the number of dwelling units that received acoustical insulation as a part of the Santa Ana Heights Acoustical Insulation Program (AIP) implemented as mitigation for the 1985 Master Plan EIR. Several homes within the AIP area did not receive the acoustical upgrades because they never responded to the program, voluntarily declined involvement in the program, or are located within Santa Ana Heights Business Park. Residential uses located within the business park do not conform to the zoning of the business park and were excluded from the program to increase the likelihood of redevelopment with a conforming use. This is discussed further in Section 7.5.6.

Table 22 shows that Phases 2 and 3 of Alternative C have the largest contours. This is the result of the removal of the nighttime operational restrictions. These Phases of Alternative C also result in the largest number of residences and persons exposed to noise levels exceeding 65 CNEL. However, the 1985 JWA Master Plan results in the most residences and persons exposed to noise levels exceeding 60 CNEL. All of the Proposed Project, Alternative A, and Alternative B Phases result in smaller contours and fewer residences and persons than the Master Plan. This is also true for Alternative C Phase 1.

The table shows that the contour areas and number of impacted dwelling units under Phase 1 of Alternatives A and B are smaller than under the No Project conditions and Phase 1 of the Project Alternative which are equivalent. This is despite the increase in Class A ADDs with Phase 1 of Alternatives A and B over the No Project Conditions shown in Table 12. However, this table also shows that there are slightly fewer commercial aircraft ADDs with Phase 1 of Alternatives A and B than there is for the No Project conditions. This is because the allowed annual passengers is the same for each of these alternatives. Aircraft operations were determined by determining the number of passengers accommodated by the Class A aircraft ADDs and subtracting the total to determine the number of passengers that would be assigned Class E aircraft. The increase in Class A aircraft ADDs allowed under Phase 1 of Alternatives A and B decreased the amount of Class E ADDs required to serve the remaining passengers. This results in an overall reduction of the commercial aircraft operations and noise levels under Phase 1 of Alternatives A and B over the No Project Conditions.

Table 22
Land Uses Within CNEL Contours

CNEL	2013	Master Plan	No Project	Proposed Project 1	Proposed Project 2	Proposed Project 3	Alt A 1	Alt A 2	Alt A 3	Alt B 1	Alt B 2	Alt B 3	Alt C 1	Alt C 2	Alt C 3
Total Contour Area (sq. mi.)															
60-65	2.05	4.13	2.22	2.22	2.33	2.42	2.16	2.21	2.37	2.18	2.46	2.71	2.96	4.61	4.61
65-70	0.88	1.22	0.94	0.94	0.98	1.02	0.92	0.94	0.99	0.93	1.03	1.12	1.34	1.71	1.70
>70	0.59	0.99	0.65	0.65	0.69	0.72	0.64	0.66	0.72	0.64	0.74	0.83	0.92	1.29	1.29
Contour Area Within Airport Boundaries (sq. mi.)															
60-65	0.10	0.01	0.09	0.09	0.08	0.08	0.09	0.09	0.08	0.09	0.07	0.06	0.05	0.00	0.00
65-70	0.20	0.07	0.19	0.19	0.19	0.17	0.20	0.19	0.18	0.20	0.18	0.16	0.15	0.11	0.12
>70	0.50	0.63	0.52	0.52	0.53	0.55	0.51	0.52	0.54	0.51	0.55	0.58	0.60	0.69	0.68
Contour Area Outside of Airport Boundaries (sq. mi.)															
60-65	1.95	4.12	2.13	2.13	2.25	2.34	2.07	2.12	2.29	2.09	2.39	2.65	2.91	4.61	4.61
65-70	0.68	1.15	0.75	0.75	0.79	0.85	0.72	0.75	0.81	0.73	0.85	0.96	1.19	1.60	1.58
>70	0.09	0.36	0.13	0.13	0.16	0.17	0.13	0.14	0.18	0.13	0.19	0.25	0.32	0.60	0.61
Number of Schools															
60-65	4	9	5	5	6	7	5	5	6	5	7	8	6	9	9
65-70	0	2	0	0	0	0	0	0	0	0	0	0	3	3	3
>70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Hospitals															
60-65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Places of Worship															
60-65	5	5	5	5	5	5	5	5	5	5	5	6	8	6	6
65-70	2	2	2	2	2	2	2	2	2	2	2	2	1	3	3
>70	1	3	1	1	1	1	1	1	1	1	1	1	2	3	3

(Table Continued on Next Page)

Table 22 (Continued)
Land Uses Within CNEL Contours

CNEL	2013	Master Plan	No Project	Proposed Project 1	Proposed Project 2	Proposed Project 3	Alt A 1	Alt A 2	Alt A 3	Alt B 1	Alt B 2	Alt B 3	Alt C 1	Alt C 2	Alt C 3
Total Population															
60-65	2,329	17,846	2,535	2,535	2,705	2,824	2,488	2,549	2,785	2,498	2,877	3,062	4,155	11,045	11,015
65-70	241	1,017	317	317	395	433	294	361	452	302	466	575	862	2,175	2,173
>70	0	15	0	0	0	0	0	0	0	0	0	3	15	230	230
Total Number of Dwelling Units															
60-65	932	7,138	1,014	1,014	1,082	1,130	995	1,020	1,114	999	1,151	1,225	1,662	4,418	4,406
65-70	96	407	128	127	158	173	118	144	181	121	186	230	345	870	869
>70	0	6	0	0	0	0	0	0	0	0	0	1	6	92	92
Number of Dwelling Units Within AIP That Received Insulation															
60-65	389	167	379	379	366	355	382	373	350	381	346	315	220	2	2
65-70	38	255	48	48	61	72	45	54	77	46	81	111	203	387	387
>70	0	5	0	0	0	0	0	0	0	0	0	1	4	38	38
Number of Dwelling Units Within AIP That Did Not Receive Insulation															
60-65	117	33	96	96	78	73	102	85	71	100	70	56	32	1	1
65-70	58	141	79	79	97	102	73	90	104	75	105	119	141	120	120
>70	0	1	0	0	0	0	0	0	0	0	0	0	2	54	54
Number of Dwelling Units Outside AIP															
60-65	426	6,938	539	539	638	701	511	562	693	518	735	854	1,410	4,415	4,403
65-70	0	11	1	0	0	0	0	0	0	0	0	0	1	363	362
>70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6.4.1 Change Over Existing Conditions

No Project Alternative

Beginning in 2016 and through the horizon year contemplated for the Proposed Project (i.e., 2030), the No Project Alternative will increase the total contour areas by between 8% and 10% over existing conditions. Outside of the Airport boundaries, the areas exposed to between 60 and 65 CNEL and between 65 and 70 CNEL will increase by up to 10%. The area exceeding 70 CNEL outside the Airport boundary will increase by 44% over existing conditions. The total number of persons and residences exposed to noise levels between 60 and 65 CNEL will increase by 9% and the number of persons exposed to noise levels between 65 and 70 CNEL will increase by 32%. Under the No Project Alternative, there will be one additional school exposed to a noise level between 60 and 65 CNEL compared to existing conditions.

Proposed Project

The Proposed Project will increase the total contour areas by between 8% and 10% with Phase 1, between 11% and 17% with Phase 2 and between 16% and 22% with Phase 3 over existing conditions. The 60 to 65 CNEL and 65 to 70 CNEL areas outside of the Airport boundaries will increase by up to 10% with Phase 1, up to 16% with Phase 2, and up to 25% with Phase 3 of the Proposed Project. During Phase 1 of the Proposed Project, the >70 CNEL contour area will increase by 44% over existing conditions. During Phase 2 this area will increase by 78% and during Phase 3 will this area will increase by 89%.

The number of persons and residences exposed to aircraft noise levels between 60 and 65 CNEL are projected to increase by 9% over existing conditions with Phase 1 of the Proposed Project, by 16% with Phase 2 and by 21% with Phase 3. The number of persons and residences exposed to aircraft noise levels between 65 and 70 CNEL are projected to increase by 32% over existing conditions with Phase 1 of the Proposed Project, 64% with Phase 2, and 80% with Phase 3. There are no residences or persons anticipated to be exposed to noise levels exceeding 70 CNEL with any Phase of the Proposed Project.

Under Phase 1 of the Proposed Project, one additional school will be exposed to aircraft noise levels between 60 and 65 CNEL compared to existing conditions. Two additional schools will be exposed to this noise level under Phase 2 and three additional schools will be exposed under Phase 3. No additional hospitals or places of worship will be exposed to noise levels exceeding 60 CNEL with all three Phases of the Proposed Project.

Alternative A

Alternative A will increase the total contour areas by between 5% and 8% with Phase 1, between 8% and 12% with Phase 2, and between 13% and 22% with Phase 3 over existing conditions. The 60 to 65 CNEL and 65 to 70 CNEL areas outside of the Airport boundaries will increase by up to 6% under Phase 1, up to 10% under Phase 2, and up to 19% under Phase 3. The >70 CNEL contour area outside the Airport boundaries will increase by 44% over existing conditions with Phase 1, 78% with Phase 2 and by 100% with Phase 3 of Alternative A.

The number of persons and residences exposed to aircraft noise levels between 60 and 65 CNEL are projected to increase by 7% over existing conditions with Phase 1 of Alternative A, by 9% with Phase 2, and by 20% with Phase 3. The number of persons and residences exposed to aircraft noise levels between 65 and 70 CNEL are projected to increase by 22% over existing conditions with Phase 1 of Alternative A, by 50% with Phase 2, and by 88% with Phase 3. There are no residences or persons projected to be exposed to aircraft noise levels exceeding 70 CNEL with any Phase of Alternative A.

Under Phases 1 and 2 of Alternative A, one additional school will be exposed to aircraft noise levels between 60 and 65 CNEL compared to existing conditions. Two additional schools will be exposed to this noise level under Phase 3. No additional hospitals or places of worship will be exposed to noise levels exceeding 60 CNEL with all three Phases of Alternative A.

Alternative B
Alternative B will increase the total contour areas by between 6% and 8% under Phase 1, by between 17% and 25% under Phase 2, and by between 27% and 41% under Phase 3 over existing conditions. The 60 to 65 CNEL and 65 to 70 CNEL areas outside of the Airport boundaries will increase by 7% under Phase 1, by up to 25% under Phase 2, and by up to 41% under Phase 3. The >70 CNEL contour area outside the Airport boundaries will increase by 44% over existing conditions with Phase 1, by 111% with Phase 2, and by 178% with Phase 3 of Alternative B.

The number of persons and residences exposed to aircraft noise levels between 60 and 65 CNEL are projected to increase by 7% over existing conditions with Phase 1 of Alternative B, by 24% with Phase 2, and by 31% with Phase 3. The number of persons and residences exposed to aircraft noise levels between 65 and 70 CNEL are projected to increase by 25% over existing conditions with Phase 1 of Alternative B, by 93% with Phase 2, and by 139% with Phase 3. There are no persons or residences projected to be exposed to noise levels exceeding 70 CNEL with Phase 1 and 2 of Alternative B. Under Phase 3, one residence is projected to be exposed to aircraft noise levels exceeding 70 CNEL.

Under Phase 1 of Alternative B, one additional school will be exposed to aircraft noise levels between 60 and 65 CNEL compared to existing conditions. Two additional schools will be exposed to this noise level under Phases 2 and three additional schools will be exposed under Phase 3. No additional hospitals will be exposed to noise levels exceeding 60 CNEL with all three Phases of Alternative B. Under Phase 3 of Alternative B, one additional place of worship will be exposed to aircraft noise levels between 60 and 65 CNEL compared to existing conditions.

Alternative C
Alternative C will increase the total contour areas by between 44% and 56% under Phase 1, by between 94% and 125% under Phase 2, and by between 93% and 125% under Phase 3 over existing conditions. The 60 to 65 CNEL and 65 to 70 CNEL areas outside of the Airport boundaries will increase between 49% and 75% under Phase 1 and by up to 136% under Phases 2 and 3. The >70 CNEL contour area outside the Airport boundaries will increase by 256% over existing conditions with Phase 1, by 567% with Phase 2, and by 578% with Phase 3 of Alternative C.

The number of persons and residences exposed to aircraft noise levels between 60 and 65 CNEL are projected to increase by 78% over existing conditions with Phase 1 of Alternative C, by 374% with Phase 2, and by 373% with Phase 3. The number of persons and residences exposed to aircraft noise levels between 65 and 70 CNEL are projected to increase by 258% over existing conditions with Phase 1 of Alternative B, by 803% with Phase 2, and by 802% with Phase 3. There are 6 additional residences and approximately 15 persons projected to be exposed to noise levels exceeding 70 CNEL with Phase 1 of Alternative C. There are 92 additional residences and approximately 230 additional persons exposed to aircraft noise exceeding 70 CNEL with Phases 2 and 3 of Alternative C.

Two additional schools will be exposed to aircraft noise levels between 60 and 65 CNEL with Phase 1 of Alterative C and five additional schools will be exposed with Phases 2 and 3. Three additional schools will be exposed to noise levels between 65 and 70 CNEL under all three Phases of Alternative C. Three additional places of worship will be exposed to noise levels between 60 and 65 CNEL under Phase 1 of Alternative C. One additional place of worship will go from being exposed to an aircraft noise level between 65 and 70 CNEL under existing conditions to exceeding 70 CNEL under Phase 1 of Alternative C. Under Phases 2 and 3 of Alternative C, one additional place of worship will be exposed to noise levels between 65 and 70 CNEL and another two additional places of worship will be exposed to noise levels exceeding 70 CNEL.

6.4.2 Alternative Comparison

The differences in land use impacts between the respective Phases of the Proposed Project and Alternative A are minor. The Alternative A noise contour areas are slightly smaller but the biggest difference is only 5%. Fewer residences and persons are exposed to noise levels between 60 and 65 CNEL, but only up to 5%. Under Phase 3 of Alternative A, slightly more residences and persons are projected to be exposed to noise levels between 65 and 70 CNEL than under Phase 3 of the Proposed Project. Again, this difference is only 4%.

Under Phase 1 of Alternative B, the contour areas, residences and number of persons exposed to noise levels between 60 and 65 CNEL is slightly smaller, less than 2%, than conditions with Phase 1 of the Proposed Project. Under Phase 2 of Alternative B, the contour areas are between 5% and 7% larger than with Phase 2 of the Proposed Project. The number of residences and persons exposed to noise levels between 60 and 65 dB is only 7% greater with Phase 2 of Alternative B over Phase 2 of the Proposed Project. However, the number of residences and persons exposed to noise levels between 65 and 70 CNEL is 18% greater with Alternative B.

The contour areas, residences and number of persons exposed with Alternative C is considerably greater than with the corresponding Proposed Project Phase. The noise contours for Alternative C Phase 1 are between 33% and 43% larger than with the Proposed Project Phase 1. The number of residences and persons exposed to noise levels between 60 and 65 CNEL is 64% larger than with Phase 1 of the Proposed Project. The number of residences and persons exposed to noise levels exceeding 65 CNEL is almost twice (1.72x) the number with the Proposed Project. The noise contours with Phase 2 of Alternative C are between 75% and 98% larger than with Phase 2 of the Proposed Project. The number of residences and persons exposed to noise levels between 60 and 65 CNEL is approximately three times greater and the number exceeding 65 CNEL is 4.5 times greater. The contour areas under Phase 3 of Alternative C are between 67% and 91% larger than the contours with Phase 3 of the Proposed Project. Almost three times the number of residences and persons are exposed to noise levels between 60 and 65 CNEL and four times the number of residences and persons are projected to be exposed to noise levels exceeding 65 CNEL with Phase 3 of Alternative C compared to Phase 3 of the Proposed Project.

6.5 Change in Single Event Noise Levels

Single event noise levels represent the noise generated by a single aircraft overflight. Specifically, it is a measure the total noise energy from an overflight at a specific location. For aircraft noise, SENEL levels are typically about 10 dB higher than the maximum (Lmax) noise levels. The Lmax represents the maximum instantaneous noise energy at a specific location.

Single event noise levels can be used for specific estimates of potential speech interference or sleep disturbance. Speech interference is one the primary complaints from residents in the most impacted area, Santa Ana Heights. Further, speech interference is the primary cause of noise impacts to schools as aircraft flights can interrupt teacher-student communication and disrupting the learning environment. This is discussed further at the end of Section 2.4.4 under the heading School Room Effects.

Figure 15 and 16 in Section 4.1.5 present the departure and arrival 85 dB SENEL contours for the commercial aircraft operating at JWA. This equates to a maximum outdoor noise level of approximately 75 dBA and a maximum indoor noise level of approximately 55 dBA with windows closed. Figure 5 shows that there is little speech interference at this level of noise. Indoor speech interference begins at 65 dBA, 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.

The Time Above analysis presented in Section 6.6 shows the number of minutes that these noise levels are expected to be exceeded each day for the proposed project and the alternatives at each of the NMS. The time above 85 dBA reflects the cumulative number of minutes each day that considerable speech interference would be expected inside a room with closed windows. The time above 75 dBA reflects the cumulative number of minutes each day that considerable speech interference would be expected inside a room with open windows. The time above 65 dBA reflects the cumulative number of minutes each day that considerable speech interference would occur outside.

It should be noted that CNEL levels are dependent on the single event noise levels and the number operations during the daytime, evening, and nighttime periods. Further, the CNEL noise level criterion, 65 CNEL outdoors and 45 CNEL indoors for most noise sensitive uses, was selected based on speech interference. The 10 dB nighttime noise penalty used by the CNEL metric accounts for sleep disturbance as well.

The aircraft expected to use JWA in the future are the same that currently use it or have similar noise characteristics. Accordingly, the future SENEL contours are the same as the existing conditions, which appeared in Figure 15 and 16 in Section 4.1.5. Historical SENEL levels measured at sensitive receptor locations, that is the NMS, are provided in Appendix A. Histograms showing the distribution of SENEL levels at the NMS are presented in Figure 14.

Note that this noise analysis does not take into account the fact that future versions (currently being manufactured) of the Boeing 737 (737-MAX) and Airbus A320 (A320-NEO) families include significant noise reduction features. Because these aircraft have not yet undergone noise certification required under Part 36 of the Federal Aviation Regulations, it would be speculative to estimate the amount of noise reduction that will be achieved. Therefore, the worst-case assumption of no improvement in fleet noise characteristics has been made for this study.

Phases 2 and 3 of Alternative C would result in in the introduction of nighttime operations that would likely result in significant impacts due to sleep disturbance. As discussed previously, however, removal of the current curfew under Phases 2 and 3 of Alternative C would require further discretionary action by the County's Board of Supervisors and additional environmental documentation.

Figure 7 presents the currently accepted 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 Figure 7 would be used to estimate awakenings in this case. Single event departure noise contours for six most common commercial aircraft operating at JWA were presented previously in Figure 15. This figure shows the 85 dBA SENEL contours from the aircraft. This is equivalent to an indoor sound exposure of 65 dB SENEL with closed windows and 73 dBA SENEL with open windows. Figure 7 shows that approximately 5% of the people located on the 85 dBA SENEL contour would be expected to be awakened in homes with closed windows and approximately 7.5% would be awakened in homes with open windows. Residents located within the 85 dBA SENEL contour and subject to higher single event noise levels would experience even higher awakening rates. If Alternative C were to be adopted, the environmental documentation required for the separate discretionary action by the Board to repeal the curfew would be required to provide a more detailed analysis of the environmental impacts from the action.

6.6 Time Above Threshold (TA) Values

This metric is described in Section 2.4.3. TA values were generated for JWA existing conditions, as well as each Phase of the Proposed Project and Project 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.

Table 23 presents the number of minutes each day that aircraft noise levels are projected to exceed 65 dBA for the existing conditions along with all Phases of the Proposed Project and Project Alternatives. Table 24 presents the increase in the time above 65 dBA with all Phases of the Proposed Project and Project Alternatives over existing conditions. Table 25 presents the time above 77 dBA and Table 26 presents the increase in time over 77 dBA over existing conditions. Table 27 presents the time above 85 dBA and Table 28 presents the increase in time over 85 dBA over existing conditions.

6.6.1 Time Above 65 dBA

Table 23 shows that under existing conditions, aircraft noise levels exceed 65 dBA for more than an hour each day at NMS 1S, 2S, and 3S, between 30 minutes and an hour each day at NMS 4S, 5S, 6S, 7S, and 8N and for less than 20 minutes a day at NMS 9N and 10N.

Noise Monitoring Stations 1S, 2S & 3S

Under the No Project Alterative, the time exceeding 65 DBA at NMS 1S, 2S and 3S would increase by less than 7% (6.2 minutes at most) over existing conditions. Phase 3 of the Proposed Project would increase the time exceeding 65 dBA at these NMS by less than 20% (16.2 minutes at most) over existing conditions. Phase 3 of Alternative A would increase the time exceeding 65 dBA by less than 20% (16.3 minutes at most) at these NMS. Phase 3 of Alternative B would increase the time exceeding 65 dBA between 25% and 37% (32.6 minutes at most). Phase 3 of Alternative C would increase the time between 46% and 61% (53.5 minutes at most) at these three NMS.

Noise Monitoring Stations 4S, 5S, 6S, 7S & 8N

Under the No Project Alterative, the time exceeding 65 DBA at NMS 4S, 5S, 6S, 7S and 8N would increase by less than 8% (4.2 minutes at most) over existing conditions. Phase 3 of the Proposed Project would increase the time exceeding 65 dBA at these NMS by less than 25% (9.8 minutes at most) over existing conditions. Phase 3 of Alternative A would increase the time exceeding 65 dBA by less than 31% (12.8 minutes at most) at these NMS. Phase 3 of Alternative B would increase the time exceeding 65 dBA between 28% and 44% (19.9 minutes at most). Phase 3 of Alternative C would increase the time between 53% and 86% (35.7 minutes at most) at these three NMS.

Noise Monitoring Stations 9N & 10N

Under the No Project Alterative, the time exceeding 65 DBA at NMS 9N and 10N would increase by up to 20% (3.1 minutes at most) over existing conditions. Phase 3 of the Proposed Project would increase the time exceeding 65 dBA at these NMS by up to 38% (6.1 minutes at most) over existing conditions. Phase 3 of Alternative A would increase the time exceeding 65 dBA by up to 34% (52.8 minutes at most) at these NMS. Phase 3 of Alternative B would increase the time exceeding 65 dBA by up to 65% (10.3 minutes at most). Phase 3 of Alternative C would increase the time by up to 87% (14.9 minutes at most) at these three NMS.

Table 23
Summary of Time Above 65 dBA (min.) at NMS

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	91.2	97.1	97.1	102.8	106.8	96.2	98.8	107.2	96.5	110.5	123.5	141.5	145.5	144.7
2S	87.3	93.5	93.5	99.2	103.5	92.4	95.2	103.6	92.7	106.9	119.9	137.2	141.2	140.6
3S	78.5	80.4	80.4	84.0	86.2	80.3	81.9	87.5	80.3	89.7	98.2	113.9	115.9	114.8
4S	42.4	45.7	45.7	49.2	52.1	44.5	46.3	51.2	44.9	53.0	60.7	67.6	69.6	69.8
5S	44.6	46.2	46.2	49.6	51.6	47.5	50.0	54.8	47.0	53.7	59.5	73.2	75.6	75.8
6S	41.7	42.5	42.5	45.6	46.6	46.6	49.9	54.5	45.3	49.9	53.4	74.6	77.3	77.4
7S	37.7	40.4	40.4	43.4	45.2	41.5	43.7	48.1	41.2	47.3	52.6	65.7	67.8	67.8
8N	58.3	62.5	62.5	65.6	68.1	61.4	62.6	67.4	61.7	70.2	78.2	87.0	90.1	89.3
9N	7.6	9.1	9.1	9.9	10.5	8.6	8.9	9.9	8.8	10.7	12.5	13.2	14.0	14.0
10N	17.1	20.2	20.2	21.9	23.2	19.8	20.6	22.9	19.9	23.8	27.4	30.5	31.9	32.0

Table 24
Increase in Time above 65 dBA (min.) Over Existing Conditions

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

Table 25
Summary of Time Above 77 dBA (min.) at NMS

NMS	Existing	No Project	Proposed Project P1	Proposed Project P2	Proposed Project P3	Alternative A P1	Alternative A P2	Alternative A P3	Alternative B P1	Alternative B P2	Alternative B P3	Alternative C P1	Alternative C P2	Alternative C P3
1S	22.5	24.2	24.2	26.2	27.7	24.2	25.4	28.3	24.2	28.7	32.7	39.9	41.4	41.5
2S	19.9	21.7	21.7	23.6	25.0	21.5	22.6	25.2	21.6	25.8	29.6	35.5	36.9	36.9
3S	17.5	18.2	18.2	19.6	20.5	18.6	19.7	21.6	18.5	21.3	23.7	29.0	29.9	30.0
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	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	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9
7S	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
8N	19.4	22.2	22.2	23.9	25.3	21.6	22.5	24.9	21.8	25.8	29.6	32.4	34.0	34.0
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

Table 26
Increase in Time above 77 dBA (min.) Over Existing Conditions

NMS	No Project	Project P1	Project P2	Project P3	Alternative A P1	Alternative A P2	Alternative A P3	Alternative B P1	Alternative B P2	Alternative B P3	Alternative C P1	Alternative C P2	Alternative C 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

Table 27
Summary of Time Above 85 dBA (min.) at NMS

		No	Proposed Project			Alternative A			Alternative B			Alternative C		
NMS	Existing	Project	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

Table 28
Increase in Time above 85 dBA (min.) Over Existing Conditions

	No	Project			Alternative A			Alternative B			Alternative C		
NMS	Project	P1	P2	P3	P1	P2	P3	P1	P2	P3	P1	P2	P3
1S	0.2	0.2	0.4	0.5	0.2	0.4	0.7	0.2	0.7	1.1	2.2	2.2	2.2
2S	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.1	0.1	0.2	1.0	1.0	1.0
3S	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.5	0.5	0.5
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	0.0	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
8N	1.0	1.0	1.6	2.1	0.7	1.0	1.9	0.8	2.3	3.7	4.8	5.5	5.5
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
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

6.6.2 Time Above 77 dBA

Table 25 shows that aircraft noise is not projected to exceed 77 dBA at NMS 4S, 5S, 9S and 10S under existing conditions. This noise level is exceeded between 1.5 and 22.5 minutes per day at NMS 1S, 2S, 3S, and 8N and between 6 seconds and 42 seconds each day at NMS 6S and 7S.

Noise Monitoring Stations 4S, 5S, 9N & 10N

Table 25 shows that aircraft noise is not projected to exceed 77 dBA at NMS 4S, 5S, 9N and 10N under any of the future scenarios. This is the same as the existing conditions.

Noise Monitoring Stations 6S & 7S

Table 26 shows that none of the future scenarios are projected to increase the time above 77 dBA at NMS 6 and 7 except for a 6 second per day increase at NMS 6S under Phase 3 of Alternative B and all three Phases of Alternative C.

Noise Monitoring Stations 1S, 2S, 3S & 8N

Under No Project conditions, the time above 77 dBA would not increase at NMS 3S and would increase up to 14% at NMS 1S, 2S and 8N (up to 2.8 minutes per day). Under Phase 3 of the Proposed Project, the time exceeding 77 dBA would increase by between 17% and 30% (up to 5.9 minutes per day) at these NMS. Phase 3 of Alternative A would increase the time above 77 dBA by between 23% and 28% (up to 5.8 minutes per day). Phase 3 of Alternative B would increase the time above 77 dBA by between 22% and 33% (up to 6.4 minutes per day). Phase 3 of Alternative C would increase the time above 77 dBA by between 71% and 85% (up to 18.9 minutes per day) at these NMS.

6.6.3 Time Above 85 dBA

Table 27 shows that aircraft noise is not projected to exceed 85 dBA at NMS 4S, 5S, 6S, 7S, 9N and 10N under existing conditions. Under existing conditions, 85 dBA is exceeded between 0.6 and 2.1 minutes per day at NMS 1S, 2S and 3S and for 6 minutes each day at NMS 8N.

Noise Monitoring Stations 4S, 5S, 6S, 7S, 9N & 10N

Table 27 shows that, aircraft noise is not projected to exceed 85 dBA at NMS 4S, 5S, 6S, 7S, 9N and 10N under any of the future scenarios. This is the same as existing conditions

Noise Monitoring Stations 1S, 2S, 3S

Under the No Project Alternative, the time above 85 dBA at NMS 1S, 2S and 3S would not increase over existing conditions. The Proposed Project would not increase the time 85 dBA is exceeded at NMS 2S and 3 S as well. NMS 1S would experience an increase of 12 seconds per day under Phase 3 of the Proposed Project. Alternative A would increase the time exceeding 85 dBA by between 6 and 42 seconds each day at these three NMS. Alternative B would increase the time exceeding 85 dBA by between 6 seconds and 1.1 minutes. Alternative C would increase the time by between 0.5 and 2.2 minutes per day at these three NMS.

Noise Monitoring Station 8N

Under the No Project Alternative, the time above 85 dBA would increase by 17% (1 minute per day). Under Phase 3 of the Proposed Project, the station would experience an increase in the time above 85 dBA of 35% (2.1 minutes per day). Under Phase 3 of Alternative A, the time above 85 dBA would increase by 32% (1.9 minutes per day). Under Phase 3 of Alternative B, the time would increase by 62% (3.7 minutes per day) and under Phase 3 of Alternative C the time would increase by 92% (5.5 minutes per day). Note that NMS 8N is not located in a noise sensitive area.

6.7 Short Term Construction Noise Impacts

The project will not result any new construction activities. Therefore, there will be no short-term construction noise impacts.

6.8 Traffic Noise Impacts

Increases in CNEL traffic noise levels along roadways in the vicinity of the Airport were calculated using the methodology described in Section 3.2 and traffic volumes provided by the traffic engineer for the Project, Fehr & Peers. A table showing the results of these calculations is presented in Appendix C. The leftmost column lists the roadways and segments analyzed. The adjacent column indicates whether or not existing noise sensitive uses are located along each road segment. The next twenty columns present the projected increases in traffic noise levels for four analysis years (existing, 2016, 2021, and 2026) for the Proposed Project and its Alternatives.

The first five columns of noise level increases present the change in noise levels over existing conditions. These are the theoretical increases in noise if the No Project Alternative (i.e., with the airport operating at the maximum level allowed by the current settlement agreement) or the horizon conditions of the four Project Alternatives (i.e., Phase 3) were implemented with no other changes to the existing background conditions. The next five columns show the cumulative traffic noise level increase over existing conditions in the Year 2016 with the No Project Alternative as well as Phase 1 of the four Project Alternatives. The next five columns show the same increase in the Year 2021 with the No Project Alternative as well as the Phase 2 of the four Project Alternatives. The final five columns show the same increase in the Year 2026 with the No Project as well as the Phase 3 of the four Project Alternatives.

6.8.1 County of Orange Significance Thresholds

The table in Appendix 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. Therefore, neither the Project nor any of the Project Alternatives would result in a significant direct or cumulative traffic noise impact.

6.8.2 City of Newport Beach Significance Thresholds

All traffic noise level increases of 1.0 dB or greater, which is the most restrictive threshold applied by the City of Newport Beach if the resulting CNEL is 75 or less, are highlighted and shown in bold in the Appendix C table. As shown, there is only one road segment, Bristol Street west of Santa Ana Avenue, that has a 1.0 dB or greater increase in traffic noise levels and has adjacent noise sensitive uses; all other road segments with projected traffic noise level increases of 1.0 or greater do not have existing adjacent noise sensitive land uses that could be impacted by traffic noise. The Bristol Street road segment is located in the City of Costa Mesa and, therefore, is not subject to the City of Newport Beach Significance Thresholds and, as such, there would be no significant impact. The City of Costa Mesa has not established a specific traffic noise level increase significance threshold. A review of recent environmental documents from the City's website showed that an increase of 3 dB or greater is typically applied determine the significance of traffic noise increases. The 1.0 dB increase is less than the City of Costa Mesa's 3 dB threshold as well as the County's more stringent 1.5 dB threshold.

In the case of noise exposure greater than 75 dBA CNEL, the impact is considered significant if there is any increase in noise level (i.e., 0.1 dB or greater). However, 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. The smallest road segments for which traffic volumes were estimated have a right-of-way width of 60 feet. Based on the FHWA traffic noise model a road with a 45 mph posted speed limit would need to have an average daily traffic volume greater than 33,000 vehicles per day to generate a noise level greater than 75 CNEL outside of the right-of-way. The only road segments located in the City of Newport Beach with traffic volumes greater than this are McArthur Boulevard and Jamboree Boulevard. These are also the only two road segments with posted speed limits greater than 45 mph. The right-of-way of these road segments is approximately 160 feet. With a posted speed of 55 mph, the ADT would need to be greater than 80,000 vehicles per day to generate a noise level exceeding 75 CNEL at the edge of the right-of-way. The maximum ADT on these two roadways in the City of Newport Beach is projected to be less than 50,000. Therefore, traffic noise levels will not exceed 75 CNEL at any sensitive uses and there are no significant impacts based on this criterion.

In summary, there are no road segments located within the City of Newport Beach that are projected to experience increases in traffic noise levels greater than 1.0 dB or noise levels greater than 75 dBA CNEL in a private yard area. Therefore, neither the Proposed Project nor its Alternatives would result in a significant direct or cumulative traffic noise impact based on the City of Newport Beach's thresholds.

6.8.3 Fuel Tanker Noise Impacts

As discussed in Section 3.2, the Project or Alternatives would not be expected to considerably change the traffic mix (i.e. percentage of trucks) on arterial roadways in the vicinity of the Project. This assumption was incorporated into the analysis presented above. There is one area where this assumption is not apparently valid, the travel path of jet fuel tanker trucks to and from the airport. All of the jet fuel dispensed at the airport is delivered by truck. In 2013, there were an average 28 truck trips of jet fuel being delivered to the airport each day. All of these deliveries take place during nighttime hours between 11:30 p.m. and 5:30 a.m. There are four simultaneous unloading positions and, given the time it takes to unload a tanker, a maximum of 32 trucks can be accommodated during these nighttime hours.

Implementation of the Proposed Project or the Alternatives will also result in the increase of jet fuel that is delivered to the airport by truck. With the Proposed Project or Alternatives there will be between 9 and 20 additional truck trips to deliver jet fuel to the airport. Because all of the existing deliveries occur during the nighttime hours, only four additional deliveries can be accommodated during the nighttime hours. To estimate the maximum environmental impact it was assumed that the remaining added truck trips would occur during the evening hours.

These fuel trucks enter the Airport on the west side at Paularino Avenue normally arriving from the north via I-405. Recently, I-405 has been closed at I-605 many nights due to the construction of new interchange ramps. Because of this, the fuel trucks have been using SR-91, SR-22, and SR-55 and exiting on to Paularino Avenue and traveling directly to the Airport. The reverse path is used for the return trip Twenty additional trucks on any freeway would not considerably affect traffic noise levels from the freeway. Further, there are no noise sensitive uses along Paularino Avenue between SR-55 and the airport.

Once the I-405/I-605 interchange construction no longer causes nighttime closures of I-405, the fuel trucks will resume using I-405 to travel to and from the Airport. The trucks use the Bristol Street exit and travel south on Bristol Street and east on Paularino Avenue, following the reverse path on the return trip. There are no noise sensitive uses along Bristol Street between I-405 and Paularino Avenue. There are residential uses on both sides of Paularino Avenue between Bristol Street and the SR-55 Freeway that would be exposed to increased traffic noise levels from these additional fuel truck trips. There are no sensitive uses located along Paularino Avenue between SR-55 and the airport gate.

The traffic study prepared for the project shows that the existing daily traffic volume on Paularino Avenue between Bristol Street and Red Hill Avenue is 15,400 ADT. Twenty additional truck trips on this section of road results in a 0.5 dB increase which does not represent a significant impact. Further, all of the homes along this road segment have barriers located between the roadway and outdoor private use areas that reduce noise levels in these areas to below 65 CNEL. Therefore, the additional fuel delivery trucks will not result in a significant traffic noise impact.

6.9 Cumulative Noise Impacts

For purposes of CEQA, "cumulative impacts" refer to individual effects which, when considered together, are considerable, or which compound or increase other environmental impacts. Because of the way noise levels are combined, in order for two noise sources to result in a cumulative impact, the noise levels generated by the sources need to generate similar noise levels that are just below or exceeding an applicable noise standard, 65 CNEL for residences. Two noise sources generating equal noise levels will result in a cumulative noise level 3 dB greater than the level from only one of the sources. Therefore, the noise levels from two individual sources would need to be within 3 dB of the standard for a cumulative impact to be possible. If the noise levels from two sources differ by 10 dB or more, the cumulative noise level is the same as the loudest noise sources. The noise levels must be within 4 dB of each other for the cumulative noise level to be 1.5 dB greater than the loudest noise level. These facts considerably limit the situations where cumulative noise impacts could occur.

Here, the two primary environmental noise sources are aircraft, from both JWA as well as other air traffic passing over the area, and roadway traffic. State and Federal Laws prohibit local municipalities from directly controlling these noise sources. The only practical ways for local municipalities to control noise from these sources is through planning; separating noise sensitive uses from major roadways and airports, and through noise standards for new developments located near these noise sources.

Local municipalities can regulate noise sources on private property, such as generators, HVAC units, or other noise generating equipment. The County of Orange and all of the cities within the project area have adopted Noise Ordinances that provide noise limits that cannot be exceeded at neighboring properties. These standards limit noise levels on an hourly or shorter basis (Newport Beach's standards are based on 15 minute Leq noise levels). Further, allowable noise levels in residential areas during the nighttime are reduced by 10 dB. Facilities operating in compliance with these standards would need to generate the maximum allowable noise levels for 24 hours a day at an adjacent residential area to generate a noise level approaching the 65 CNEL residential noise standard. In general, the types of facilities that could cause such impacts are located in industrial areas, away from residential areas, and we are not aware of any existing or proposed facilities located near residential areas that operate under such conditions. Therefore, there is no indication that aircraft and stationary noise sources would result in a significant cumulative impact.

Aircraft and traffic noise could result in cumulative impacts along major roadways with adjacent residential uses exposed to noise levels approaching or exceeding the 65 CNEL standard. This would only be expected to occur in the first row of homes along a major roadway. South of the Airport, most of the roadways with adjacent residential uses are not major arterials that would be expected to result in noise levels approaching or exceeding the 65 CNEL standard.

6.9.1 Cumulative Noise Impacts Based on County of Orange Significance Thresholds

Irvine Avenue has adjacent homes and generates moderate traffic noise levels. However, all of the residences along Irvine Avenue face the roadway and do not have any private outdoor living areas directly exposed to traffic noise. The 65 CNEL standard is not applicable in front yards but limited to private outdoor living areas. In this case, the house structure is a very effective noise barrier considerably reducing traffic noise levels in the rear yards. Therefore, it is unlikely that cumulative noise levels would exceed 65 CNEL outside of the 65 CNEL aircraft noise contour.

The roadways with considerable traffic noise and adjacent noise sensitive uses are Jamboree Road and Pacific Coast Highway. The noise contours for Phases 2 and 3 of Alternative C show that aircraft noise levels will approach 59 CNEL along these roadways. Homes to exposed to traffic noise levels of 64 CNEL or higher would have a cumulative noise exposure of 65 CNEL or greater. However, the noise level increase would be less than 1.2 dB and, therefore, would not result in a significant cumulative impact. The aircraft noise levels from all of the other scenarios considered are much lower in these areas and would not result in a significant cumulative impact.

As discussed above, Phases 2 and 3 of Alternative C will significantly impact homes around the edge of Newport Back Bay near Monitoring NMS 4S, 5S, 6S, and 7S with an aircraft noise exposure of less than 65 CNEL. As discussed below, there are no mitigation measures available to reduce this impact to a level of insignificance. While these homes are not directly exposed to other considerable individual sources, they are subject to the general background din from traffic and other noise sources in the area. Because of this, these homes will be subject to a significant cumulative noise impact.

Phase 3 of Alternative B and all Phases of Alternative C will significantly impact homes in the greater Santa Ana Heights area near NMS 1S, 2S and 3S. However, these homes will be exposed to aircraft noise levels greater than 65 CNEL and therefore would be eligible for Sound Insulation funded by the airport or FAA (Federal regulations prohibit the FAA or airport from funding Sound Insulation Programs outside of the 65 CNEL contour). While noise levels from other noise sources impacting these homes are moderate or low, these homes would be subject to a significant cumulative noise impact without mitigation. With implementation of a Sound Insulation program, this cumulative impact would be reduced to a level of insignificance.

6.9.2 Cumulative Noise Impacts Based on City of Newport Beach Significance Thresholds

As discussed in Section 2.6.2, the City of Newport Beach has adopted more stringent significance thresholds than recommended by the FAA and used for this analysis. This results in more areas being identified as being significantly impacted. The Proposed Project Phase 3, Alternative A Phase 3, Alternative B Phases 2 and 3 and all three Phases of Alternative B are projected to impact homes around NMS 1S, 2S, and/or 3S. These homes will be exposed to aircraft noise levels exceeding 65 CNEL under these scenarios. Therefore, using the reasoning discussed above, these alternatives would result in significant cumulative noise impacts to the homes around the NMS listed in Section 6.2.2. However, as discussed above, these homes would be eligible for a Sound Insulation Program that would mitigate the cumulative impact to less than significant.

All three Phases of Alternative C would result in Significant Impacts at the homes around NMS 4S, 5S, 6S and/or 7S. Therefore, using the reasoning discussed above, these alternatives would result in significant cumulative noise impacts to the homes around the NMS listed in Section 6.2.2. As these homes would not be eligible for a Sound Insulation Program, this cumulative impact would be significant and unavoidable.

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7.0 NOISE MITIGATION MEASURES

This section describes measures that have the potential to mitigate noise impacts. Noise mitigation can address any or all of the following three components of a noise impact problem:

- The noise source
- The sound propagation path
- The receiver

Mitigation at the noise source includes controlling noise through restrictions on sources, engineering noise controls, relocating the noise source, or limits on the operations of the source. Mitigation of the sound propagation path includes the construction of noise barriers or improvements in building construction. Mitigation at the receiver includes relocating the receiver or restrictions on the location of receivers (land use controls).

This section analyzes a full range of potential aviation noise mitigation for John Wayne Airport and discusses their potential applicability. Section 7.1 provides an overview of airport noise mitigation. Section 7.2 presents the noise mitigation measures that are available to the airport proprietor. As discussed in the section, an FAA approved Part 161 study is required to implement many of these measures. Part 161 sets a very high bar for implementation of airport specific mitigation measures. Therefore, while the measures described in Section 7.2 represent the FAA prescribed mitigation measures available to airport proprietors, it is unlikely that these measures would satisfy the requirements of Part 161 needed for implementation. Section 7.3 presents the mitigation measures that available to state and local governments. Section 7.4 presents the measures that require the Federal Government to implement. Section 7.5 presents the noise mitigation measures currently in use at JWA. Specific measures recommended to mitigate the significant impacts are discussed in Section 7.6.

7.1 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. A coordinated approach to noise abatement and the sometimes difficult task of resolving noise impacts was outlined in the Department of Transportation/Federal Aviation Administration (DOT/FAA) Noise Abatement Policy of November 18, 1976. The need for noise compatibility programs has been recognized since that time through passage of the Aviation Safety and Noise Abatement (ASNA) Act in 1979, the statutory authority for Federal Aviation Regulation (FAR) Part 150. The Airport Noise and Capacity Act of 1990 established a definitive schedule for the replacement of older noisier aircraft while limiting the ability of airport proprietors to establish new airport access restrictions. Responsibility for the coordinated effort to abate noise impacts rests with the airport users, aircraft manufacturers, airport proprietors, federal, state and local governments, and residents within the environs of the airport.

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 which grants authority to the local units of government to implement land use controls which 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 do 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 airport 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.

This section contains a description of potential noise abatement measures or actions for the reduction of noise levels associated with civilian aircraft operations at John Wayne Airport. A general evaluation of each is made on the basis of the three factors listed above, and will be presented in three different categories:

a) Those measures generally considered available to the airport proprietor;

b) Those measures available to the state or local unit of government; and

c) Those measures dependent upon Federal government concurrence for implementation.

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).

7.2 Aircraft Noise Mitigation Options Available to the Airport Proprietor

The subsections below describe measures that are 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. The 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. 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.

7.2.1 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 to certain FAR Part 36, Stage Three, noise level requirements. Older, noncomplying (Stage Two) turbojets would be denied or given only restricted access to the airport.

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, and no Stage 2 operations are forecast for JWA under the proposed project case scenarios, no project or project alternatives.

7.2.2 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 which affects 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 a Part 161 application for 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 base line 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 the aircraft types, either based upon their "noisiness," or 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 36-1C and 36-3G, and it is possible to devise limitations based upon those certificated data. This measure can be formulated 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 that 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 (aka "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 John Wayne Airport. This long-term averaging is not practical for general aviation aircraft and 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, three violations of the noise level limits within three years is grounds for denial of use.

7.2.3 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 producing 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 Advisory Circular 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.

7.2.4 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 pm to 7am (8 am on Sundays). Air carrier arrivals are prohibited from 11 pm to 7am (8 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 and the nighttime restrictions remain in place after the expiration of the 1985 Settlement Agreement.

7.2.5 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.

7.2.6 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.

7.2.7 Acquisition of Land or Interest Therein

The most complete method to totally control and mitigate noise intrusion is to purchase the impacted property, but it is also the most costly and it may remove the property from the tax rolls of the community. It can also disrupt existing communities. However, certain land areas are more critical than others and can be purchased to mitigate severe noise intrusion and purchase of the full or partial interest may be the only means of achieving compatibility. One method of keeping the area on the tax rolls is to purchase the property and then resell it for a compatible use or to resell it for residential use but retain a portion of the "bundle of rights" that are part of property ownership. In other words, the airport can resell the property to the original homeowner or anyone else, but retain a covenant or easement which identifies the airports right to fly over the property and to create noise. This results in the property owner giving up his/her right to initiate litigation against the airport for noise intrusion. In addition, this method allows the market to set the price and value of the noise easement which is retained by the airport. The airport could also develop or resell the property to another government agency to develop it as a compatible use (golf course, nature area, cemetery, etc.), or the agency could purchase the property outright for their own use. This would have to be coordinated with the local community and airport management to ensure redevelopment with a compatible use. This measure is meaningful only where airport noise exceeds community noise criteria.

An alternative to purchasing land is to purchase an easement, which is the right to do something (positive easement) or the right to preclude the owner of the rest of the property from doing something (negative easement). An easement is sometimes preferred because it keeps property on the tax rolls, but many times it costs as much as the entire fee. There are two main types of easements associated with airports, the clear zone easement and a noise easement which was discussed in an earlier paragraph. Easements can be purchased, condemned or dedicated through the subdivision process. No matter what interest of land is purchased, if federal assistance is used, the provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970 (URARPAPA, PL 91-646) must be followed.

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

7.2.8 Sound Insulation Programs

As part of the easement acquisition process described above, airport proprietors may institute a program to install sound insulation in homes 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 Passenger Facility Charge (PFC) upon approval of the FAA. Additional funding sources include AIP 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 [31]. 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. A copy of this memorandum is presented in Appendix D.

The memorandum also includes a replacement for the noise insulation projects paragraph of FAA Order 5100-38C, the Airport Improvement Program Handbook [32]. This document specifies that the average interior noise level in all habitable rooms must exceed 45 CNEL in order to be eligible for sound insulation. This would allow the noise level in some habitable rooms to exceed 45 CNEL as long as the level in another room was lower than 45 CNEL by more than the exceedance. 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.

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.

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.

The FAA Guidance also limits eligibility to homes that were constructed before October 1, 1998. This restriction assumes that homes built after this date had sufficient information regarding aircraft noise to achieve compatible interior noise levels. In the County of Orange, this information became available in 1985 with the airport's Master Plan and the County's adoption of their land use noise compatibility standards presented in Section 2.6.1 and the standard mitigation measures presented in Section 7.6.4. The sound insulation measure has been extensively implemented at JWA as a mitigation measure to the 1985 Master Plan. This program is discussed in Section 7.5.6. It should also 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.

7.2.9 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).

7.2.10 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 many times heavier, larger aircraft which were unable to operate in a safe manner previously can be accommodated at the airport. This may not necessarily be undesirable, however, 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.

7.2.11 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.

7.2.12 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.

7.2.13 Noise Monitoring Program

Noise monitoring programs can enhance the effectiveness of noise compatibility programs. Of course, noise monitoring systems do nothing to directly reduce noise levels. Noise monitoring systems are tools to be used as part of a noise management program. Historically, continuous noise monitoring systems are part of aircraft noise abatement programs at airports experiencing severe encroachment that have been pressured to demonstrate how they were reducing noise impact. The noise monitoring of aircraft operations is a means of showing concern and progress toward reducing a problem. Most of the systems have several remote microphone units that sample the weighted sound level, code the samples, and transmit the data to a minicomputer system with printouts. Any FAA approved noise monitoring system would have the following minimum capabilities to provide: continuous measurement of dBA at each station, hourly Leq data, daily CNEL data, and single event maximum A-weighted sound level data. In addition, state of the art noise monitoring systems have the ability to track and plot aircraft position through direct or indirect connection to the FAA radar system.

JWA's noise monitoring system is one of the most sophisticated systems in the world. This is discussed further in Section 7.5.7.

7.2.14 Noise Complaint/Citizen Liaison Program

A comprehensive noise complaint handling system has many advantages, including: identification and control of aberrant pilots, public accessibility, data collection to identify sensitive areas and positive public relations. The airport management should identify specific staff to handle noise complaints from citizens. The compliance officer should keep a database of each complaint noting the time, place, type of complaint, type of aircraft and N-number or other identifying characteristic of the aircraft. This will help identify problem areas and can be used to notify pilots of the noise complaint program, what they did to violate and why noise abatement is of particular concern at that airport. This will give the citizens of the community one central location to lodge noise complaints and to gain information concerning aircraft operations or changes in flight procedures.

JWA has an access and noise office that includes staff to receive and respond to noise complaints. This is discussed further in Section 7.5.7.

7.3 Options Available to State/Local Government

7.3.1 Land Use Controls

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 airports 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 and cannot be overemphasized to ensure coordination of development plans for all parties involved. This is particularly important 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 unit of the 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 as well, 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. Comprehensive future land use planning, when it is coordinated with the zoning ordinance, subdivision regulations and the capital improvements program, 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 later in this report. The

Airport Land Use Commission has adopted a comprehensive Airport Environs Land Use Plan (AELUP) and has a State-mandated review authority over planning in the vicinity of Orange County airports.

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.

7.4 Options Dependent Upon the Federal Government

7.4.1 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. In addition, this measure cannot be implemented without the direct concurrence of the FAA and compliance with Advisory Circular 91-53A.

The departure procedures at John Wayne Airport already include a deep power cutback as discussed in Section 7.5.4. This provides a noise benefit to homes near the airport, in Santa Ana Heights. No changes in the JWA departure procedures are proposed as part of this project.

7.4.2 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 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.

The FAA has published Advisory Circular 91-53-A regarding noise abatement departure procedures (NADP). AC 91-53-A sets minimum requirements for departure procedures and limits the number of NADP's that an airline may use. Again, these procedures cannot be implemented without the concurrence of the Federal Aviation Administration, 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.

7.4.3 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 Federal Aviation Regulations 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).

7.4.4 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.

7.4.5 GPS Landing System

A landing system based on Global Positioning 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 will be included in this study.

7.5 Current Noise Abatement Measures

John Wayne Airport has enacted a number of noise abatement measures to reduce its noise impact. In fact, the noise abatement measures at Orange County are some of the most restrictive in the country and would not be allowed under current FAA regulations as a result of the 1990 Airport Noise and Capacity Act. The majority of these measures are a result of the 1985 Settlement agreement between the County, the City of Newport Beach and two community groups. This resulted in the establishment of the Commercial Airline Access Plan and Regulation which restricts the number of the loudest commercial aircraft operations and annual passenger limits, nighttime flight curfews, and the infamous noise abatement departure procedure.

Further the County developed the Santa Ana Heights Specific Plan to restrict further development of sensitive land uses in the most noise impacted residential area around the airport and implemented a sound insulation program for the existing homes. The Airport has also established the Access and Noise Department which operates and maintains a state of the art noise monitoring system and receives and responds to aircraft noise complaints from the community. This office also produces and publishes quarterly noise reports. Each of these measures is discussed in more detail below.

7.5.1 The Phase 2 Commercial Airline Access Plan and Regulation at John Wayne Airport [27]

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 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 ADD's and passengers in light of improvements to aircraft design that have 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.

In addition to limiting the number of ADDs and annual passengers, The Plan also defines the SENEL noise level limits for the two classes of commercial aircraft, A and E, that cannot be exceeded by commercial aircraft from an air carrier on an energy average basis each calendar quarter. These limits are presented in Table 29. 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.

Table 29
Commercial Aircraft SENEL Noise Limits

NMS	Class A	Class E
NMS 1S	101.8 dB	93.5 dB
NMS 2S	101.1 dB	93.0 dB
NMS 3S	100.7 dB	89.7 dB
NMS 4S	94.1 dB	86.0 dB
NMS 5S	94.6 dB	86.6 dB
NMS 6S	96.1 dB	86.6 dB
NMS 7S	93.0 dB	86.0 dB
NMS 8N	--	--
NMS 9N	--	--
NMS 10N	--	--

The Access Plan also establishes a nighttime curfew that limits hours that commercial and cargo aircraft can operate. Commercial departures are allowed Monday through Saturday from 7:00 a.m. to 10:00 pm, and on Sundays from 8:00 a.m. to 10:00 p.m. Commercial arrivals are allowed Monday through Saturday from 7:00 a.m. to 11:00 pm, and on Sundays from 8:00 a.m. to 11:00 p.m. Under certain conditions, aircraft operations outside of the allowed operational hours are allowed as specified in Section 8.5.2 of the Access Plan, "Permitted Commercial and Cargo Operations Hours."

> "(a) Except as expressly authorized by this section, no *Air Carrier*, *Commuter Carrier*, nor *Commercial Cargo Carrier* shall operate any aircraft at *JWA* at any other times other than the *Permitted Commercial Operations Hours* and *Permitted Cargo Operations Hours*.
>
> The *Airport Director* or senior *County* operations representative then on duty may (but is not required to) authorize a departure or landing outside of the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours*, as applicable to a specific commercial operation, only under the following conditions and limitations, and only upon his determination that the specific operation is not being performed under circumstances inconsistent with the basic intent of the *County* in establishing the *Permitted Commercial Operations Hours* and *Permitted Cargo Operations Hours*, respectively in the first instance:
>
> (b) The flight was scheduled to arrive or depart during the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours* and was delayed by not more than one-half hour beyond the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours* by emergency, mechanical, air traffic control, or weather delays substantially beyond the control of the operator; and
>
> (c) If any person is granted permission under this section to conduct a departure or arrival outside of the *Permitted Commercial Operations Hours* or *Permitted*
>
> *Cargo Operations Hours* and was delayed by not more than one-half hour beyond the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours* by air traffic control or weather delays substantially beyond the control of the operator; and
>
> (d) If any person is granted permission under this section to conduct a departure or arrival outside of the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours*, that person must file a written report with the *Airport Director* within forty-eight (48) hours after the arrival or departure which describes in detail the specific circumstances which caused the person to make the request. Any failure to file the written report within the time permitted by this paragraph will render the *Airport Director's* authorization invalid and void.

> Nothing in this section establishes a "right" or privilege of any person to conduct air operations outside of the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours*. No person may conduct operations outside the *Permitted Commercial Operations Hours* or *Permitted Cargo Operations Hours* under the authority of this section unless that person has first received express approval for the specific operation from the *Airport Director* or senior *County* operations officer on duty at the time the operation is conducted."

The 1990 Airport Noise and Capacity Act (ANCA) effectively prohibits airports from establishing limits on the number of commercial operations or nighttime curfews. However, because the Settlement Agreement and Phase 2 Access Plan were implemented before ANCA, they were grandfathered and are not subject to the requirements of Part 160. It is highly unlikely that these measures would satisfy these requirements and be allowed by the FAA at this time.

7.5.2 General Aviation Noise Ordinance

The General Aviation Noise Ordinance (GANO) also 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 presented in Table 30. The nighttime general aviation noise limit is very restrictive and only the quietest of the general aviation fleet can operate at night.

Table 30
General Aviation SENEL Noise Limits

NMS	Daytime	Nighttime
NMS 1S	101.8 dB	86.8 dB
NMS 2S	101.1 dB	86.9 dB
NMS 3S	100.7 dB	86.0 dB
NMS 4S	--	86.0 dB
NMS 5S	--	86.0 dB
NMS 6S	--	86.0 dB
NMS 7S	--	86.0 dB
NMS 8N	--	86.0 dB
NMS 9N	--	86.0 dB
NMS 10N	--	86.0 dB

7.5.3 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 and the GANO prohibits general aviation aircraft that are unable to comply with strict noise limits from operating during the nighttime hours.

As discussed above, the 1990 ANCA effectively prohibits airports from nighttime curfews. However, because the Settlement Agreement, Phase 2 Access Plan, and

GANO were implemented before ANCA, they were grandfathered and are not subject to the requirements of Part 160. It is highly unlikely that these measures would satisfy these requirements and be allowed by the FAA at this time.

7.5.4 Noise Abatement Departure

Anyone who has ever flown in a commercial aircraft departing from John Wayne Airport is familiar with the noise abatement departure procedure. Under this procedure, commercial aircraft use full power to climb as quickly as safely possible 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, resulting 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.

7.5.5 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

7.5.6 Santa Heights Acoustical Insulation Program (AIP)

The Santa Ana Heights Acoustical Insulation Program (AIP) 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 units and 279 multi-family units. Of these, sound insulation was provided for 71% of the eligible units (427 du). Of those not insulated (179 du), five du 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 du.[1] And, 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 du. Of the 78 remaining homes that were not insulated, 19 homeowners

[1] 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.

declined the offer, and 59 homeowners did not respond despite a good faith effort to contact them.

SIP 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.

7.5.7 JWA Access and Noise Office

The primary purpose of the JWA Access and Noise Office is to monitor compliance with and enforce the Phase 2 Commercial Airline Access Plan and Regulation and the General Aviation Noise Ordinance discussed above. The Office uses a state-of-the-art noise monitoring system to perform its duties and publishes quarterly noise abatement reports to track enforcement. This report presents the number of aircraft operations during the quarter along with the noise levels recorded by the noise monitoring system. The quarterly report also presents a summary of the noise related complaints received by the office, another important function of the office.

Noise Monitoring System

To monitor and enforce the noise and operational restrictions, the staff utilizes 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) noise-monitoring stations and they are field calibrated once each month. The field calibration equipment is laboratory certified annually.

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.

Noise Complaints

The Access and Noise staff also 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 at http://www.ocair.com/reportspublications/AccessNoise/default.aspx.

7.6 Mitigation Measures Recommended for Further Consideration

As discussed in Section 5.1, while the County of Orange is the lead agency for this project, the City of Newport Beach will also need to take discretionary actions to implement the Project. The City has established noise level increase thresholds that are lower than the County's. For this reason, significant impacts from the Proposed Project and Alternatives are assessed under the County standards in Section 6.2.1 and under the City standards in Section 6.2.2. Below, Section 7.6.1 presents Mitigation Measure N-1 to mitigate the significant impacts identified under the County threshold and Section 7.6.2 present Mitigation Measure N-2 to mitigate significant impacts under the City threshold.

As discussed below, both Mitigation Measures, N-1 and N-2 will compare the noise levels at the NMS presented in the fourth quarterly report each year after 2015 with the levels presented in the 2013 fourth quarterly report. This will be used to determine when and where the noise level increases over existing, conditions exceed the City or County thresholds. When the increase is greater than the threshold, sensitive uses within the 65 CNEL contour will become eligible to be evaluated to determine if the interior noise level of any habitable room exceeds 45 CNEL and experiences a significant interior noise impact. Sensitive uses with interior noise levels in habitable rooms exceeding 45 CNEL are then referred to Mitigation Measure N-3 presented in Section 7.6.3 which will implement an acoustical insulation program for these significantly impacted sensitive uses. Note that Land Use Mitigation Measure LU-1 also refers uses that are determined to be significantly impacted under the Land Use significance threshold to Mitigation Measure N-3.

7.6.1 Mitigation of Impacts Based on County Significance Thresholds

Tables 20 and 21 presented in Section 6.2 show 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, 2S and 8N. These NMS are projected to experience noise levels exceeding 65 CNEL with the alternative and more than a 1.5 CNEL increase over existing conditions. Under all three Phases of Alternative C, these three NMS as well as NMS 3S are projected to be significantly impacted for the same reason.

The primary area where these 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 (SAHCP). The SAHCP 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 in Section 7.2.8.

Table 31 presents the number of dwelling units that would have a noise exposure of 65 CNEL or greater and experience a noise exposure increase of 1.5 dB or more over existing conditions. The total number of impacted dwelling units is shown in the first column of values. The remaining columns break out the number of units that were insulated and not insulated under the Santa Ana Heights Acoustical Insulation Program (AIP) along with the number of units outside of the AIP. The number of dwelling units within the AIP area that were insulated under the program is shown in the second column of values.

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

In addition to the homes presented Table 31 there is a preschool located at the corner of Orchard Drive and Cypress Street that will be exposed to aircraft noise levels exceeding 65 CNEL under Phase 3 of Alternative B and all three Phases of Alternative C and be significantly impacted. Further, The Peter and Mary Muth Interpretive Center would also be located within the 65 CNEL contour with all three phases of Alternative C and be significantly impacted as well.

Because there is no practical method for mitigating outdoor noise levels, the number of residences presented in the “Total DU” column of Table 31, and the schools discussed in the previous paragraph will be subject to a significant and unavoidable outdoor noise impact.

Significant indoor noise impacts occur when the interior noise level of a sensitive use exceeds the 45 CNEL interior noise standard. The homes 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 homes will not be significantly impacted and no mitigation is required. The remaining homes that were not insulated and educational facilities may be impacted unless additional sound insulation is provided.

Table 31
Number of Residences Exposed to 65 CNEL or Greater and an Increase of 1.5 dB or More Over Existing Conditions

Nearest NMS	Total DU	Within AIP Insulated	Within AIP Not Insulated: Conforming	Within AIP Not Insulated: Non Conforming	Outside AIP Not Insulated	Total Not Insulated
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*

As a part of the Santa Ana Heights AIP, the noise reduction of the treated homes was measured before and after the insulation. The "before" measurements provide a reasonable estimate of the noise reduction provided by the homes that were not treated. Of the 903 rooms tested, only 2.5% 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% of the untreated rooms achieved more than 22 dB of outdoor-to-indoor noise reduction. Therefore, most of the remaining untreated dwelling units 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%, 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:** Starting with the 2015 Fourth Quarterly Noise Report, the annual noise levels at NMS 1S, 2S, and 3S will be compared 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 Acoustical Insulation Program (AIP) will be eligible for evaluation for participation in the Sound Insulation Program 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 below in Mitigation Measure N-3.
>
> 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 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 45 CNEL then the use will be eligible for the SIP described in Mitigation Measure N-3.

Alternative C Phases 2 and 3 will also impact the sensitive uses surrounding Newport Back Bay represented by NMS 4S, 5S, 6S, and 7S. These uses are projected to be impacted because they will experience a noise level increase of 3.0 dB or greater but the absolute noise levels at these homes will be less than 65 CNEL. Table 32 presents the number of dwelling units that would be significantly impacted by these two alternatives. In addition, three schools, one educational facility (The Back Bay Interpretive Center) and one place of worship would be significantly impacted with these alternatives.

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 [31]. Therefore, the measures used previously to address impacts in Santa Ana Heights are not available to mitigate impacts for homes outside the 65 CNEL contour because there is no funding source. Therefore, these sensitive uses would be unavoidably significantly impacted by aircraft noise under these two scenarios.

Table 32
Number of Residences Exposed to 60 CNEL or Greater and an Increase of 3.0 dB or Greater Over Existing Conditions

Nearest NMS	Dwelling Units
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*

In addition, the project case scenarios each contemplate an extension of the 1985 Settlement Agreement, differing only in the details of the proposed adjustments to the agreement. The Settlement Agreement is one of the major noise mitigation measures adopted as a result of the 1985 Master Plan, and the project cases extend these measures. Essentially, the proposed project is a project to continue existing adopted mitigation beyond the date when the County is otherwise required by a federal court order to maintain the measures identified in the Settlement Agreement.

In addition, the following noise control measures are in place and should be continued independent of the project case scenario selected:

- Nighttime operations restrictions (Except Under Alternative C Phase 2 and 3 which would remove 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 (The noise related conditions are presented below, in Section 7.6.4.)

7.6.2 Mitigation of Impacts Based on Newport Beach Significance Thresholds

As discussed in Sections 2.6.2 and 6.2.2 the City of Newport Beach has adopted significance thresholds for noise that are more restrictive than those recommended by the FAA. Section 6.2.2 concluded that Proposed Project Phase 3, Alternative A Phase 3, Alternative B Phase 2 and 3, and all Phases of Alternative C would result in a significant impact due to a noise exposure with these alternatives between 65 and 75 CNEL and a 1 dB increase over existing conditions.

Table 33 presents the number of dwelling units 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 dwelling units is shown in the first column of values. The remaining columns break out the number of units that were insulated and not insulated under the AIP along with the number of units outside of the AIP. The number of dwelling units within the AIP area that were insulated under the program is shown in the second column of values.

The number of units that were included in the Santa Ana Heights 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. The next column shows the number of du that are located outside of the SIP area. The final column shows the total number of residential dwelling units that have not been previously insulated.

In addition to the homes presented Table 33 there is a preschool located at the corner of Orchard Drive and Cypress Street that will be exposed to aircraft noise levels exceeding 65 CNEL under Phase 3 of Alternative B and all three Phases of Alternative C and would be significantly impacted. Further, The Peter and Mary Muth Interpretive Center would also be located within the 65 CNEL contour with all three phases of Alternative C and would be significantly impacted.

Because there is no practical method for mitigating outdoor noise levels, the number of residences presented in the "Total DU" column of Table 33, and the schools discussed in the previous paragraph will be subject to a significant and unavoidable outdoor noise impact.

Significant indoor noise impacts occur when the interior noise level exceeds the 45 CNEL interior noise standard. The homes 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 homes will not be significantly impacted and no mitigation is required. The remaining homes and educational facilities that were not insulated may be impacted unless additional sound insulation is provided.

Table 33
Number of Residences Exposed 65 CNEL or Greater and an Increase of 1.0 dB or More Over Existing Conditions

Nearest NMS	Total DU	Within AIP Insulated	Within AIP Not Insulated Conforming	Within AIP Not Insulated Non Conforming	Outside AIP Not Insulated	Total Not Insulated
Project Alternative, 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*

As a part of the AIP, the noise reduction of the treated homes was measured before and after the insulation. The "before" measurements provide a reasonable estimate of the noise reduction provided by the homes that were not treated. Of the 903 rooms tested, only 2.5% 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% of the untreated rooms achieved more than 22 dB of outdoor-to-indoor noise reduction. Therefore, most of the remaining untreated dwelling units 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%, 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:** Starting with the 2015 Fourth Quarter Noise Report, the annual noise levels at NMS 1S, 2S, and 3S will be compared 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 Acoustical Insulation Program (AIP) will be eligible for evaluation for participation in the Sound Insulation Program 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 Quarterly 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 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 45 CNEL then the use will be eligible for the SIP described in Mitigation Measure N-3.

Based on the City of Newport Beach significance thresholds, all phases of Alternative C will also significantly impact the homes surrounding Newport Back Bay represented by NMS 4S, 5S, 6S, and 7S (Note Phase 1 of Alternative C only impacts the area near NMS 6S). These homes are projected to be impacted because they will experience a noise level increase of 2.0 dB or greater but the absolute noise levels at these homes will be between 60 and 65 CNEL. Table 34 presents the number of dwelling units that would be significantly impacted by these two alternatives. In addition, three schools, one educational facility (The Back Bay Interpretive Center) and one place of worship would be significantly impacted with these alternatives.

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 [31]. Therefore, the measures used previously to address impacts in Santa Ana Heights are not available to mitigate impacts for homes outside the 65 CNEL contour because there is no funding source. Therefore, these residences would be unavoidably significantly impacted by aircraft noise under these two scenarios.

Table 34
Number of Residences Exposed to between 60 and 65 CNEL and an Increase of 2.0 dB or Greater Over Existing Conditions

Nearest NMS	Dwelling Units
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*

7.6.3 Mitigation Measure N-3 – Sound Insulation Program

Mitigation Measures N-1 and N-2 described above, as well as Mitigation Measure LU-1 from the Land Use Impacts Analysis will use measurements to determine where interior noise levels exceed the interior noise standard of 45 CNEL. When this occurs, Mitigation Measure N-3, a Sound Insulation Program, described below, will be implemented to provide acoustical upgrades to reduce interior noise levels by at least 5 dB to below 45 CNEL.

As discussed previously in Section 7.2.8, FAA has established a set of requirements and procedures that must be followed in order for Airport or Federal funding of a sound insulation program. The noise insulation measures are typically limited to window and door replacement, ceiling insulation, caulking and weather stripping. In addition, homes without a system that allows adequate ventilation with windows closed would be eligible for installation of such a system. Homes that are so dilapidated that these upgrades would not reduce the interior noise levels by at least 5 dB would not be eligible for the program.

Further, the FAA guidance states that only sensitive uses with an average interior noise level in habitable rooms greater than 45 CNEL are eligible for insulation. However, the County of Orange noise standards specifically require the noise levels in all habitable be below 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 interior 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 it will be re-evaluated. If a subsequent annual report noise levels and previous of outdoor-to-indoor noise reduciton indicate that the interior noise levels exceed 45 CNEL, it will be re-evaluated for insulation eligibility.

N-3: 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 JWA 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 as discussed in Section 7.2.8. Any sound insulation program that uses airport or federal funds is required to comply with the FAA criteria.

Generally, homes that have previously received acoustical upgrades as a part of the AIP, sensitive uses with buildings constructed after 1998, and uses whose average interior noise level is less than 45 CNEL would not be eligible for insulation due to the FAA criteria. Homes that were upgraded as part of the AIP would not be expected to experience interior noise levels exceeding 45 CNEL due to these previous upgrades.

Sensitive uses constructed after 1985 were subject to County or City standards that required interior noise levels to be reduced below 45 CNEL based on the 1985 Master Plan contours. Except for Phases 2 and 3 of Alternative C, the future noise contours south of the airport are contained within the Master Plan contours. Therefore, uses complying with the interior noise standard based on the Master Plan contours would also comply under all of the alternatives considered except for Phases 2 and 3 of Alternative C. Noise levels in the impacted area under Phases 2 and 3 of Alternative C are less than 3 dB greater than estimated in the Master Plan. This difference is small enough that it is likely that homes designed to achieve an interior noise level less than 45 CNEL under the Master Plan would still achieve this noise level with Phases 2 and 3 of Alternative C. However, there could be a few rooms that do not provide the required level of reduction.

As discussed above, the City and County interior noise standard is that the noise level in ALL habitable rooms be less than 45 CNEL. The FAA's recent policy that only homes with an average noise level exceeding 45 CNEL are eligible for insulation is subject to considerable controversy and is not consistent with the County's standards. Under the City and County standards homes with any room exceeding 45 CNEL are considered significantly impacted. Therefore, the FAA's policy could result in unmitigated significant impacts for homes with one or more habitable rooms with interior noise levels exceeding 45 CNEL but an average interior noise level of less than 45 CNEL. Because of this, the County will request that the FAA waive the average noise level requirement and allow homes with any room exceeding 45 CNEL to be eligible to receive insulation.

Under the Santa Ana Heights Acoustical Insulation Program (AIP), the non-conforming residential uses located within the business park zoned area were not eligible for the program. The goal of the business park rezoning is to eliminate all noise sensitive uses within the most noise impacted area of Santa Ana Heights. Providing acoustical insulation for the homes within this area is not consistent with this goal as it provides incentive for the non-conforming use to remain. Therefore, non-conforming residential uses will not be eligible for insulation under this mitigation measure.

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.

7.6.4 County of Orange Standard Noise Mitigation Measures

The following mitigation measures are the standard conditions used by the County for mitigating noise impacts:

N1: RESIDENTIAL NOISE

All residential lots and dwellings shall be sound attenuated against present and projected noise which shall be the sum of all noise impacting the project so as not to exceed a composite interior standard of 45 dBA CNEL in all habitable rooms and a source specific exterior standard of 65 dBA CNEL in outdoor living areas. Evidence prepared by a County certified acoustical consultant, that these standards will be satisfied in a manner consistent with Zoning Code Section 7-9-137.5, shall be submitted as follows:

A. Prior to the recordation of a subdivision map or prior to the issuance of grading permits, as determined by the Manager, Building Permits, the applicant shall submit an acoustical analysis report to the Manager, Building Permits, for approval. The report shall describe in detail the exterior noise environment and preliminary mitigation measures. Acoustical design features to achieve interior noise standards may be included in the report in which case it may also satisfy "B" below.

B. Prior to the issuance of any building permits for residential construction, the applicant shall submit an acoustical analysis report describing the acoustical design features of the structures required to satisfy the exterior and interior noise standards to the Manager, Building Permits, for approval along with satisfactory evidence which indicates that the sound attenuation measures specified in the approved acoustical report have been incorporated into the design of the project.

C. Prior to the issuance of any building permits, the applicant shall show all freestanding acoustical barriers on the project's plot plan illustrating height, location and construction in a manner meeting the approval of the Manager, Building Permits.

N2: NON-RESIDENTIAL NOISE

Except when the interior noise level exceeds the exterior noise level, all non-residential structures shall be sound attenuated against the combined impact of all present and projected noise from exterior noise sources to meet the interior noise criteria as specified in the Noise Element and Land Use/Noise Compatibility Manual.

Prior to the issuance of any building permits, the applicant shall submit to the Manager, Building Permits, evidence prepared under the supervision of a County-certified acoustical consultant that these standards will be satisfied in a manner consistent with Zoning Code Section 7-9-137.5. The evidence shall be in the form of an acoustical analysis report describing in detail the exterior noise environment and the acoustical design features required to achieve the interior noise standard and which indicate that the sound attenuation measures specified have been incorporated into the design of the project.

N3: OVERFLIGHT NOTIFICATION
Prior to the recordation of each subdivision map that creates building sites, the owner of the property shall prepare and record notice that this property is subject to overflight, sight, and sound of aircraft operating from John Wayne Airport in a manner meeting the approval of the Manager, Building Permits.

N4: DEPARTMENT OF REAL ESTATE REPORT INFORMATION
Prior to the issuance of any certificates of use and occupancy, the developer shall produce evidence acceptable to the Manager, Building Inspection, that information stating this property is subject to the overflight, sight, and sound of aircraft operating from John Wayne Airport has been provided to the Department of Real Estate (DRE) of the State of California for inclusion into the Final Subdivision Public Report.

N5: AVIATION EASEMENT
Prior to the recordation of each subdivision map or the issuance of any building permit, whichever comes first, the subdivider shall dedicate an aviation easement over this property to the County of Orange in a manner meeting the approval of the Manager, Building Permits.

N6: AIRCRAFT NOISE SIGNS
Prior to the issuance of any certificates of use and occupancy, the applicant shall post aircraft noise impact notification signs in all sales offices associated with new residential development located within an aircraft 63 dBA CNEL contour. The number and location of said signs shall be as approved by the Manager, Building Permits.

7.7 Unavoidable Significant Impacts

7.7.1 Unavoidable Significant Impacts Based on County Significance Thresholds

As discussed in Section 7.6.1, there is no practical method for mitigating outdoor noise levels, therefore all noise sensitive uses with outdoor activities, residences and school, exposed to noise levels of 65 CNEL or greater and an increase of 1.5 dB or more over existing conditions will be subject to an unavoidable significant impact to their outdoor noise environment. This unavoidable significant impact would occur at the homes and preschool near NMS 1S and 2S under Phase 3 of Alternative B, and at the homes and preschool near NMS 1S, 2S, and 3S under all Phases of Alternative C. The Total DU column of Table 31 presents the number of residences that would be subject to an unavoidable significant outdoor noise impact under these alternatives. In addition, one school would be subject to a significant outdoor noise impact under these alternatives.

The last column of Table 31 presents the number of dwelling units that will be significantly impacted that have not been previously insulated and may be exposed to interior noise levels greater than 45 CNEL without mitigation. As discussed in Section 7.6.3, non-conforming residential uses will not be eligible for mitigation due to the County and City goal of removing all noise sensitive uses from the Business Park zoned area. The fifth column of Table 31 shows the number of non-conforming residential uses that would be subject to a significant unavoidable interior noise impact with Phase 3 of Alterative B or under any phase of Alternative C.

As discussed in Section 7.6.1, the outdoor-to-indoor noise reduction of the majority of homes slated to receive acoustical upgrades was measured prior to implementation of the insulation. This data is representative of the noise reduction provided by the homes in the area that did not receive acoustical insulation. This data showed that 95% of the rooms measured prior to receiving acoustical insulation provided at least 22 dB of outdoor-to-indoor noise reduction and 75% provided at least 25 dB of outdoor-to-indoor noise reduction. Under Phase 3 of Alternative B, the maximum residential noise exposure is 70 CNEL. Therefore, only approximately 25% of the homes that were not treated under the AIP would be expected to have noise levels greater than 45 CNEL and be subject to a significant interior noise impact.

As discussed in Section 7.6.3, the FAA has established specific requirements for the use of airport funds to implement Sound Insulation Programs. One of the more controversial aspects is the requirement that the average noise level in habitable rooms must exceed 45 CNEL in order to be eligible for insulation. This conflicts with the City and County standards that require noise levels in ALL habitable rooms be less than 45 CNEL. As discussed above, the County will request that the FAA waive the average noise level requirement and allow homes with noise levels in any habitable room exceeding 45 CNEL be eligible for insulation. If this requirement is not waived this may result in some homes that are significantly impacted, i.e., have at least one room with an interior noise level greater than 45 CNEL not being eligible to receive insulation because the average noise level of all habitable rooms is less than 45 CNEL. These homes would be unavoidably significantly impacted. Note that Mitigation Measures N-1, N-2, and LU-1 require the interior noise levels in such cases to be re-evaluated annually to determine if the average interior noise level exceeds 45 CNEL resulting in the home becoming eligible for insulation.

As discussed in Section 7.5, implementation of Phase 2 or 3 of Alternative C would result in a significant and unavoidable noise impact to the homes along the perimeter of Newport Back Bay near NMS 4S, 5S, 6S, and 7S. The number of homes subject to this unavoidable significant impact is tabulated in Table 32. In addition, three schools, one educational facility and one place of worship would be unavoidable significantly impacted with these alternatives.

7.7.2 Unavoidable Significant Impacts Based on Newport Beach Significance Thresholds

As discussed in Section 7.6.1, there is no practical method for mitigating outdoor noise levels, therefore all noise sensitive uses with outdoor activities, residences and school, exposed to noise levels of 65 CNEL or greater and an increase of 1.5 dB or more over existing conditions will be subject to an unavoidable significant impact to their outdoor noise environment. This unavoidable significant impact would occur at the homes and preschool near NMS 1S and 2S under Phase 3 of Alternative B, and at the homes and preschool near NMS 1S, 2S, and 3S under all Phases of Alternative C. The Total DU column of Table 33 presents the number of residences that would be subject to an unavoidable significant outdoor noise impact under these alternatives. In addition, one school would be subject to a significant outdoor noise impact under these alternatives.

The last column of Table 33 presents the number of dwelling units that will be significantly impacted that have not been previously insulated and may be exposed to interior noise levels greater than 45 CNEL without mitigation. As discussed in Section 7.6.3, non-conforming residential uses will not be eligible for mitigation due to the County and City goal of removing all noise sensitive uses from the Business Park zoned area. The fifth column of Table 33 shows the number of non-conforming residential uses that would be subject to a significant unavoidable interior noise impact with Phase 3 of Alterative B or under any phase of Alternative C.

As discussed in Section 7.6.1, the outdoor-to-indoor noise reduction of the majority of homes slated to receive acoustical upgrades was measured prior to implementation of the insulation. This data is representative of the noise reduction provided by the homes in the area that did not receive acoustical insulation. This data showed that 95% of the rooms measured prior to receiving acoustical insulation provided at least 22 dB of outdoor-to-indoor noise reduction and 75% provided at least 25 dB of outdoor-to-indoor noise reduction. Under Phase 3 of Alternative B, the maximum residential noise exposure is 70 CNEL. Therefore, only approximately 25% of the homes that were not treated under the AIP would be expected to have noise levels greater than 45 CNEL and be subject to a significant interior noise impact.

As discussed in Section 7.6.3, the FAA has established specific requirements for the use of airport funds to implement Sound Insulation Programs. One of the more controversial aspects is the requirement that the average noise level in habitable rooms must exceed 45 CNEL in order to be eligible for insulation. This conflicts with the City and County standards that require noise levels in ALL habitable rooms be less than 45 CNEL. As discussed above, the County will request that the FAA waive the average noise level requirement and allow homes with noise levels in any habitable room exceeding 45 CNEL be eligible for insulation. If this requirement is not waived this may result in some homes that are significantly impacted, i.e., have at least one room with an interior noise level greater than 45 CNEL not being eligible to receive insulation because the average noise level of all habitable rooms is less than 45 CNEL. These homes would be unavoidably significantly impacted. Note that Mitigation Measures N-1, N-2, and LU-1 require the interior noise levels in such cases to be re-evaluated annually to determine if the average interior noise level exceeds 45 CNEL resulting in the home becoming eligible for insulation.

As discussed in Section 7.6.2, implementation of any Phase of Alternative C would result in a significant and unavoidable noise impact. This impact would be limited to the area around NMS 6S under Phase 1 but would expand to the areas around NMS 4S, 5S, 6S, and 7S under Phases 2 and 3. The number of homes subject to this unavoidable significant impact is tabulated in Table 34. In addition, three schools, one educational facility and one place of worship would be unavoidable significantly impacted with these alternatives.

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APPENDIX A
SENEL LEVELS BY YEAR/AIRLINE/AIRCRAFT/CLASS

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John Wayne Airport Departures

Airline / Aircraft	Class	Year	Operations: Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events): 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Air Canada																	
A319	A	2010	165	1	0	0	131,835	95.6 (165)	94.1 (160)	93.8 (166)	86.8 (153)	85.5 (165)	85.4 (162)	80.5 (143)	--	--	--
		2011	2	0	0	0	113,428	91.9 (2)	91.3 (2)	90.3 (2)	84.6 (2)	82.7 (2)	83.2 (2)	79.4 (1)	--	--	--
E190	A	2010	26	0	0	0	92,509	95.2 (26)	93.8 (25)	92.8 (26)	87.5 (24)	86.8 (25)	86.3 (25)	82.0 (23)	--	--	--
Alaska Airlines																	
B7374	A	2003	1,740	391	1	1	113,659	94.5 (1,987)	93.0 (1,659)	91.7 (2,024)	84.9 (2,004)	87.0 (1,874)	86.6 (1,918)	84.4 (2,008)	92.9 (53)	94.2 (55)	80.8 (55)
		2004	2,339	493	7	7	115,248	94.9 (2,604)	93.4 (2,562)	92.1 (2,612)	85.4 (2,620)	87.5 (2,438)	86.8 (2,581)	84.7 (2,538)	93.1 (168)	83.4 (135)	81.9 (140)
		2005	2,416	412	10	10	117,300	95.6 (2,569)	94.2 (2,601)	93.1 (2,641)	85.9 (2,485)	87.6 (2,406)	87.6 (2,499)	85.6 (2,617)	93.1 (107)	82.7 (104)	82.8 (95)
		2006	2,614	647	4	4	117,058	95.5 (3,098)	93.9 (3,076)	92.7 (3,103)	85.7 (3,074)	87.0 (2,961)	87.3 (3,084)	85.1 (2,895)	92.2 (101)	82.4 (63)	81.8 (67)
		2007	1,686	331	11	11	117,115	95.5 (1,869)	93.7 (1,848)	92.7 (1,877)	85.8 (1,848)	87.0 (1,889)	87.3 (1,855)	84.9 (1,795)	92.1 (104)	80.7 (62)	80.5 (72)
		2008	281	42	0	0	117,482	95.7 (309)	94.1 (310)	92.9 (308)	85.6 (305)	87.3 (310)	88.0 (307)	84.9 (305)	92.6 (11)	84.1 (1)	80.4 (9)
		2009	63	18	0	0	118,238	97.0 (75)	95.4 (74)	95.7 (73)	88.8 (75)	89.3 (75)	89.9 (72)	85.6 (53)	92.9 (5)	80.2 (5)	80.7 (4)
		2010	57	15	0	0	120,858	97.4 (61)	95.9 (69)	96.7 (67)	88.9 (63)	89.9 (69)	90.3 (66)	86.6 (67)	92.9 (3)	79.3 (3)	--
		2011	42	13	0	0	119,641	97.4 (50)	95.7 (50)	96.5 (52)	89.4 (51)	89.9 (51)	90.6 (46)	86.9 (49)	92.5 (3)	81.0 (3)	82.9 (1)
		2012	26	14	0	0	121,287	97.1 (39)	96.0 (37)	97.0 (39)	89.2 (35)	90.2 (38)	91.0 (38)	86.9 (33)	96.2 (1)	82.3 (1)	85.3 (1)
		2013	17	7	0	0	121,504	97.2 (23)	95.8 (23)	96.7 (23)	89.3 (23)	90.1 (23)	90.6 (22)	87.2 (21)	93.6 (1)	--	--
	AA	2003	24	9	0	0	108,096	93.3 (29)	91.3 (29)	90.1 (30)	84.3 (30)	85.6 (30)	84.8 (25)	83.0 (26)	92.7 (3)	81.3 (2)	81.2 (2)
	F	2007	1	0	0	0	95,000	87.3 (1)	87.5 (1)	84.7 (1)	79.4 (1)	77.6 (1)	77.4 (1)	82.7 (1)	--	--	--
	PE	2006	1	0	0	0	94,000	89.8 (1)	90.2 (1)	87.2 (1)	81.1 (1)	83.1 (1)	81.4 (1)	80.0 (1)	--	--	--
B7377	A	2003	502	119	2	2	123,127	91.6 (574)	90.4 (488)	87.8 (591)	80.8 (563)	83.8 (547)	83.4 (588)	81.4 (570)	89.2 (23)	82.0 (8)	80.9 (5)
		2004	127	42	0	0	121,852	91.9 (155)	91.1 (143)	88.4 (155)	81.1 (155)	84.2 (148)	83.3 (155)	81.1 (148)	89.4 (13)	80.1 (3)	78.2 (3)
		2005	308	110	1	1	124,795	92.1 (396)	91.2 (400)	88.5 (403)	82.2 (362)	84.8 (372)	83.8 (372)	83.4 (388)	89.9 (9)	79.0 (1)	77.8 (4)
		2006	651	82	1	1	125,136	93.0 (672)	91.5 (657)	88.7 (667)	81.4 (668)	83.2 (662)	83.4 (669)	81.4 (647)	90.0 (47)	87.2 (5)	77.0 (18)
		2007	1,092	165	4	4	125,686	92.7 (1,169)	91.3 (1,173)	88.6 (1,177)	81.5 (1,151)	83.3 (1,182)	83.7 (1,163)	81.2 (1,110)	89.4 (65)	85.3 (6)	79.8 (22)
		2008	1,212	34	0	0	124,201	92.3 (1,156)	91.2 (1,176)	88.3 (1,174)	81.2 (1,139)	83.1 (1,157)	83.7 (1,141)	82.0 (1,158)	90.3 (52)	80.3 (14)	78.2 (14)
		2009	1,823	133	0	0	124,056	93.1 (1,866)	92.0 (1,839)	88.0 (1,872)	81.3 (1,855)	82.6 (1,851)	83.1 (1,810)	80.4 (1,411)	89.3 (67)	79.6 (17)	79.5 (14)
		2010	1,906	151	0	0	125,505	92.3 (1,924)	91.4 (1,948)	88.0 (1,982)	81.8 (1,885)	83.2 (1,992)	83.6 (1,951)	80.7 (1,899)	90.3 (53)	81.1 (19)	78.5 (7)
		2011	2,069	266	1	1	126,138	92.3 (2,147)	91.4 (2,187)	88.1 (2,217)	81.7 (2,201)	83.4 (2,220)	84.1 (2,102)	80.7 (2,100)	90.2 (97)	84.1 (27)	80.6 (10)
		2012	2,229	272	0	0	126,817	92.0 (2,392)	91.7 (2,380)	88.5 (2,404)	81.8 (2,239)	83.4 (2,441)	84.0 (2,336)	80.8 (2,167)	90.4 (45)	79.9 (15)	79.5 (15)
		2013	1,628	269	2	2	127,949	92.1 (1,821)	91.7 (1,799)	88.7 (1,838)	81.8 (1,778)	83.5 (1,841)	84.0 (1,798)	81.1 (1,666)	90.0 (52)	78.8 (6)	77.5 (6)
	AA	2003	287	39	0	0	123,821	91.4 (295)	90.2 (291)	87.8 (310)	82.1 (306)	83.6 (308)	84.6 (274)	81.3 (307)	90.5 (11)	81.4 (7)	77.5 (3)
	E	2003	1,636	410	1	1	119,266	90.4 (1,904)	89.4 (1,725)	87.1 (1,957)	81.4 (1,849)	83.4 (1,877)	83.2 (1,778)	81.1 (1,834)	90.2 (57)	89.7 (30)	78.6 (22)
		2004	550	85	1	1	120,368	90.9 (564)	90.1 (549)	87.7 (567)	81.1 (557)	84.0 (532)	83.3 (559)	80.9 (533)	89.5 (58)	85.3 (23)	78.4 (26)
		2005	372	18	1	1	117,747	90.1 (359)	89.6 (358)	87.3 (358)	81.6 (346)	83.4 (291)	82.9 (310)	80.9 (340)	89.6 (27)	80.5 (8)	77.5 (15)
		2006	60	2	0	0	120,225	91.7 (61)	90.5 (61)	87.9 (60)	81.1 (58)	83.0 (58)	82.8 (61)	81.3 (54)	80.3 (1)	77.4 (1)	--
		2007	3	0	0	0	124,233	92.8 (3)	91.5 (3)	88.4 (3)	81.6 (3)	83.2 (3)	83.7 (3)	81.6 (3)	--	--	--
		2008	14	25	0	0	123,274	92.2 (39)	90.8 (39)	88.0 (39)	80.9 (38)	82.3 (39)	82.7 (39)	80.4 (38)	--	--	--
	PE	2003	250	53	0	0	121,886	91.0 (299)	90.2 (259)	87.5 (296)	80.5 (286)	83.7 (271)	82.7 (297)	81.8 (287)	90.7 (2)	--	75.9 (1)
		2004	732	136	1	1	123,184	91.5 (807)	90.6 (793)	88.0 (805)	81.5 (796)	84.2 (775)	83.7 (795)	81.3 (759)	90.6 (49)	84.7 (17)	78.8 (24)
		2005	920	217	1	1	124,029	91.7 (1,051)	90.7 (1,048)	88.3 (1,083)	81.4 (1,011)	84.0 (976)	83.4 (990)	81.7 (1,057)	89.7 (36)	80.4 (11)	80.4 (19)
		2006	1,065	231	2	2	122,047	91.7 (1,227)	90.4 (1,213)	87.9 (1,224)	81.2 (1,200)	82.9 (1,176)	82.9 (1,217)	81.1 (1,124)	88.8 (49)	77.7 (5)	77.5 (14)
		2007	867	314	2	2	122,306	91.6 (1,103)	90.4 (1,096)	87.9 (1,113)	81.1 (1,076)	82.9 (1,109)	83.3 (1,098)	80.8 (999)	88.6 (59)	86.6 (6)	77.5 (13)
		2008	734	271	0	0	123,781	92.0 (949)	90.9 (966)	88.0 (959)	80.8 (938)	83.0 (954)	83.6 (944)	80.9 (936)	89.8 (30)	80.9 (5)	78.6 (8)
		2009	1,239	132	0	0	122,110	92.5 (1,303)	91.6 (1,286)	87.5 (1,313)	81.1 (1,297)	82.4 (1,306)	82.6 (1,275)	79.9 (882)	89.5 (44)	78.8 (11)	78.9 (11)
		2010	1,240	87	0	0	122,840	91.4 (1,247)	90.6 (1,266)	87.4 (1,285)	81.4 (1,231)	82.9 (1,285)	83.3 (1,262)	80.0 (1,211)	90.1 (26)	80.6 (10)	78.3 (3)
		2011	1,226	151	0	0	124,572	92.0 (1,270)	91.2 (1,285)	87.8 (1,309)	81.5 (1,296)	83.1 (1,304)	83.7 (1,230)	80.5 (1,233)	90.0 (53)	81.5 (13)	83.3 (6)
		2012	544	45	1	1	124,884	91.5 (560)	91.4 (551)	88.1 (550)	81.6 (453)	83.3 (562)	83.8 (522)	80.7 (507)	89.9 (20)	80.7 (9)	80.8 (7)
B7378	A	2005	61	4	0	0	137,460	94.5 (63)	92.9 (63)	91.3 (64)	84.2 (63)	85.3 (64)	86.1 (60)	83.9 (64)	--	--	--
		2006	1	0	0	0	148,000	98.1 (1)	96.3 (1)	95.4 (1)	85.7 (1)	86.8 (1)	87.1 (1)	86.9 (1)	--	--	--
		2007	286	157	1	1	139,277	95.0 (424)	93.4 (422)	91.1 (427)	84.0 (425)	85.3 (427)	85.9 (426)	83.5 (402)	92.0 (8)	77.4 (1)	81.8 (3)
		2008	522	137	0	0	136,386	94.7 (650)	92.9 (648)	90.1 (645)	82.9 (630)	84.3 (649)	84.9 (646)	82.4 (640)	90.2 (5)	80.0 (2)	77.8 (2)
		2009	558	41	0	0	137,524	97.7 (585)	96.1 (565)	95.2 (585)	87.9 (573)	87.9 (586)	88.0 (558)	84.0 (251)	92.8 (9)	81.2 (4)	81.4 (3)
		2010	425	15	0	0	140,321	98.0 (414)	96.5 (425)	95.9 (422)	88.2 (403)	88.2 (426)	88.4 (416)	84.6 (427)	92.0 (6)	80.7 (4)	79.0 (2)
		2011	310	73	0	0	141,014	98.2 (354)	96.7 (356)	96.1 (361)	88.4 (361)	88.5 (366)	88.7 (333)	84.9 (358)	92.1 (14)	81.8 (7)	81.6 (7)
		2012	343	124	1	1	145,004	98.1 (436)	97.1 (448)	96.8 (456)	88.2 (421)	88.6 (455)	89.1 (429)	85.2 (432)	92.3 (7)	81.7 (4)	81.4 (4)
		2013	325	53	1	1	145,726	98.1 (375)	97.0 (370)	96.9 (376)	88.0 (339)	88.7 (368)	89.1 (366)	85.3 (360)	90.8 (3)	--	79.8 (2)

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Aloha Air																	
B7377	A	2003	815	102	2	2	145,741	96.8 (844)	94.9 (670)	93.5 (858)	87.0 (842)	86.9 (809)	88.7 (821)	85.3 (844)	93.5 (35)	82.4 (30)	80.9 (24)
		2004	807	358	10	10	141,775	96.2 (1,066)	94.3 (1,016)	92.6 (1,069)	86.4 (1,081)	86.5 (1,020)	88.8 (1,058)	84.8 (1,022)	92.3 (75)	81.5 (48)	80.6 (56)
		2005	1,051	332	21	21	142,766	96.2 (1,291)	94.5 (1,276)	92.6 (1,330)	86.4 (1,241)	86.0 (1,223)	87.6 (1,225)	84.8 (1,286)	92.5 (47)	82.8 (33)	81.3 (32)
		2006	1,159	595	14	14	134,181	95.3 (1,636)	93.2 (1,589)	91.3 (1,641)	85.0 (1,624)	84.5 (1,555)	86.6 (1,625)	83.8 (1,434)	92.5 (96)	83.8 (35)	82.0 (50)
		2007	1,125	545	13	13	133,322	95.4 (1,540)	93.3 (1,517)	91.3 (1,552)	85.0 (1,529)	84.4 (1,532)	86.4 (1,520)	83.4 (1,364)	91.6 (112)	80.1 (27)	79.5 (36)
	E	2003	0	372	7	7	118,732	90.5 (360)	89.1 (354)	86.7 (368)	82.1 (359)	82.1 (340)	82.4 (351)	79.6 (334)	89.5 (9)	80.5 (2)	79.0 (1)
		2004	1	87	3	3	121,899	91.3 (84)	90.0 (85)	87.3 (85)	82.2 (83)	82.9 (69)	82.7 (83)	80.0 (76)	88.4 (6)	77.8 (3)	--
		2005	2	137	5	5	122,030	91.0 (142)	89.9 (143)	87.1 (143)	82.0 (127)	81.3 (142)	82.5 (144)	79.9 (134)	--	--	--
	F	2003	1	0	0	0	128,273	90.6 (1)	90.3 (1)	86.8 (1)	81.2 (1)	81.7 (1)	82.5 (1)	80.4 (1)	--	--	--
American Airlines																	
B7378	A	2003	1,808	111	0	0	140,044	96.0 (1,729)	94.0 (1,413)	92.0 (1,778)	86.0 (1,770)	85.8 (1,650)	87.3 (1,682)	84.2 (1,736)	91.8 (82)	95.0 (64)	81.3 (52)
		2004	3,431	34	0	0	141,692	97.6 (3,087)	95.6 (2,990)	94.4 (3,108)	87.8 (3,104)	87.3 (2,926)	88.1 (3,047)	85.1 (2,986)	91.5 (265)	84.0 (160)	80.5 (177)
		2005	2,838	30	0	0	142,506	98.7 (2,551)	96.5 (2,553)	95.8 (2,629)	88.8 (2,507)	87.4 (2,318)	88.7 (2,415)	85.6 (2,601)	91.4 (139)	81.2 (103)	81.3 (94)
		2006	3,015	17	0	0	143,135	98.8 (2,834)	96.5 (2,776)	96.0 (2,832)	88.4 (2,818)	87.0 (2,742)	88.7 (2,809)	84.6 (2,659)	92.0 (132)	80.0 (51)	80.8 (67)
		2007	2,887	84	0	0	142,934	98.9 (2,718)	96.6 (2,693)	96.0 (2,743)	88.6 (2,697)	87.2 (2,745)	88.9 (2,695)	84.6 (2,589)	91.2 (167)	80.0 (45)	80.3 (80)
		2008	2,634	157	0	0	141,654	98.6 (2,614)	96.5 (2,634)	95.9 (2,636)	88.4 (2,599)	86.9 (2,626)	88.7 (2,584)	84.6 (2,624)	91.5 (93)	80.9 (28)	79.4 (51)
		2009	3,761	98	1	1	141,755	98.3 (3,673)	96.3 (3,603)	95.6 (3,684)	88.1 (3,670)	87.3 (3,660)	88.6 (3,539)	84.5 (2,485)	91.2 (132)	79.2 (41)	79.5 (52)
		2010	3,661	45	0	0	140,873	98.2 (3,457)	96.3 (3,527)	95.6 (3,555)	87.0 (3,389)	88.5 (3,586)	88.6 (3,475)	84.4 (3,517)	92.0 (90)	81.2 (43)	81.0 (37)
		2011	3,569	39	1	1	142,423	98.6 (3,321)	96.8 (3,354)	96.0 (3,391)	88.0 (3,377)	88.0 (3,412)	88.7 (3,172)	85.0 (3,310)	91.7 (155)	81.3 (55)	80.3 (58)
		2012	3,779	24	0	0	145,260	98.5 (3,568)	97.2 (3,575)	96.8 (3,629)	88.5 (3,285)	88.1 (3,662)	89.1 (3,464)	85.6 (3,323)	92.3 (85)	82.2 (37)	81.8 (56)
		2013	2,901	17	0	0	144,831	98.2 (2,796)	96.9 (2,749)	96.3 (2,812)	88.3 (2,691)	88.1 (2,808)	89.0 (2,743)	85.6 (2,597)	92.2 (79)	79.7 (20)	81.2 (46)
	AA	2003	81	17	0	0	123,658	91.6 (73)	90.2 (79)	87.4 (85)	83.1 (83)	82.2 (82)	83.1 (72)	80.6 (77)	90.0 (10)	82.7 (10)	79.3 (4)
	F	2003	3	0	0	0	121,905	89.5 (3)	89.8 (2)	86.5 (3)	83.0 (1)	83.9 (3)	82.3 (2)	78.8 (3)	--	--	--
		2004	6	0	0	0	105,650	91.0 (6)	90.6 (6)	88.9 (6)	84.4 (6)	83.6 (6)	82.2 (6)	79.1 (3)	--	--	--
		2005	1	0	0	0	111,924	93.1 (1)	92.5 (1)	90.9 (1)	84.8 (1)	80.7 (1)	77.3 (1)	76.4 (1)	--	--	--
		2006	4	0	0	0	116,064	95.1 (4)	93.8 (4)	92.0 (4)	87.2 (4)	85.0 (4)	86.3 (2)	81.0 (4)	--	--	--
		2007	3	3	0	0	113,490	94.3 (6)	93.4 (6)	91.1 (6)	86.3 (6)	84.5 (6)	85.3 (6)	81.3 (3)	--	--	--
		2008	1	0	0	0	115,326	92.9 (1)	92.2 (1)	90.8 (1)	86.1 (1)	83.7 (1)	84.5 (1)	81.6 (1)	--	--	--
B757	A	2003	1,960	224	4	4	200,481	94.3 (2,087)	93.0 (1,554)	91.5 (2,098)	85.3 (2,048)	85.5 (1,918)	86.5 (2,031)	83.3 (2,067)	89.4 (35)	84.8 (13)	77.6 (13)
		2004	300	27	0	0	214,268	95.9 (287)	94.5 (277)	93.0 (293)	87.1 (291)	87.6 (267)	88.5 (281)	85.4 (279)	88.1 (26)	81.4 (13)	78.5 (9)
		2005	768	3	0	0	206,707	95.3 (721)	94.1 (727)	92.6 (750)	86.3 (681)	86.3 (740)	87.4 (726)	84.5 (746)	87.8 (8)	81.1 (2)	77.7 (2)
		2006	1,190	8	0	0	204,932	95.6 (1,113)	94.1 (1,115)	92.3 (1,123)	86.1 (1,121)	85.7 (1,076)	87.4 (1,120)	84.4 (1,053)	89.9 (46)	83.1 (15)	79.6 (19)
		2007	1,070	5	0	0	208,509	95.9 (982)	94.3 (965)	92.7 (983)	86.5 (976)	86.2 (985)	88.0 (964)	84.4 (945)	89.3 (66)	79.8 (8)	80.5 (22)
		2008	932	4	0	0	204,619	95.1 (884)	93.7 (889)	92.1 (891)	86.2 (877)	85.6 (891)	87.4 (883)	84.1 (889)	89.6 (26)	82.4 (8)	78.2 (12)
		2009	857	3	0	0	204,401	94.6 (823)	93.4 (808)	91.7 (826)	86.3 (814)	85.7 (818)	87.5 (793)	83.8 (496)	89.0 (27)	79.1 (9)	78.1 (9)
		2010	978	6	0	0	204,020	94.6 (941)	93.5 (939)	92.0 (955)	85.6 (899)	86.9 (956)	86.9 (896)	83.7 (934)	89.8 (21)	81.1 (7)	79.2 (5)
		2011	752	10	0	0	203,006	94.6 (707)	93.7 (709)	92.0 (723)	86.6 (728)	86.2 (722)	87.5 (682)	83.7 (700)	89.0 (26)	81.7 (12)	79.2 (4)
		2012	445	2	0	0	198,793	93.9 (429)	93.4 (417)	92.2 (423)	86.8 (348)	86.0 (429)	87.6 (390)	83.7 (405)	89.0 (11)	84.4 (2)	80.9 (3)
	AA	2003	1,278	143	0	0	187,002	92.1 (1,242)	90.7 (1,245)	89.7 (1,296)	84.1 (1,264)	84.0 (1,290)	85.0 (1,142)	82.5 (1,263)	88.9 (68)	83.2 (58)	80.2 (31)
	F	2003	7	1	0	0	155,468	88.8 (8)	88.3 (7)	86.9 (8)	80.8 (8)	81.4 (5)	80.8 (6)	80.4 (6)	--	--	--
		2005	0	1	0	0	159,772	90.1 (1)	88.9 (1)	88.8 (1)	--	81.1 (1)	82.1 (1)	80.7 (1)	--	--	--
		2006	1	1	0	0	142,531	86.6 (2)	87.2 (2)	84.6 (2)	81.0 (1)	87.5 (2)	81.8 (2)	80.3 (1)	--	--	--
		2007	2	1	0	0	158,713	89.4 (3)	88.8 (3)	88.2 (3)	79.4 (2)	84.1 (2)	83.1 (3)	81.3 (2)	--	--	--
		2010	1	0	0	0	165,421	88.4 (1)	88.2 (1)	85.7 (1)	86.9 (1)	86.5 (1)	86.0 (1)	--	--	--	--
MD80	A	2003	491	1	0	0	116,234	99.1 (418)	97.6 (367)	97.8 (446)	90.9 (439)	91.5 (422)	92.4 (406)	89.3 (421)	98.8 (28)	87.4 (27)	86.1 (24)
		2004	832	74	0	0	126,245	100.8 (775)	99.9 (746)	99.7 (780)	92.5 (788)	93.4 (689)	94.4 (778)	91.5 (737)	99.9 (80)	89.0 (81)	86.8 (49)
		2005	1,098	34	0	0	123,616	100.4 (1,018)	99.5 (996)	99.0 (1,042)	92.3 (933)	92.5 (895)	93.6 (953)	90.9 (986)	99.5 (51)	86.9 (50)	87.3 (46)
		2006	912	10	0	0	122,932	100.5 (830)	99.4 (809)	98.7 (834)	91.7 (837)	91.9 (810)	93.4 (837)	90.3 (776)	99.3 (53)	85.6 (47)	85.7 (38)
		2007	964	6	1	1	121,758	100.1 (875)	98.9 (863)	98.5 (874)	91.8 (873)	91.7 (883)	93.4 (873)	90.2 (821)	97.6 (60)	85.4 (52)	84.8 (44)
		2008	544	1	0	0	120,633	100.1 (523)	98.9 (527)	98.4 (526)	91.6 (519)	91.3 (527)	93.3 (529)	90.0 (515)	99.9 (9)	85.3 (8)	86.4 (7)
		2009	5	0	0	0	118,995	99.9 (5)	99.7 (5)	99.0 (5)	93.1 (4)	92.9 (5)	94.5 (4)	91.3 (2)	--	--	--
		2010	2	0	0	0	105,980	96.2 (2)	95.8 (2)	96.3 (2)	90.0 (2)	90.1 (2)	91.6 (2)	88.4 (2)	--	--	--
	F	2003	1	2	0	0	98,925	96.1 (3)	94.6 (3)	96.0 (3)	90.2 (3)	89.8 (2)	90.5 (3)	86.4 (3)	--	--	--
		2004	5	0	0	0	101,827	96.0 (4)	95.3 (4)	95.7 (4)	89.3 (4)	90.2 (3)	90.5 (4)	87.8 (4)	95.2 (1)	82.7 (1)	76.9 (1)
		2005	0	1	0	0	95,000	94.3 (1)	94.9 (1)	94.4 (1)	--	88.7 (1)	89.5 (1)	86.0 (1)	--	--	--
		2006	2	0	0	0	97,411	94.9 (2)	94.8 (2)	94.7 (2)	90.8 (2)	88.8 (2)	90.7 (2)	88.3 (2)	--	--	--
		2007	5	0	0	0	101,095	95.8 (5)	96.1 (5)	96.4 (5)	90.9 (5)	91.0 (5)	90.4 (4)	88.5 (5)	--	--	--
		2008	2	0	0	0	106,064	97.6 (2)	98.1 (1)	97.0 (2)	90.6 (2)	89.4 (2)	90.3 (2)	86.9 (2)	--	--	--
		2012	1	0	0	0	118,135	--	--	--	--	--	--	--	--	--	84.3 (1)

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
American Eagle Airlines																	
E140	A	2006	1	0	0	0	31,020	84.5 (1)	86.5 (1)	84.6 (1)	--	--	78.4 (1)	--	--	--	--
	E	2003	2,870	502	1	1	39,565	86.5 (3,210)	85.6 (2,719)	88.0 (3,210)	79.8 (2,191)	79.6 (2,040)	80.3 (3,030)	79.6 (291)	84.2 (70)	95.5 (9)	77.4 (2)
		2004	2,378	539	2	2	40,705	86.7 (2,696)	85.9 (2,624)	88.4 (2,693)	80.1 (1,984)	80.3 (2,338)	80.9 (2,634)	80.1 (255)	84.9 (190)	82.1 (12)	77.6 (4)
		2005	2,891	583	2	2	41,775	86.7 (3,188)	85.9 (3,216)	88.6 (3,272)	80.1 (2,498)	80.4 (1,870)	81.3 (3,061)	81.0 (403)	85.2 (131)	81.8 (5)	79.2 (17)
		2006	3,282	697	2	2	41,503	86.8 (3,796)	85.5 (3,757)	88.4 (3,788)	79.7 (3,128)	79.1 (2,318)	81.0 (3,748)	79.4 (443)	84.7 (144)	78.2 (3)	81.3 (8)
		2007	2,415	561	4	4	41,167	87.0 (2,802)	85.4 (2,776)	88.3 (2,806)	79.8 (2,327)	78.8 (1,725)	81.3 (2,747)	80.7 (201)	84.0 (137)	89.0 (6)	--
		2008	2,457	482	0	0	40,233	86.6 (2,770)	85.6 (2,809)	88.2 (2,803)	79.7 (2,234)	79.1 (1,596)	80.8 (2,737)	80.6 (234)	84.3 (98)	80.8 (3)	78.7 (2)
		2009	2,770	459	2	2	40,879	86.5 (3,117)	85.5 (3,063)	88.1 (3,109)	79.9 (2,647)	78.9 (1,743)	81.2 (3,006)	79.6 (147)	83.5 (97)	84.0 (1)	80.2 (2)
	F	2003	16	2	0	0	32,520	85.5 (15)	85.7 (15)	85.2 (15)	80.0 (6)	78.8 (5)	78.0 (9)	83.1 (1)	82.4 (1)	--	--
		2004	7	0	0	0	32,423	84.9 (7)	84.6 (7)	84.6 (7)	77.5 (2)	77.7 (3)	78.1 (5)	83.9 (1)	--	--	--
		2005	13	2	0	0	30,859	84.6 (13)	84.3 (13)	85.0 (13)	78.0 (4)	78.2 (3)	76.6 (8)	102.9 (1)	87.6 (2)	--	81.4 (1)
		2006	5	0	0	0	34,287	85.5 (4)	85.5 (4)	85.8 (4)	80.0 (1)	77.1 (1)	78.5 (3)	84.3 (1)	87.7 (1)	--	--
		2007	7	1	0	0	35,823	85.5 (6)	84.0 (8)	86.0 (7)	79.1 (7)	79.9 (1)	78.4 (7)	--	--	--	--
		2008	2	0	0	0	33,482	88.4 (2)	84.8 (2)	86.5 (2)	93.8 (1)	80.3 (2)	77.1 (2)	--	--	--	--
		2009	1	1	0	0	33,606	84.2 (2)	83.5 (2)	84.3 (2)	77.6 (1)	--	75.9 (2)	--	--	--	--
American West																	
A319	A	2003	500	117	0	0	126,254	92.7 (601)	91.3 (477)	89.8 (600)	84.6 (586)	84.0 (529)	83.6 (603)	80.3 (465)	87.7 (7)	81.4 (5)	78.4 (2)
		2004	358	11	0	0	124,674	92.0 (337)	91.1 (327)	90.1 (341)	85.1 (338)	84.4 (311)	85.1 (333)	81.0 (285)	86.0 (24)	81.4 (8)	77.9 (8)
		2005	509	101	1	1	126,336	91.6 (554)	90.8 (563)	90.4 (577)	85.3 (548)	83.6 (515)	84.5 (541)	82.3 (483)	87.0 (22)	77.8 (8)	78.4 (9)
		2006	765	353	4	4	126,763	91.5 (1,083)	90.6 (1,082)	90.0 (1,084)	84.9 (1,071)	83.4 (1,023)	84.3 (1,082)	80.7 (873)	86.6 (23)	93.9 (3)	78.9 (6)
		2007	907	219	1	1	126,998	91.5 (1,042)	90.6 (1,041)	90.2 (1,052)	85.1 (1,027)	83.6 (1,041)	84.5 (1,038)	80.7 (807)	85.9 (63)	77.9 (4)	81.0 (9)
		2008	863	310	3	3	121,782	90.9 (1,108)	90.2 (1,120)	89.5 (1,116)	84.5 (1,110)	83.0 (1,081)	84.0 (1,098)	80.4 (856)	86.2 (39)	81.6 (4)	77.1 (5)
		2009	1,575	69	0	0	118,214	90.1 (1,578)	90.0 (1,538)	88.8 (1,578)	84.2 (1,568)	82.8 (1,500)	83.4 (1,513)	80.0 (536)	85.8 (49)	80.3 (3)	81.9 (8)
		2010	384	1	0	0	127,178	92.2 (366)	91.4 (370)	90.1 (378)	83.9 (356)	84.5 (379)	86.1 (368)	80.5 (295)	87.3 (4)	--	--
		2011	546	29	0	0	127,547	92.6 (518)	91.7 (524)	90.0 (532)	84.8 (530)	83.9 (526)	84.6 (490)	80.8 (445)	87.5 (37)	80.2 (8)	81.8 (1)
		2012	887	324	0	0	127,010	92.4 (1,146)	92.0 (1,143)	90.0 (1,156)	84.5 (1,032)	83.7 (1,157)	84.9 (1,116)	80.6 (909)	87.7 (26)	80.2 (9)	82.3 (7)
		2013	558	208	2	2	127,938	92.1 (733)	91.8 (729)	89.7 (743)	84.2 (697)	83.7 (741)	84.4 (723)	80.9 (607)	86.0 (20)	--	--
	AA	2003	229	27	0	0	122,481	91.6 (234)	90.6 (234)	89.9 (241)	85.0 (237)	83.4 (231)	84.3 (219)	81.6 (184)	85.0 (8)	80.2 (4)	75.2 (1)
	E	2003	310	154	1	1	119,181	91.0 (448)	90.1 (404)	89.1 (451)	84.5 (422)	83.4 (433)	83.4 (418)	80.4 (289)	86.2 (5)	80.9 (3)	74.1 (1)
		2004	74	0	0	0	120,920	91.2 (73)	90.4 (70)	89.5 (61)	84.5 (66)	84.3 (71)	83.8 (67)	80.6 (48)	87.8 (1)	79.6 (1)	--
		2005	214	74	1	1	116,678	90.1 (269)	89.6 (274)	88.9 (265)	84.0 (248)	82.5 (238)	83.0 (261)	79.7 (153)	85.2 (8)	76.5 (1)	74.3 (1)
		2006	274	234	0	0	117,496	90.1 (483)	89.6 (476)	88.9 (478)	84.0 (475)	82.5 (449)	83.0 (474)	79.8 (304)	84.6 (24)	82.8 (1)	79.9 (2)
		2007	157	162	2	2	116,876	89.7 (303)	89.4 (301)	88.8 (303)	84.0 (301)	82.5 (292)	82.7 (300)	79.1 (149)	85.3 (13)	--	81.1 (3)
	F	2006	1	0	0	0	106,282	88.7 (1)	89.8 (1)	86.8 (1)	84.5 (1)	--	81.3 (1)	--	--	--	--
A320	A	2003	709	5	0	0	134,519	94.1 (680)	92.9 (472)	91.0 (679)	85.7 (662)	84.8 (603)	84.9 (661)	81.6 (604)	88.7 (19)	90.1 (12)	78.3 (10)
		2004	1,115	36	0	0	136,363	94.1 (1,061)	92.9 (1,020)	91.3 (1,060)	86.2 (1,042)	85.6 (986)	86.3 (1,047)	82.4 (927)	87.9 (70)	81.6 (20)	78.9 (34)
		2005	971	107	2	2	135,952	94.1 (994)	92.8 (987)	91.6 (1,017)	86.4 (935)	85.0 (890)	85.7 (953)	82.4 (926)	88.3 (40)	80.1 (18)	82.3 (18)
		2006	943	5	0	0	136,966	93.3 (881)	92.0 (867)	91.0 (886)	85.7 (876)	84.5 (845)	85.4 (872)	82.4 (777)	88.5 (46)	80.4 (8)	80.5 (18)
		2007	964	197	3	3	136,885	93.5 (1,083)	92.2 (1,067)	91.3 (1,088)	85.9 (1,065)	84.7 (1,085)	85.6 (1,054)	82.1 (944)	87.4 (59)	81.3 (4)	78.3 (13)
		2008	995	89	0	0	132,336	93.2 (1,021)	92.0 (1,034)	90.7 (1,025)	85.2 (1,013)	84.0 (1,006)	84.8 (1,005)	81.6 (918)	87.1 (35)	80.6 (1)	78.2 (11)
		2009	1,125	9	0	0	131,522	92.9 (1,079)	92.1 (1,057)	90.3 (1,084)	85.0 (1,075)	83.9 (1,071)	84.7 (1,036)	82.1 (688)	87.1 (39)	79.2 (6)	79.7 (5)
		2010	653	2	0	0	134,934	93.1 (616)	92.3 (631)	90.4 (634)	84.3 (605)	85.1 (637)	85.0 (624)	81.4 (585)	87.7 (14)	79.3 (4)	80.6 (3)
		2011	536	5	0	0	135,252	93.6 (486)	92.9 (498)	90.4 (507)	84.7 (505)	84.1 (501)	85.0 (478)	81.7 (449)	87.4 (32)	82.2 (8)	82.2 (4)
		2012	725	7	1	1	134,301	93.7 (695)	93.4 (696)	91.1 (708)	84.9 (657)	84.2 (712)	85.3 (672)	81.3 (597)	87.2 (12)	79.2 (6)	81.0 (2)
		2013	295	8	0	0	133,821	93.4 (282)	92.9 (280)	90.5 (288)	84.7 (279)	83.9 (288)	84.7 (282)	81.4 (249)	86.2 (13)	77.6 (1)	78.6 (1)
	AA	2003	318	92	0	0	129,646	93.2 (371)	91.8 (363)	90.4 (384)	86.2 (378)	84.3 (378)	85.2 (329)	83.0 (329)	88.8 (15)	82.0 (8)	81.4 (7)
	E	2003	137	66	0	0	125,463	91.7 (184)	90.8 (167)	89.2 (194)	84.8 (190)	83.1 (183)	83.3 (162)	80.9 (129)	87.7 (7)	81.9 (4)	79.7 (2)
		2004	68	33	1	1	123,039	91.4 (88)	91.1 (90)	89.4 (72)	85.0 (85)	84.5 (89)	83.6 (86)	80.9 (65)	87.7 (10)	80.4 (4)	75.7 (6)
		2005	157	102	1	1	121,746	91.6 (238)	91.2 (241)	90.0 (190)	85.6 (212)	84.2 (185)	84.5 (208)	81.4 (203)	86.2 (15)	78.3 (3)	77.4 (7)
		2006	15	1	0	0	124,902	91.2 (15)	90.9 (15)	89.9 (16)	85.5 (14)	84.2 (11)	84.5 (13)	81.1 (10)	--	--	--
		2007	15	9	0	0	122,305	91.1 (19)	90.7 (17)	89.4 (19)	84.2 (19)	82.9 (19)	83.5 (19)	80.1 (17)	84.8 (5)	--	76.9 (1)
	F	2003	2	1	0	0	111,620	89.8 (3)	89.3 (2)	88.7 (3)	84.5 (3)	82.3 (3)	81.3 (2)	76.5 (1)	--	--	--
		2005	2	1	0	0	107,126	87.7 (3)	88.6 (3)	87.3 (3)	83.1 (3)	80.9 (3)	80.7 (3)	--	--	--	--
		2008	1	0	0	0	106,934	88.3 (1)	90.3 (1)	88.2 (1)	82.6 (1)	81.5 (1)	76.9 (1)	--	--	--	--
		2011	1	0	0	0	106,287	89.7 (1)	89.1 (1)	88.0 (1)	84.0 (1)	82.2 (1)	82.5 (1)	78.8 (1)	--	--	--
		2012	0	1	0	0	105,077	91.8 (1)	92.2 (1)	87.5 (1)	82.1 (1)	80.4 (1)	80.4 (1)	--	--	--	--
A321	A	2009	36	0	0	0	149,700	97.4 (36)	96.1 (36)	93.5 (36)	86.7 (36)	85.8 (36)	86.6 (36)	82.7 (27)	--	--	--
		2010	220	0	0	0	151,497	97.0 (200)	96.0 (204)	93.2 (213)	86.5 (193)	86.5 (216)	86.6 (205)	82.9 (196)	89.6 (4)	81.1 (1)	78.0 (2)
		2011	291	4	0	0	153,491	97.8 (262)	96.8 (260)	93.9 (273)	87.4 (273)	86.5 (272)	87.5 (253)	83.6 (263)	89.2 (14)	80.4 (3)	75.8 (1)
		2012	123	3	0	0	152,369	97.0 (110)	96.6 (113)	93.7 (119)	87.1 (100)	86.4 (122)	87.4 (108)	84.2 (120)	87.0 (3)	76.6 (1)	--
		2013	217	2	0	0	164,986	98.1 (216)	97.5 (210)	95.3 (217)	87.0 (206)	86.0 (214)	86.7 (211)	83.3 (207)	92.0 (2)	--	82.5 (2)

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
American West (Continued)																	
B7373	A	2003	416	55	1	1	108,614	94.9 (456)	93.2 (303)	91.4 (455)	85.1 (441)	85.1 (406)	86.1 (455)	82.9 (442)	90.3 (11)	79.4 (2)	81.3 (4)
		2004	951	113	1	1	108,045	95.3 (931)	93.8 (911)	91.8 (934)	85.7 (941)	85.9 (876)	86.6 (921)	83.5 (920)	91.2 (100)	81.4 (62)	80.7 (68)
		2005	1,072	95	1	1	109,194	95.3 (1,054)	93.7 (1,040)	91.8 (1,081)	85.9 (1,025)	85.4 (954)	86.7 (988)	83.6 (1,056)	91.5 (56)	81.7 (40)	81.9 (39)
		2006	978	50	0	0	108,422	95.5 (943)	93.6 (936)	91.6 (952)	85.7 (949)	84.8 (916)	86.6 (941)	83.3 (892)	90.6 (48)	81.7 (24)	80.7 (26)
		2007	422	99	4	4	107,363	95.3 (470)	93.5 (471)	91.6 (479)	85.6 (478)	84.6 (480)	86.5 (469)	83.0 (452)	91.6 (32)	80.1 (14)	82.6 (18)
		2008	422	1	2	2	105,200	95.0 (397)	93.2 (399)	91.4 (405)	85.4 (395)	84.4 (403)	86.5 (397)	83.1 (402)	89.7 (16)	80.6 (4)	79.2 (8)
		2009	486	3	0	0	103,165	94.3 (464)	92.8 (453)	90.9 (465)	84.6 (463)	84.9 (457)	86.2 (438)	82.6 (390)	90.5 (19)	82.4 (9)	79.5 (10)
		2010	683	126	0	0	106,906	94.5 (757)	93.0 (770)	91.3 (767)	83.8 (757)	86.0 (780)	86.7 (760)	82.9 (754)	91.2 (24)	80.6 (17)	81.2 (12)
		2011	415	261	0	0	108,351	94.5 (645)	93.3 (652)	91.1 (651)	85.2 (652)	85.1 (655)	86.7 (613)	83.1 (612)	89.9 (15)	80.7 (3)	81.9 (4)
	AA	2003	984	39	2	2	104,521	93.9 (857)	92.4 (880)	90.2 (931)	85.9 (918)	85.0 (916)	86.1 (821)	83.4 (913)	90.5 (56)	92.7 (57)	80.1 (52)
	F	2003	2	1	0	0	87,191	87.9 (3)	87.7 (2)	86.5 (3)	82.1 (3)	81.8 (3)	81.9 (3)	78.8 (3)	--	--	--
		2007	1	0	0	0	84,400	87.4 (1)	88.2 (1)	86.0 (1)	84.3 (1)	81.5 (1)	82.8 (1)	78.4 (1)	--	--	--
		2008	2	0	0	0	85,846	88.3 (2)	88.7 (2)	86.4 (2)	81.4 (2)	82.9 (2)	83.2 (2)	77.7 (1)	--	--	--
		2011	1	0	0	0	82,811	87.7 (1)	88.0 (1)	87.0 (1)	83.7 (1)	80.5 (1)	82.5 (1)	78.0 (1)	--	--	--
B757	A	2003	8	0	0	0	177,235	93.4 (8)	94.6 (6)	90.5 (8)	83.1 (8)	84.1 (8)	82.8 (8)	80.3 (6)	--	--	--
		2005	293	1	0	0	185,045	94.4 (278)	94.4 (287)	91.5 (291)	85.5 (265)	84.5 (278)	85.1 (280)	83.8 (264)	87.9 (2)	78.2 (1)	--
		2006	509	0	0	0	180,896	95.2 (464)	94.7 (459)	91.5 (472)	84.8 (460)	83.6 (436)	84.5 (457)	82.1 (392)	89.7 (29)	81.4 (8)	77.7 (12)
		2007	444	10	0	0	179,754	95.0 (401)	94.4 (402)	91.4 (411)	84.7 (403)	83.9 (395)	84.9 (395)	81.3 (323)	89.0 (34)	79.9 (7)	79.4 (8)
		2008	342	0	0	0	179,234	94.7 (318)	94.3 (325)	91.0 (325)	83.9 (315)	83.7 (302)	84.2 (313)	81.3 (280)	88.5 (12)	81.8 (3)	79.6 (1)
		2009	236	0	0	0	179,129	94.2 (222)	94.0 (215)	90.3 (220)	84.4 (217)	83.0 (218)	84.6 (213)	80.9 (101)	87.7 (12)	78.6 (1)	76.5 (2)
		2010	14	0	0	0	181,541	94.8 (14)	94.5 (14)	91.4 (14)	83.5 (13)	84.7 (14)	83.6 (14)	80.8 (12)	--	--	--
		2011	8	8	0	0	171,820	93.3 (16)	93.5 (16)	89.3 (15)	82.6 (12)	82.5 (15)	82.1 (13)	79.8 (9)	--	--	--
		2012	3	1	0	0	189,468	94.7 (4)	94.5 (4)	91.6 (4)	84.2 (4)	82.7 (4)	84.3 (4)	82.1 (3)	--	--	--
		2013	1	1	0	0	176,680	91.9 (2)	92.1 (2)	88.1 (2)	82.5 (2)	81.9 (2)	82.9 (2)	79.7 (2)	--	--	--
	AA	2003	3	2	0	0	170,914	94.0 (5)	93.4 (5)	90.3 (5)	83.6 (5)	82.7 (5)	82.7 (4)	79.7 (5)	--	--	--
	F	2006	4	0	0	0	151,355	89.2 (4)	89.7 (4)	86.9 (4)	80.8 (3)	81.3 (2)	79.1 (4)	--	--	--	--
		2008	1	0	0	0	0	88.9 (1)	89.5 (1)	85.9 (1)	--	82.4 (1)	77.3 (1)	--	--	--	--
Compass Airlines																	
E170	A	2012	80	2	0	0	77,113	95.4 (80)	94.7 (80)	95.3 (81)	88.0 (80)	87.3 (81)	87.8 (79)	83.3 (76)	92.2 (1)	--	78.5 (1)
E175	A	2012	568	20	0	0	83,584	95.7 (547)	94.7 (535)	95.3 (559)	88.3 (463)	87.8 (567)	88.4 (520)	84.0 (540)	90.3 (13)	82.0 (5)	80.6 (3)
Continental																	
B7373	A	2006	1	0	0	0	118,589	96.7 (1)	94.3 (1)	95.3 (1)	88.2 (1)	90.0 (1)	89.6 (1)	87.0 (1)	--	--	--
		2008	1	1	0	0	102,963	95.6 (2)	92.8 (2)	94.6 (2)	87.7 (2)	85.8 (2)	86.9 (2)	83.8 (2)	--	--	--
B7375	A	2003	764	0	0	0	114,400	95.7 (650)	94.0 (592)	93.6 (685)	87.3 (670)	87.5 (652)	88.7 (625)	85.1 (674)	94.3 (59)	87.1 (47)	81.9 (42)
		2004	504	0	0	0	114,907	95.8 (417)	94.1 (394)	94.0 (416)	87.6 (416)	88.1 (384)	88.7 (405)	85.3 (392)	94.1 (76)	90.7 (58)	81.3 (53)
		2005	696	0	0	0	115,695	96.0 (540)	94.3 (533)	94.4 (557)	87.9 (526)	87.3 (506)	89.1 (508)	85.6 (541)	94.7 (105)	81.4 (59)	82.0 (71)
		2006	833	3	0	0	116,868	96.5 (617)	94.3 (603)	94.4 (630)	88.1 (618)	87.1 (595)	89.2 (609)	85.6 (573)	94.5 (181)	81.7 (100)	81.4 (90)
		2007	25	0	0	0	115,863	96.6 (12)	93.7 (12)	93.6 (12)	88.2 (12)	86.3 (12)	88.3 (11)	84.8 (11)	92.5 (13)	79.6 (6)	80.8 (6)
		2009	1	0	0	0	112,690	94.2 (1)	92.9 (1)	91.8 (1)	86.5 (1)	86.5 (1)	87.0 (1)	82.8 (1)	--	--	--
B7377	A	2003	958	280	0	0	137,309	95.6 (1,126)	93.8 (884)	92.7 (1,140)	85.5 (1,114)	85.4 (1,059)	86.8 (1,098)	83.5 (1,131)	94.9 (70)	81.9 (51)	80.5 (39)
		2004	1,126	230	0	0	136,857	95.5 (1,153)	93.8 (1,125)	92.3 (1,158)	85.5 (1,157)	85.7 (1,085)	86.6 (1,146)	83.2 (1,111)	93.9 (151)	82.4 (94)	80.5 (81)
		2005	1,213	255	2	2	138,483	95.8 (1,247)	94.1 (1,259)	93.0 (1,281)	86.1 (1,204)	85.6 (1,154)	86.8 (1,186)	83.6 (1,262)	94.3 (153)	82.6 (54)	81.6 (66)
		2006	1,377	273	2	2	139,095	96.1 (1,508)	94.2 (1,505)	93.2 (1,522)	86.0 (1,512)	85.1 (1,454)	86.9 (1,501)	83.7 (1,414)	93.9 (100)	81.1 (43)	80.7 (42)
		2007	2,072	247	7	7	137,395	96.1 (2,129)	94.1 (2,100)	93.0 (2,145)	85.9 (2,112)	84.8 (2,143)	86.6 (2,091)	83.0 (2,026)	92.6 (137)	79.9 (46)	78.8 (54)
		2008	1,720	225	3	3	137,582	96.0 (1,813)	94.1 (1,815)	92.9 (1,826)	85.7 (1,806)	84.8 (1,826)	86.4 (1,796)	83.2 (1,812)	93.2 (84)	80.5 (27)	80.9 (32)
		2009	1,795	304	7	7	138,191	95.8 (1,996)	94.1 (1,970)	92.9 (2,005)	85.7 (1,998)	85.2 (1,988)	86.6 (1,930)	83.5 (1,309)	91.9 (86)	80.2 (27)	80.1 (28)
		2010	1,967	313	5	5	139,089	96.0 (2,124)	94.4 (2,161)	93.3 (2,178)	85.3 (2,054)	86.3 (2,194)	86.8 (2,135)	83.4 (2,147)	93.0 (77)	79.9 (39)	80.0 (13)
		2011	1,767	291	2	2	138,657	96.0 (1,955)	94.4 (1,969)	93.1 (1,997)	85.7 (1,987)	85.7 (2,002)	86.9 (1,855)	83.4 (1,923)	91.7 (47)	81.4 (15)	81.4 (11)
	AA	2003	296	0	0	0	127,458	92.9 (278)	91.6 (265)	89.5 (280)	84.8 (276)	84.9 (274)	85.1 (249)	82.6 (276)	91.4 (8)	82.2 (8)	79.2 (1)
B7378	A	2003	2	0	0	0	145,817	96.2 (2)	95.9 (2)	95.4 (2)	85.9 (2)	86.4 (2)	88.1 (2)	85.1 (2)	--	--	--
		2005	5	0	0	0	140,471	97.0 (5)	94.9 (5)	93.3 (5)	85.6 (5)	84.8 (5)	85.6 (5)	82.9 (5)	--	--	--
		2006	1	1	0	0	139,481	96.9 (2)	95.1 (2)	93.8 (2)	86.1 (2)	83.9 (2)	84.3 (2)	78.5 (1)	--	--	--
		2007	2	2	0	0	147,922	98.2 (2)	95.8 (2)	94.0 (1)	88.4 (2)	87.1 (2)	89.4 (2)	86.3 (2)	93.1 (2)	79.6 (1)	82.3 (1)
		2008	108	0	0	0	149,416	98.2 (84)	96.2 (85)	95.2 (91)	87.4 (88)	86.3 (88)	88.8 (82)	84.8 (89)	93.8 (13)	82.0 (12)	79.3 (5)
		2009	434	0	0	0	149,824	98.1 (368)	96.0 (361)	94.8 (367)	87.1 (362)	86.9 (365)	88.3 (342)	84.8 (321)	94.3 (56)	80.6 (34)	81.6 (26)
		2010	594	2	0	0	150,416	98.0 (476)	96.0 (484)	94.8 (497)	86.4 (464)	88.2 (501)	88.5 (482)	85.1 (494)	95.0 (81)	80.4 (60)	82.0 (36)
		2011	580	3	0	0	147,048	97.8 (518)	95.9 (529)	94.2 (534)	87.2 (538)	87.3 (538)	88.3 (486)	85.0 (514)	94.1 (39)	80.6 (18)	80.7 (17)
B757	A	2003	2	0	0	0	204,911	96.2 (2)	95.9 (2)	92.6 (2)	85.7 (2)	85.4 (2)	86.5 (2)	85.3 (1)	--	--	--

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Delta Airlines																	
A319	A	2010	1,722	197	9	9	134,047	95.2 (1,771)	93.6 (1,802)	93.1 (1,826)	86.1 (1,740)	85.8 (1,822)	86.2 (1,769)	81.9 (1,714)	91.4 (87)	79.5 (13)	80.2 (9)
		2011	2,651	18	0	0	133,075	95.1 (2,462)	93.7 (2,487)	93.1 (2,526)	86.5 (2,524)	85.4 (2,515)	86.3 (2,374)	81.9 (2,355)	89.0 (118)	81.8 (22)	79.5 (21)
		2012	1,699	1	0	0	136,768	94.9 (1,576)	94.1 (1,568)	93.7 (1,588)	86.6 (1,436)	85.6 (1,610)	86.6 (1,520)	82.3 (1,458)	91.4 (63)	81.3 (25)	80.6 (34)
		2013	1,127	3	0	0	137,698	94.8 (1,059)	94.0 (1,045)	93.5 (1,075)	86.5 (1,029)	85.6 (1,074)	86.5 (1,054)	82.5 (974)	91.0 (48)	80.0 (14)	81.3 (16)
	F	2012	0	1	0	0	102,332	91.5 (1)	91.4 (1)	90.2 (1)	84.6 (1)	81.8 (1)	81.7 (1)	--	--	--	--
A320	A	2010	172	5	0	0	136,205	95.6 (174)	94.0 (171)	93.2 (174)	86.7 (150)	85.6 (175)	86.6 (170)	82.2 (172)	91.8 (2)	--	--
		2011	20	0	0	0	139,291	95.9 (16)	94.3 (18)	94.0 (18)	86.5 (18)	86.0 (17)	86.6 (14)	82.7 (18)	85.9 (1)	82.2 (1)	--
		2012	13	2	0	0	137,348	95.4 (12)	94.4 (12)	94.0 (13)	87.0 (12)	86.0 (13)	87.7 (13)	83.3 (12)	91.4 (2)	--	80.9 (2)
		2013	6	0	0	0	140,740	94.8 (5)	93.8 (4)	94.0 (6)	86.9 (6)	85.6 (5)	89.6 (5)	82.3 (6)	--	--	--
B7373	A	2004	318	2	0	0	111,652	95.9 (304)	94.4 (302)	93.7 (305)	86.7 (300)	87.5 (297)	87.6 (296)	84.7 (281)	92.0 (14)	82.4 (9)	81.4 (10)
		2005	509	0	0	0	113,513	96.2 (449)	94.4 (444)	94.4 (470)	87.0 (436)	87.0 (431)	87.8 (423)	84.6 (459)	92.5 (31)	80.7 (18)	80.3 (22)
		2006	4	0	0	0	120,094	96.5 (4)	94.1 (4)	95.0 (4)	87.0 (4)	86.4 (4)	87.5 (3)	82.5 (2)	--	--	--
		2007	3	0	0	0	136,316	95.3 (3)	93.6 (2)	92.6 (3)	89.0 (1)	86.9 (2)	87.9 (3)	85.3 (3)	--	--	--
		2008	11	0	0	0	138,236	95.7 (11)	93.9 (11)	93.2 (11)	87.6 (11)	86.7 (11)	88.8 (11)	85.5 (11)	--	--	--
B7377	A	2007	1	0	0	0	135,701	97.3 (1)	95.6 (1)	94.1 (1)	88.5 (1)	--	89.6 (1)	84.9 (1)	--	--	--
		2008	277	7	3	3	141,173	95.8 (249)	94.1 (261)	92.1 (264)	85.3 (260)	84.9 (252)	86.8 (244)	84.0 (262)	92.4 (20)	79.3 (6)	80.9 (7)
		2009	730	103	17	17	140,449	96.0 (816)	94.2 (805)	92.1 (824)	84.8 (815)	85.6 (808)	87.1 (786)	83.7 (599)	91.7 (21)	80.2 (9)	79.4 (8)
		2010	1,355	160	5	5	140,488	96.1 (1,422)	94.3 (1,445)	92.2 (1,466)	83.9 (1,412)	86.4 (1,473)	86.9 (1,415)	83.8 (1,448)	92.7 (37)	80.2 (14)	81.4 (12)
		2011	1,441	245	2	2	139,512	96.1 (1,539)	94.4 (1,573)	92.3 (1,594)	85.4 (1,593)	86.2 (1,599)	87.4 (1,479)	84.6 (1,537)	91.8 (76)	82.3 (27)	79.8 (28)
		2012	770	145	2	2	142,409	96.0 (862)	95.0 (859)	92.8 (864)	86.1 (737)	86.4 (882)	87.8 (822)	85.1 (833)	91.6 (28)	81.1 (11)	79.8 (12)
		2013	6	0	0	0	141,080	94.1 (5)	93.4 (5)	91.3 (5)	85.3 (5)	86.1 (5)	87.2 (4)	84.0 (2)	92.6 (1)	82.9 (1)	--
	F	2011	1	0	0	0	0	90.8 (1)	88.8 (1)	86.7 (1)	81.9 (1)	82.4 (1)	83.1 (1)	78.8 (1)	--	--	--
B7378	A	2003	157	6	0	0	139,742	94.3 (159)	92.9 (145)	89.9 (161)	83.9 (154)	84.3 (141)	84.9 (158)	82.3 (156)	91.1 (2)	--	--
		2004	43	0	0	0	131,398	93.6 (34)	91.8 (33)	89.7 (34)	84.3 (33)	85.2 (32)	84.7 (32)	82.3 (31)	90.3 (9)	79.4 (4)	78.6 (5)
		2005	54	6	0	0	136,135	94.8 (54)	93.0 (55)	90.2 (56)	84.1 (52)	84.4 (44)	85.5 (53)	82.5 (54)	91.8 (3)	80.3 (1)	78.2 (1)
		2006	129	4	0	0	139,042	95.2 (124)	93.1 (121)	90.3 (125)	84.5 (124)	83.6 (117)	85.8 (123)	82.9 (118)	90.8 (7)	--	81.0 (3)
		2007	28	10	0	0	121,296	94.0 (37)	92.3 (35)	91.1 (37)	85.8 (36)	84.9 (37)	86.9 (37)	83.8 (34)	88.3 (1)	--	--
		2008	193	10	1	1	134,959	95.8 (185)	94.1 (187)	93.3 (188)	87.6 (184)	86.7 (183)	88.8 (180)	85.7 (186)	91.4 (14)	78.8 (1)	80.7 (9)
		2009	337	5	0	0	133,553	95.6 (329)	93.8 (324)	92.8 (328)	87.4 (324)	86.3 (328)	88.4 (308)	84.7 (198)	91.8 (5)	78.9 (4)	79.9 (4)
		2010	203	12	1	1	138,100	96.1 (203)	94.4 (206)	93.7 (207)	88.0 (197)	87.7 (208)	89.3 (198)	86.1 (200)	94.2 (7)	81.1 (7)	79.3 (5)
		2011	33	9	0	0	136,080	95.9 (40)	94.4 (41)	93.2 (42)	86.9 (42)	87.6 (42)	88.8 (34)	85.8 (40)	--	--	--
		2012	20	6	0	0	138,384	96.3 (24)	95.2 (22)	94.2 (24)	87.5 (22)	87.9 (24)	89.1 (23)	86.2 (23)	93.1 (1)	80.7 (2)	83.0 (2)
		2013	5	2	0	0	128,473	94.5 (7)	93.4 (7)	92.3 (7)	87.0 (7)	86.0 (7)	87.8 (7)	84.5 (5)	--	--	--
	AA	2003	238	6	1	1	138,942	93.5 (225)	91.9 (231)	89.5 (236)	84.9 (229)	84.2 (232)	85.7 (216)	82.7 (231)	91.4 (7)	85.4 (4)	78.9 (4)
	F	2012	1	2	0	0	118,473	90.9 (3)	89.7 (3)	86.6 (2)	84.1 (3)	81.3 (3)	83.7 (3)	78.3 (1)	--	--	--
B757	A	2003	1,095	0	0	0	201,144	95.2 (974)	93.7 (819)	92.8 (1,000)	85.3 (982)	85.5 (932)	85.7 (944)	82.7 (976)	92.2 (77)	83.4 (39)	80.8 (39)
		2004	1,428	81	1	1	198,832	95.4 (1,333)	94.0 (1,289)	93.1 (1,337)	86.2 (1,335)	86.6 (1,250)	86.3 (1,303)	83.9 (1,267)	91.0 (148)	89.3 (67)	80.2 (80)
		2005	1,598	1	0	0	200,958	95.9 (1,421)	94.4 (1,425)	94.0 (1,460)	87.2 (1,363)	86.7 (1,291)	86.9 (1,360)	83.7 (1,434)	90.8 (91)	80.6 (45)	81.8 (56)
		2006	1,472	0	0	0	201,298	96.1 (1,350)	94.3 (1,323)	93.8 (1,363)	87.0 (1,339)	86.2 (1,299)	86.7 (1,344)	83.4 (1,256)	90.9 (86)	79.6 (21)	80.9 (34)
		2007	1,345	3	0	0	203,986	96.5 (1,215)	94.6 (1,205)	94.3 (1,227)	87.4 (1,211)	86.4 (1,228)	87.3 (1,203)	83.7 (1,165)	90.2 (91)	83.2 (15)	78.1 (36)
		2008	969	79	8	8	206,098	96.7 (994)	94.7 (990)	94.6 (999)	87.4 (986)	86.4 (1,004)	87.4 (991)	83.9 (991)	91.3 (37)	79.1 (3)	81.4 (18)
		2009	755	12	2	2	205,213	96.4 (705)	94.7 (701)	94.1 (715)	87.3 (704)	86.5 (714)	87.5 (691)	83.8 (472)	90.6 (49)	79.2 (14)	79.8 (15)
		2010	124	55	1	1	202,885	96.0 (173)	94.6 (171)	93.8 (172)	86.4 (151)	87.3 (173)	87.3 (162)	83.5 (167)	92.5 (6)	--	80.0 (1)
		2011	20	3	0	0	194,531	95.4 (22)	93.9 (22)	92.4 (21)	86.3 (21)	86.0 (22)	86.4 (20)	82.8 (20)	88.5 (1)	--	--
		2012	516	12	1	1	206,795	95.9 (490)	94.9 (503)	94.2 (512)	87.1 (500)	86.4 (514)	87.5 (489)	83.6 (447)	92.7 (12)	81.7 (5)	82.0 (7)
		2013	729	11	0	0	207,205	95.7 (686)	94.7 (683)	94.1 (699)	87.1 (672)	86.3 (695)	87.3 (684)	83.9 (638)	92.0 (39)	81.9 (7)	81.5 (21)
	AA	2003	2	1	0	0	169,738	93.3 (2)	92.4 (1)	90.1 (2)	85.6 (2)	83.8 (2)	84.5 (2)	81.3 (2)	85.8 (1)	--	--
	F	2013	0	1	0	0	187,975	--	--	--	--	--	--	--	87.4 (1)	--	77.9 (1)
MD90	A	2003	354	0	0	0	144,580	92.2 (345)	91.4 (205)	90.9 (344)	82.8 (326)	84.5 (310)	85.3 (340)	82.5 (330)	93.9 (5)	78.1 (1)	81.9 (4)
		2004	589	2	0	0	140,796	91.2 (536)	90.2 (515)	90.0 (541)	82.8 (504)	83.8 (491)	84.8 (530)	83.5 (486)	90.3 (45)	81.1 (9)	80.0 (25)
		2005	669	9	0	0	141,861	91.6 (634)	90.5 (626)	90.6 (645)	83.5 (586)	84.0 (578)	85.0 (603)	83.1 (620)	90.6 (21)	93.7 (3)	79.5 (11)
		2006	818	4	1	1	140,674	91.7 (781)	90.5 (780)	90.2 (780)	82.7 (747)	82.9 (714)	84.7 (769)	83.0 (707)	89.9 (30)	82.7 (2)	78.4 (14)
		2007	831	6	0	0	137,130	91.3 (776)	89.9 (773)	89.7 (781)	82.4 (732)	82.4 (721)	84.5 (761)	81.6 (678)	89.4 (48)	83.4 (3)	77.7 (15)
		2008	954	13	2	2	136,392	91.2 (916)	89.8 (925)	89.5 (921)	82.2 (846)	82.4 (804)	84.4 (909)	81.9 (851)	89.8 (29)	81.9 (7)	80.2 (13)
		2009	864	8	0	0	136,344	91.1 (827)	90.0 (803)	89.5 (828)	82.4 (766)	82.6 (724)	84.7 (796)	81.7 (492)	88.6 (39)	84.2 (6)	78.1 (10)
		2010	182	0	0	0	134,285	91.3 (177)	89.8 (175)	89.5 (174)	82.8 (160)	82.3 (159)	84.1 (174)	81.4 (161)	93.6 (4)	82.9 (2)	78.0 (2)
	AA	2003	451	0	0	0	141,391	92.2 (373)	90.9 (375)	90.4 (400)	83.1 (385)	83.6 (390)	85.7 (349)	83.2 (382)	92.0 (37)	87.1 (20)	79.7 (27)
	E	2003	427	13	0	0	138,992	91.1 (410)	90.0 (383)	89.3 (415)	82.2 (390)	82.8 (407)	84.5 (385)	81.7 (404)	88.6 (11)	80.4 (4)	78.2 (8)

John Wayne Airport Departures

Airline / Aircraft	Class	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Express Jet																	
CL60	A	2005	1	0	0	0	70,043	91.4 (1)	90.5 (1)	88.8 (1)	79.0 (1)	--	81.9 (1)	79.3 (1)	--	--	--
	E	2003	248	6	0	0	83,520	89.5 (244)	88.6 (181)	87.3 (242)	79.6 (172)	82.3 (198)	82.4 (237)	80.6 (206)	84.0 (7)	78.5 (3)	78.8 (1)
		2004	781	6	0	0	77,576	90.3 (716)	89.1 (695)	88.2 (719)	81.0 (604)	82.2 (665)	83.0 (704)	81.6 (641)	85.5 (54)	79.0 (9)	79.2 (9)
		2005	309	1	0	0	74,153	90.6 (288)	89.0 (283)	88.2 (291)	81.2 (243)	81.8 (174)	82.8 (262)	81.3 (249)	87.0 (12)	79.6 (6)	77.5 (3)
FedEx																	
A300	A	2003	0	11	0	0	288,501	94.6 (10)	93.2 (10)	92.2 (10)	87.6 (10)	87.1 (9)	87.4 (10)	84.0 (9)	88.2 (1)	--	83.1 (1)
		2004	0	9	0	0	303,780	97.8 (8)	96.1 (8)	94.0 (8)	88.9 (8)	88.3 (7)	89.0 (8)	86.0 (7)	92.1 (1)	--	--
		2005	0	1	0	0	305,764	94.5 (1)	93.4 (1)	93.4 (1)	86.5 (1)	85.6 (1)	--	83.9 (1)	--	--	--
		2006	0	47	0	0	311,845	98.2 (46)	96.6 (46)	95.0 (46)	88.6 (46)	88.6 (45)	89.5 (46)	86.0 (44)	93.7 (1)	--	--
		2007	0	119	0	0	304,307	97.9 (113)	96.3 (113)	94.8 (114)	88.4 (109)	88.9 (113)	89.5 (111)	86.2 (107)	93.6 (5)	--	83.3 (1)
		2008	0	137	0	0	310,738	97.9 (132)	96.3 (132)	94.6 (130)	87.7 (129)	88.6 (130)	89.0 (133)	85.8 (132)	92.6 (3)	81.1 (3)	75.3 (1)
		2009	2	183	0	0	302,544	96.8 (180)	95.7 (176)	93.9 (181)	87.2 (179)	88.7 (174)	88.9 (175)	85.6 (130)	91.1 (4)	--	79.7 (1)
		2010	2	245	0	0	306,629	97.1 (233)	96.0 (237)	94.1 (237)	87.7 (228)	88.9 (239)	89.2 (235)	85.7 (235)	95.2 (8)	81.0 (5)	84.3 (5)
		2011	0	253	0	0	300,676	96.2 (243)	95.2 (244)	93.8 (241)	88.0 (242)	87.8 (244)	89.2 (235)	85.6 (235)	93.1 (8)	80.0 (4)	80.8 (2)
		2012	0	229	1	1	301,306	96.0 (216)	95.7 (220)	93.8 (215)	88.1 (199)	87.8 (220)	89.5 (212)	85.7 (205)	91.1 (7)	80.0 (4)	81.4 (4)
		2013	0	106	0	0	300,912	95.6 (103)	95.2 (99)	93.8 (103)	87.9 (102)	87.8 (104)	89.2 (100)	86.0 (90)	92.5 (2)	78.8 (1)	80.0 (2)
A306	A	2012	0	21	0	0	306,852	96.0 (21)	95.8 (21)	94.4 (21)	88.6 (21)	88.0 (21)	90.0 (21)	86.0 (18)	--	--	--
		2013	0	63	0	0	309,594	97.1 (63)	96.7 (62)	94.7 (63)	88.6 (61)	88.3 (61)	90.0 (61)	85.9 (60)	--	--	--
A310	A	2003	0	219	0	0	275,368	99.5 (209)	97.8 (203)	97.3 (211)	91.4 (209)	91.4 (200)	92.6 (202)	88.9 (211)	94.8 (4)	83.9 (3)	81.2 (1)
		2004	0	175	0	0	279,940	99.7 (160)	98.2 (165)	97.6 (165)	91.6 (166)	91.7 (151)	92.6 (167)	89.1 (157)	94.6 (8)	82.4 (6)	--
		2005	1	204	0	0	271,550	99.5 (187)	98.0 (193)	97.4 (193)	91.6 (182)	90.8 (171)	92.3 (185)	88.8 (186)	95.8 (6)	85.5 (5)	83.5 (4)
		2006	1	177	0	0	296,239	99.0 (172)	97.2 (172)	96.3 (170)	90.4 (170)	89.7 (163)	91.2 (171)	87.4 (154)	93.7 (5)	82.2 (2)	81.5 (1)
		2007	0	93	0	0	303,348	97.7 (91)	96.2 (89)	94.7 (90)	88.3 (91)	89.1 (91)	89.7 (91)	86.6 (86)	89.7 (2)	80.3 (1)	78.1 (1)
		2008	0	53	0	0	299,661	97.5 (50)	96.3 (51)	94.8 (47)	88.2 (50)	88.9 (50)	89.5 (50)	86.2 (50)	95.5 (2)	81.2 (2)	--
		2009	0	70	0	0	307,727	97.1 (69)	96.0 (67)	94.3 (68)	87.7 (69)	89.0 (69)	89.1 (68)	86.2 (42)	93.2 (1)	77.1 (1)	--
		2010	0	2	0	0	281,713	98.7 (2)	97.7 (2)	97.4 (2)	89.1 (2)	91.8 (2)	91.8 (2)	88.4 (2)	--	--	--
		2011	0	1	0	0	305,259	95.8 (1)	96.5 (1)	93.6 (1)	87.1 (1)	88.8 (1)	89.1 (1)	--	--	--	--
		2012	0	1	0	0	270,242	97.5 (1)	96.5 (1)	96.0 (1)	91.2 (1)	90.3 (1)	92.3 (1)	--	--	--	--
		2013	0	1	0	0	292,829	93.0 (1)	92.6 (1)	89.9 (1)	85.5 (1)	85.2 (1)	85.7 (1)	83.3 (1)	--	--	--
A319	A	2006	0	1	0	0	311,551	95.1 (1)	93.5 (1)	94.5 (1)	88.1 (1)	86.9 (1)	89.4 (1)	85.6 (1)	--	--	--
Frontier Air																	
A318	A	2004	3	30	0	0	123,847	92.3 (31)	90.4 (30)	90.8 (31)	85.1 (31)	84.7 (31)	84.4 (31)	81.2 (27)	87.7 (2)	--	--
		2005	257	227	1	1	128,545	93.4 (459)	90.7 (461)	91.2 (469)	85.6 (439)	84.1 (434)	84.8 (430)	80.7 (431)	87.1 (13)	81.9 (1)	79.1 (5)
		2006	3	4	0	0	131,839	93.0 (6)	91.8 (5)	91.6 (6)	85.9 (5)	85.3 (6)	85.3 (5)	81.2 (4)	81.3 (1)	--	--
		2007	1	3	0	0	120,387	92.6 (4)	90.9 (3)	90.7 (4)	85.8 (4)	83.9 (4)	84.6 (4)	79.8 (4)	--	--	--
		2008	52	3	0	0	126,895	93.0 (52)	90.7 (52)	91.3 (50)	84.9 (50)	84.5 (52)	85.1 (50)	81.7 (50)	86.3 (3)	--	77.5 (2)
		2009	76	38	0	0	125,436	92.8 (113)	91.3 (112)	90.9 (113)	84.4 (111)	84.3 (108)	84.5 (111)	81.1 (87)	86.5 (1)	--	--
		2010	54	86	0	0	121,381	92.7 (137)	91.5 (136)	90.5 (136)	84.3 (131)	84.3 (136)	84.5 (138)	80.1 (116)	87.2 (2)	--	79.9 (1)
		2011	15	29	0	0	121,945	93.1 (40)	91.9 (40)	90.9 (41)	84.6 (41)	83.9 (41)	84.3 (38)	79.8 (36)	87.7 (3)	76.4 (1)	80.0 (1)
		2012	22	160	0	0	127,052	93.1 (176)	92.4 (176)	91.7 (178)	85.2 (173)	84.2 (179)	85.3 (178)	80.6 (148)	87.1 (3)	--	79.0 (1)
		2013	4	5	0	0	130,101	92.7 (9)	91.8 (9)	91.2 (9)	84.7 (9)	84.6 (9)	84.9 (9)	81.2 (7)	--	--	--
A319	A	2003	109	22	0	0	131,482	93.0 (123)	91.5 (83)	91.8 (124)	85.6 (125)	85.7 (111)	85.3 (121)	81.1 (116)	90.4 (6)	79.7 (2)	78.2 (2)
		2004	359	124	1	1	128,984	93.1 (419)	91.5 (405)	91.7 (421)	86.1 (421)	85.5 (385)	85.5 (411)	81.4 (399)	88.7 (55)	80.5 (19)	79.4 (20)
		2005	341	66	1	1	130,002	93.1 (357)	91.5 (363)	91.7 (373)	86.5 (348)	84.7 (322)	85.3 (351)	81.2 (324)	88.2 (23)	79.4 (15)	79.7 (15)
		2006	647	313	3	3	130,707	93.5 (907)	91.4 (911)	91.8 (914)	86.0 (907)	84.7 (878)	85.5 (904)	82.0 (791)	88.1 (35)	79.3 (5)	79.8 (16)
		2007	804	294	2	2	131,643	93.7 (1,017)	91.6 (1,012)	92.1 (1,025)	86.3 (1,019)	85.3 (1,028)	86.1 (1,004)	82.0 (916)	87.6 (57)	79.7 (8)	79.7 (26)
		2008	758	232	0	0	129,785	93.6 (937)	91.7 (942)	92.0 (941)	86.2 (939)	85.3 (937)	86.1 (929)	82.2 (895)	88.7 (27)	81.3 (6)	79.1 (8)
		2009	1,003	298	0	0	130,739	93.6 (1,240)	91.9 (1,225)	91.8 (1,243)	86.0 (1,242)	85.4 (1,237)	86.1 (1,191)	82.4 (816)	87.9 (46)	83.0 (7)	78.9 (14)
		2010	1,048	235	1	1	131,599	93.9 (1,210)	92.6 (1,236)	91.9 (1,235)	85.1 (1,199)	86.0 (1,244)	85.9 (1,212)	81.6 (1,149)	88.4 (29)	78.4 (6)	78.2 (4)
		2011	1,108	267	2	2	133,135	94.0 (1,273)	92.8 (1,292)	91.9 (1,307)	85.9 (1,300)	85.5 (1,303)	86.2 (1,228)	81.8 (1,203)	88.6 (59)	80.4 (12)	81.0 (9)
		2012	1,048	127	0	0	135,809	93.7 (1,107)	93.1 (1,101)	92.3 (1,122)	86.0 (1,006)	85.5 (1,131)	86.6 (1,059)	82.1 (1,012)	89.1 (29)	79.9 (8)	82.7 (11)
		2013	706	81	0	0	137,772	93.8 (759)	93.1 (739)	92.4 (762)	85.9 (735)	85.5 (759)	86.3 (747)	82.3 (701)	89.9 (21)	78.5 (3)	82.3 (14)
A320	A	2011	2	1	0	0	138,706	94.9 (3)	94.1 (3)	90.9 (3)	84.6 (3)	84.0 (3)	83.9 (3)	80.2 (3)	--	--	--
		2012	0	1	0	0	145,429	95.1 (1)	94.6 (1)	91.1 (1)	86.0 (1)	86.0 (1)	86.4 (1)	--	--	--	--
B7373	A	2003	31	52	0	0	107,518	93.1 (82)	91.5 (64)	91.8 (82)	85.5 (79)	87.2 (62)	87.0 (82)	83.2 (80)	87.5 (1)	--	--
		2004	171	104	0	0	112,562	93.7 (268)	92.0 (261)	92.3 (268)	86.6 (263)	87.0 (261)	88.1 (261)	84.3 (240)	92.2 (5)	80.0 (5)	79.3 (5)
		2005	1	0	0	0	112,331	93.7 (1)	90.5 (1)	93.5 (1)	88.6 (1)	--	88.1 (1)	83.9 (1)	--	--	--
Interjet																	
A320	A	2012	173	0	0	0	65,686	94.9 (166)	93.6 (166)	92.7 (168)	86.5 (166)	85.9 (170)	86.8 (168)	82.8 (114)	89.9 (2)	--	82.0 (1)
		2013	493	1	0	0	140,891	94.5 (471)	93.4 (464)	92.6 (473)	86.5 (456)	85.6 (472)	86.7 (461)	83.1 (414)	87.8 (19)	77.4 (3)	81.1 (3)

John Wayne Airport Departures

Airline / Aircraft	Class	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Mesa Airlines																	
CL60	A	2007	0	1	0	0	49,500	86.2 (1)	83.4 (1)	88.4 (1)	--	77.3 (1)	81.4 (1)	--	--	--	--
	E	2003	1,027	38	1	1	50,184	85.7 (990)	84.9 (876)	86.6 (1,015)	79.8 (493)	80.2 (681)	79.2 (902)	80.1 (61)	83.6 (31)	87.4 (4)	79.2 (1)
		2004	137	90	0	0	47,456	85.7 (212)	84.4 (205)	86.3 (213)	78.9 (114)	79.9 (152)	78.9 (199)	78.7 (9)	82.1 (12)	--	--
CRJ9	A	2004	499	238	2	2	73,566	92.2 (696)	90.6 (685)	92.9 (696)	85.7 (692)	85.1 (686)	86.9 (679)	80.9 (550)	89.7 (36)	87.4 (5)	76.9 (3)
		2005	360	249	0	0	69,599	92.2 (561)	90.8 (560)	93.1 (568)	85.3 (534)	83.9 (498)	86.5 (527)	80.4 (469)	89.8 (25)	79.8 (6)	81.5 (6)
		2006	319	277	2	2	72,371	92.3 (580)	90.9 (578)	93.0 (574)	84.5 (570)	83.5 (548)	86.2 (578)	80.4 (450)	87.8 (17)	84.8 (1)	--
		2007	285	261	1	1	69,102	92.3 (521)	90.8 (517)	92.7 (524)	84.6 (514)	83.0 (515)	86.0 (520)	80.0 (390)	87.6 (20)	--	80.6 (2)
		2008	300	148	4	4	68,190	91.9 (432)	90.3 (434)	92.2 (432)	84.5 (430)	82.3 (424)	85.6 (431)	79.8 (320)	89.3 (11)	--	--
		2009	1,241	18	0	0	68,967	91.6 (1,212)	90.2 (1,196)	91.9 (1,201)	84.1 (1,186)	83.2 (1,158)	85.7 (1,159)	80.1 (755)	87.4 (42)	79.4 (1)	75.8 (2)
		2010	705	12	0	0	68,031	91.8 (687)	90.3 (679)	92.1 (678)	83.6 (636)	84.8 (682)	85.4 (674)	80.1 (572)	88.8 (20)	--	--
		2011	346	14	0	0	76,009	92.0 (330)	90.3 (333)	92.5 (338)	83.5 (336)	85.5 (339)	85.5 (313)	80.3 (288)	87.8 (19)	77.2 (1)	--
		2012	296	14	0	0	72,176	91.5 (293)	90.3 (289)	92.3 (291)	83.6 (266)	84.8 (295)	85.2 (283)	80.3 (239)	88.7 (10)	79.5 (1)	84.7 (1)
		2013	146	61	2	2	69,715	91.5 (198)	90.2 (192)	92.2 (198)	83.4 (191)	84.7 (198)	85.1 (193)	80.3 (162)	88.7 (9)	--	77.2 (1)
	F	2004	1	1	0	0	57,250	89.1 (2)	88.2 (2)	89.3 (2)	83.5 (2)	82.3 (2)	79.5 (2)	--	--	--	--
		2006	1	1	0	0	63,000	88.8 (2)	89.7 (2)	90.7 (2)	80.5 (2)	78.8 (2)	80.6 (2)	--	--	--	--
Midwest Express																	
B717	A	2003	99	0	0	0	101,917	90.9 (98)	89.8 (66)	91.5 (95)	83.2 (97)	84.0 (81)	83.3 (97)	80.1 (76)	--	--	--
		2004	430	4	0	0	122,353	91.2 (402)	90.3 (382)	91.8 (399)	83.7 (397)	84.1 (372)	84.5 (389)	81.3 (313)	88.0 (27)	80.3 (2)	76.5 (3)
		2005	120	0	0	0	112,788	91.6 (102)	90.7 (105)	93.0 (105)	84.5 (106)	84.1 (83)	84.9 (88)	81.6 (102)	89.3 (12)	76.3 (2)	79.1 (1)
Northwest Airlines																	
A319	A	2003	1,289	1	0	0	138,242	95.1 (1,104)	93.3 (966)	92.8 (1,141)	87.1 (1,109)	85.7 (1,084)	86.3 (1,073)	82.4 (1,100)	92.4 (124)	80.9 (34)	80.7 (34)
		2004	1,037	1	0	0	139,202	95.4 (854)	93.7 (834)	93.3 (856)	86.9 (856)	86.1 (802)	86.5 (841)	82.5 (805)	91.9 (159)	84.3 (54)	81.6 (50)
		2005	1,162	1	0	0	139,668	95.6 (991)	93.9 (990)	93.9 (1,014)	87.3 (944)	86.0 (902)	86.4 (944)	83.8 (988)	92.4 (112)	80.3 (26)	81.4 (41)
		2006	934	2	0	0	138,798	95.7 (867)	93.6 (862)	93.3 (869)	86.5 (864)	85.2 (837)	86.1 (866)	82.3 (795)	90.9 (50)	81.6 (8)	79.2 (16)
		2007	857	0	0	0	138,385	95.9 (780)	93.7 (779)	93.3 (791)	86.7 (785)	85.4 (792)	86.2 (773)	82.3 (718)	89.7 (50)	80.2 (6)	79.2 (16)
		2008	772	0	0	0	137,957	95.8 (727)	93.8 (735)	93.4 (736)	86.5 (726)	85.3 (732)	86.0 (724)	82.5 (725)	90.1 (24)	82.3 (4)	79.7 (9)
		2009	1,123	1	0	0	138,331	95.7 (1,071)	93.9 (1,056)	93.2 (1,071)	86.6 (1,071)	85.8 (1,062)	86.5 (1,010)	82.6 (659)	90.2 (44)	78.5 (5)	78.9 (11)
		2010	81	0	0	0	139,945	95.4 (75)	93.9 (73)	93.1 (73)	86.3 (67)	86.4 (76)	86.5 (73)	83.1 (70)	92.4 (5)	82.8 (2)	81.3 (1)
	F	2004	1	0	0	0	110,579	91.1 (1)	90.2 (1)	89.3 (1)	84.9 (1)	85.2 (1)	84.4 (1)	--	--	--	--
A320	A	2003	25	0	0	0	145,499	95.7 (16)	93.8 (15)	92.9 (16)	86.1 (14)	85.3 (16)	85.8 (9)	82.6 (16)	93.6 (7)	82.8 (4)	80.6 (3)
		2004	15	0	0	0	142,756	96.3 (12)	94.4 (12)	93.6 (12)	87.3 (12)	86.3 (11)	86.9 (10)	82.6 (12)	92.5 (2)	82.1 (2)	78.5 (1)
		2005	13	0	0	0	147,305	95.8 (9)	94.9 (10)	95.2 (10)	87.1 (10)	86.0 (10)	86.3 (10)	83.4 (10)	93.7 (3)	78.3 (1)	83.9 (2)
		2006	20	0	0	0	145,323	96.4 (18)	94.5 (18)	94.0 (18)	86.5 (17)	85.7 (16)	86.5 (18)	83.0 (16)	90.7 (2)	--	--
		2007	4	0	0	0	148,613	96.7 (4)	94.5 (4)	94.9 (4)	87.7 (4)	86.6 (4)	87.7 (4)	83.5 (4)	--	--	--
		2009	9	1	0	0	145,225	95.8 (10)	94.1 (10)	92.9 (10)	86.1 (9)	85.8 (10)	86.7 (10)	82.6 (7)	--	--	--
		2010	2	0	0	0	150,121	96.2 (1)	95.3 (1)	94.8 (1)	84.4 (1)	87.5 (1)	86.9 (1)	84.0 (1)	--	--	78.5 (1)
	F	2003	0	1	0	0	106,402	91.8 (1)	90.8 (1)	87.9 (1)	83.9 (1)	--	81.3 (1)	76.7 (1)	--	--	--
Skywest																	
CL60	E	2003	455	1	0	0	49,189	85.5 (421)	83.7 (302)	87.5 (430)	80.0 (195)	79.7 (145)	80.8 (398)	80.6 (13)	85.0 (17)	78.7 (6)	--
		2004	358	261	1	1	48,878	85.5 (567)	84.2 (555)	87.6 (567)	80.6 (277)	79.3 (388)	81.0 (555)	79.6 (40)	84.3 (44)	78.3 (5)	78.2 (3)
		2005	69	294	0	0	48,112	85.6 (339)	83.9 (343)	87.7 (347)	79.2 (143)	80.8 (88)	80.9 (329)	79.2 (31)	83.9 (13)	--	78.6 (1)
		2006	350	290	3	3	50,216	85.7 (600)	83.2 (596)	87.8 (606)	78.2 (253)	79.5 (83)	80.5 (598)	78.5 (41)	84.5 (32)	81.1 (1)	--
		2007	358	132	0	0	49,865	86.2 (456)	83.6 (449)	87.9 (448)	78.9 (202)	78.4 (84)	80.8 (449)	79.4 (37)	82.9 (30)	--	79.1 (1)
		2008	19	3	0	0	47,562	85.8 (22)	83.3 (22)	87.6 (21)	78.2 (6)	78.6 (5)	81.1 (20)	78.0 (1)	--	--	--
		2009	462	12	0	0	49,003	85.5 (459)	83.7 (457)	87.9 (459)	78.6 (133)	78.5 (104)	81.7 (446)	79.9 (24)	83.6 (12)	--	--
		2010	355	0	0	0	51,537	86.1 (331)	83.8 (338)	87.9 (332)	80.0 (150)	79.2 (118)	81.5 (328)	79.5 (38)	84.9 (14)	83.1 (1)	--
		2011	4	0	0	0	47,271	86.6 (1)	83.8 (4)	86.9 (4)	79.5 (3)	77.3 (2)	80.1 (4)	--	--	--	--
		2012	0	1	0	0	47,096	83.0 (1)	81.3 (1)	82.1 (1)	--	--	74.2 (1)	--	--	--	--
		2013	0	1	0	0	40,690	83.5 (1)	83.8 (1)	82.1 (1)	--	--	--	--	--	--	--
	F	2012	0	1	0	0	38,816	83.4 (1)	82.3 (1)	84.4 (1)	--	--	77.1 (1)	--	--	--	--
CRJ2	E	2013	0	1	0	0	36,651	83.3 (1)	80.1 (1)	80.0 (1)	--	--	--	--	--	--	--

John Wayne Airport Departures

Airline / Aircraft	Class	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Skywest (Continued)																	
CRJ7	E	2004	30	0	0	0	64,320	91.1 (22)	89.1 (22)	91.5 (22)	84.7 (19)	83.5 (19)	84.7 (22)	78.6 (12)	88.9 (8)	--	--
		2005	591	0	0	0	66,089	88.9 (546)	87.7 (551)	87.7 (556)	81.0 (453)	80.2 (357)	82.5 (517)	79.8 (466)	87.6 (21)	--	82.4 (4)
		2006	647	0	0	0	67,571	89.0 (609)	87.4 (612)	87.1 (618)	80.3 (498)	79.1 (348)	81.9 (595)	79.7 (453)	88.1 (27)	--	75.8 (2)
		2007	699	1	1	1	64,418	89.0 (642)	87.4 (641)	87.0 (655)	80.6 (530)	79.3 (295)	81.9 (636)	79.0 (366)	86.6 (39)	--	79.6 (6)
		2008	1,032	15	0	0	64,586	88.9 (978)	87.4 (992)	87.0 (986)	80.2 (744)	79.1 (459)	82.0 (977)	79.2 (626)	87.9 (39)	79.1 (2)	--
		2009	1,584	55	0	0	65,412	88.4 (1,587)	87.2 (1,562)	86.5 (1,580)	80.3 (1,118)	79.4 (896)	81.7 (1,529)	78.8 (581)	87.3 (44)	--	75.0 (2)
		2010	1,554	28	0	0	66,871	88.1 (1,502)	87.1 (1,529)	86.5 (1,528)	80.5 (1,012)	79.8 (1,056)	81.5 (1,501)	79.0 (1,031)	88.0 (32)	80.0 (1)	83.5 (1)
		2011	1,535	56	0	0	67,323	88.3 (1,487)	87.4 (1,493)	86.6 (1,501)	80.4 (1,043)	79.9 (1,082)	81.7 (1,412)	79.1 (1,067)	88.0 (71)	82.7 (6)	79.0 (1)
		2012	1,006	293	0	0	66,473	87.8 (1,248)	87.4 (1,242)	86.6 (1,248)	80.0 (794)	79.7 (875)	82.2 (1,186)	79.2 (801)	90.4 (27)	78.7 (2)	79.8 (2)
		2013	575	149	0	0	66,820	87.4 (706)	86.9 (689)	86.4 (707)	79.6 (452)	79.6 (529)	81.2 (689)	79.3 (456)	88.2 (15)	--	81.7 (1)
	F	2013	1	0	0	0	45,068	83.4 (1)	83.1 (1)	82.8 (1)	80.1 (1)	--	81.8 (1)	77.3 (1)	--	--	--
CRJ9	E	2007	1	0	0	0	72,400	91.3 (1)	87.9 (1)	86.5 (1)	82.6 (1)	--	82.6 (1)	--	--	--	--
		2010	1	0	0	0	71,233	92.8 (1)	91.9 (1)	92.7 (1)	82.7 (1)	80.1 (1)	82.8 (1)	82.4 (1)	--	--	--
		2013	6	0	0	0	73,374	90.6 (6)	89.1 (5)	87.9 (6)	80.8 (5)	77.6 (3)	83.3 (6)	79.3 (5)	--	--	--
E120	E	2003	1,539	295	0	0	24,778	81.9 (1,689)	82.7 (1,466)	82.6 (1,731)	80.7 (271)	82.8 (1,390)	79.7 (1,525)	81.3 (223)	82.1 (61)	82.1 (20)	78.7 (9)
		2004	1,128	424	1	1	24,402	82.3 (1,404)	82.9 (1,366)	82.6 (1,406)	80.4 (239)	82.8 (1,256)	80.6 (1,319)	81.2 (163)	82.4 (117)	83.7 (28)	84.3 (11)
		2005	1,310	426	1	1	24,689	82.0 (1,573)	82.3 (1,601)	82.3 (1,635)	80.3 (240)	82.8 (849)	79.4 (1,415)	81.3 (186)	82.3 (69)	79.8 (12)	79.6 (9)
		2006	1,344	492	2	2	24,429	81.9 (1,740)	82.1 (1,701)	82.3 (1,737)	78.8 (263)	81.7 (877)	78.7 (1,607)	80.5 (183)	82.3 (74)	81.3 (16)	80.8 (2)
		2007	1,152	502	3	3	24,557	81.9 (1,546)	82.2 (1,523)	82.3 (1,544)	79.3 (250)	81.4 (781)	79.2 (1,429)	80.1 (131)	81.8 (81)	82.6 (6)	77.2 (5)
		2013	1	0	0	0	26,154	83.0 (1)	82.1 (1)	83.4 (1)	--	--	--	--	--	--	--
	F	2004	1	0	0	0	19,929	--	79.4 (1)	82.1 (1)	--	82.1 (1)	79.1 (1)	--	--	--	--
Skywest Commuter																	
CRJ9	E	2012	285	4	0	0	74,275	91.2 (275)	89.6 (277)	89.4 (283)	79.8 (208)	78.9 (177)	82.7 (279)	79.3 (199)	90.7 (6)	77.0 (1)	--
		2013	662	10	0	0	77,373	90.4 (645)	89.1 (637)	88.8 (653)	79.6 (421)	79.2 (394)	82.7 (635)	79.8 (508)	89.4 (18)	83.5 (1)	--
Southwest Airlines																	
B733	A	2013	0	1	0	0	92,948	89.7 (1)	89.1 (1)	89.4 (1)	85.2 (1)	82.6 (1)	84.5 (1)	81.4 (1)	--	--	--
B7373	A	2003	4	9	0	0	106,669	94.6 (12)	92.9 (12)	91.2 (13)	84.9 (13)	85.6 (13)	86.2 (12)	83.0 (13)	--	--	--
		2004	11	12	0	0	101,820	93.4 (23)	92.6 (23)	89.9 (23)	83.4 (23)	84.9 (22)	85.0 (22)	81.9 (22)	--	--	--
		2006	188	12	0	0	108,013	94.4 (194)	92.5 (192)	90.8 (189)	84.2 (193)	84.1 (183)	85.8 (191)	82.6 (178)	89.5 (5)	78.7 (1)	84.3 (2)
		2007	10	0	0	0	107,534	94.3 (7)	92.1 (7)	89.8 (7)	85.1 (7)	82.8 (7)	84.6 (7)	81.3 (6)	89.2 (3)	--	--
		2008	1	0	0	0	108,949	95.1 (1)	92.7 (1)	91.5 (1)	85.8 (1)	85.4 (1)	--	84.3 (1)	--	--	--
		2009	1	0	0	0	112,445	93.8 (1)	93.0 (1)	91.7 (1)	87.1 (1)	85.3 (1)	87.7 (1)	--	--	--	--
		2011	0	2	0	0	89,399	89.3 (2)	89.6 (2)	88.0 (2)	82.5 (2)	81.9 (2)	81.6 (2)	78.3 (2)	--	--	--
	AA	2003	3	0	0	0	105,700	96.7 (1)	92.3 (3)	90.0 (3)	83.5 (3)	84.5 (3)	84.0 (1)	81.7 (3)	--	--	--
	E	2003	76	15	0	0	123,728	94.2 (85)	92.5 (80)	90.4 (88)	85.0 (83)	85.5 (86)	86.1 (83)	82.9 (88)	90.8 (2)	82.0 (2)	75.6 (1)
		2004	30	10	1	1	103,670	93.8 (40)	92.2 (38)	90.0 (39)	84.3 (40)	85.6 (33)	85.6 (40)	82.5 (38)	78.5 (1)	--	--
	PE	2003	2	0	0	0	113,450	92.7 (2)	92.8 (2)	91.2 (2)	81.7 (2)	88.4 (2)	87.7 (2)	84.9 (2)	--	--	--
		2004	8	1	0	0	107,077	94.8 (9)	93.3 (9)	91.1 (8)	84.7 (9)	86.4 (9)	86.6 (9)	82.8 (8)	--	--	--
B7375	A	2003	770	359	2	2	105,404	94.2 (1,078)	92.5 (907)	90.3 (1,096)	84.4 (1,079)	85.6 (1,004)	86.0 (1,058)	82.9 (1,079)	91.7 (23)	91.4 (18)	80.9 (14)
		2004	355	205	0	0	106,087	93.2 (515)	91.9 (503)	90.0 (515)	84.3 (514)	85.4 (456)	85.6 (516)	82.4 (494)	91.1 (36)	80.8 (27)	79.4 (18)
		2005	1	0	0	0	108,100	94.5 (1)	93.8 (1)	93.2 (1)	88.0 (1)	88.4 (1)	87.9 (1)	--	--	--	--
	AA	2003	237	106	0	0	102,876	93.6 (310)	92.0 (312)	90.0 (324)	84.8 (323)	85.4 (319)	86.1 (289)	83.3 (316)	90.6 (12)	97.0 (10)	81.8 (3)
	E	2003	1,718	678	3	3	103,173	92.3 (2,246)	91.0 (2,058)	89.4 (2,299)	84.4 (2,246)	84.9 (2,197)	85.4 (2,111)	82.4 (2,266)	90.8 (72)	81.9 (56)	79.9 (44)
		2004	46	30	0	0	100,439	93.0 (66)	91.3 (61)	89.6 (67)	83.7 (67)	84.9 (64)	85.2 (67)	82.0 (64)	90.9 (9)	79.6 (5)	78.0 (5)
	F	2003	4	0	0	0	86,150	88.8 (4)	88.0 (3)	87.5 (4)	83.1 (4)	82.9 (4)	89.2 (4)	82.8 (4)	--	--	--
	PE	2003	1	0	0	0	107,800	94.1 (1)	92.7 (1)	90.4 (1)	83.8 (1)	87.0 (1)	86.8 (1)	82.1 (1)	--	--	--

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Southwest Airlines (Continued)																	
B7375	PE	2004	4	0	0	0	98,725	92.0 (4)	91.2 (4)	89.8 (4)	84.1 (4)	85.1 (4)	85.0 (4)	81.9 (4)	--	--	--
B7377	A	2003	26	12	3	3	117,365	91.4 (38)	90.2 (40)	86.6 (40)	82.3 (39)	82.8 (41)	81.9 (36)	79.3 (35)	--	--	--
		2004	309	197	1	1	117,537	90.6 (464)	89.8 (452)	86.6 (462)	81.4 (444)	82.5 (435)	81.6 (461)	79.5 (377)	89.5 (39)	83.3 (10)	76.9 (5)
		2005	794	357	1	1	117,016	90.1 (1,067)	89.5 (1,081)	86.1 (1,094)	81.2 (990)	81.0 (999)	81.4 (1,039)	79.9 (901)	89.4 (35)	79.1 (9)	79.8 (8)
		2006	1,123	320	3	3	118,132	91.5 (1,370)	90.2 (1,359)	87.1 (1,367)	81.5 (1,324)	82.1 (1,264)	81.7 (1,350)	79.8 (1,059)	89.8 (61)	81.5 (14)	79.9 (13)
		2007	988	300	0	0	122,243	92.4 (1,186)	91.0 (1,190)	88.1 (1,202)	82.0 (1,153)	81.3 (1,159)	82.5 (1,192)	79.8 (974)	90.2 (74)	79.8 (9)	78.8 (15)
		2008	839	243	1	1	118,685	91.3 (1,024)	90.3 (1,040)	86.5 (1,034)	81.4 (1,002)	80.5 (1,011)	81.6 (1,014)	79.4 (889)	89.8 (31)	82.0 (2)	81.6 (4)
		2009	1,645	609	7	7	116,513	90.4 (2,192)	89.8 (2,155)	85.8 (2,186)	81.4 (2,120)	80.5 (2,056)	81.6 (2,130)	79.1 (1,160)	88.9 (52)	78.4 (11)	78.4 (5)
		2010	2,798	866	21	21	120,821	91.9 (3,458)	91.0 (3,540)	87.4 (3,557)	82.4 (3,432)	81.9 (3,463)	82.6 (3,508)	79.6 (2,945)	89.8 (82)	80.3 (30)	81.5 (8)
		2011	4,135	1,520	22	22	120,626	92.1 (5,315)	91.2 (5,374)	87.1 (5,416)	81.8 (5,323)	81.3 (5,175)	82.2 (5,117)	79.6 (4,130)	90.0 (216)	81.0 (53)	79.9 (25)
		2012	3,378	1,257	20	20	122,718	91.8 (4,427)	91.3 (4,403)	88.9 (4,482)	83.5 (4,144)	83.1 (4,438)	84.4 (4,373)	81.5 (3,727)	90.5 (87)	80.5 (35)	79.6 (19)
		2013	3,422	1,035	29	29	123,773	91.3 (4,328)	90.8 (4,255)	89.3 (4,358)	84.0 (4,201)	83.6 (4,333)	84.8 (4,294)	82.3 (3,883)	90.2 (100)	85.1 (26)	79.2 (17)
	AA	2003	11	5	0	0	117,106	91.2 (12)	89.7 (15)	86.8 (16)	81.3 (16)	82.6 (16)	82.8 (16)	80.5 (16)	--	--	--
	E	2003	3,806	460	4	4	116,430	91.0 (3,993)	89.9 (3,483)	86.7 (4,088)	82.0 (3,851)	82.8 (3,785)	82.2 (3,858)	80.9 (3,531)	90.0 (113)	90.9 (61)	78.7 (37)
		2004	4,061	1,063	3	3	117,374	90.8 (4,701)	90.0 (4,592)	86.6 (4,723)	81.6 (4,530)	82.7 (4,448)	82.3 (4,671)	80.3 (3,966)	89.9 (338)	81.4 (124)	79.0 (126)
		2005	4,626	967	2	2	118,517	90.9 (5,121)	90.2 (5,159)	86.7 (5,265)	81.8 (4,821)	81.5 (4,607)	81.8 (4,904)	80.0 (4,502)	89.8 (215)	81.6 (109)	79.0 (76)
		2006	5,278	1,595	20	20	117,260	91.0 (6,499)	89.9 (6,442)	86.3 (6,518)	81.3 (6,296)	80.6 (5,973)	81.4 (6,482)	79.3 (4,999)	89.3 (275)	79.7 (63)	78.5 (70)
		2007	5,820	1,772	11	11	119,080	91.3 (7,073)	90.2 (7,027)	86.6 (7,120)	81.6 (6,848)	80.8 (6,859)	81.9 (7,009)	79.3 (5,662)	89.1 (384)	79.7 (45)	78.6 (74)
		2008	5,061	1,514	20	20	118,235	91.1 (6,245)	90.2 (6,301)	86.4 (6,289)	81.4 (6,101)	80.7 (6,045)	81.7 (6,217)	79.6 (5,227)	89.7 (193)	80.6 (31)	80.1 (36)
		2009	7,756	2,075	17	17	117,389	90.6 (9,455)	89.9 (9,317)	85.9 (9,435)	81.5 (9,218)	80.6 (8,897)	81.7 (9,178)	79.5 (5,031)	88.9 (320)	82.0 (59)	78.1 (39)
		2010	6,914	1,836	22	22	118,216	91.2 (8,316)	90.5 (8,406)	87.1 (8,466)	82.6 (8,030)	81.9 (8,252)	82.6 (8,341)	79.5 (6,782)	89.8 (191)	80.1 (67)	82.3 (17)
		2011	5,696	1,319	12	12	118,505	91.0 (6,552)	90.3 (6,599)	86.2 (6,688)	81.6 (6,579)	81.0 (6,430)	81.9 (6,262)	79.2 (5,202)	89.3 (276)	81.6 (58)	79.9 (19)
		2012	7,530	1,518	11	11	118,633	90.1 (8,637)	90.0 (8,643)	87.7 (8,704)	83.3 (7,959)	82.3 (8,670)	83.7 (8,461)	80.8 (7,371)	89.9 (183)	80.0 (76)	80.0 (30)
		2013	4,760	809	3	3	119,718	89.8 (5,393)	89.7 (5,275)	88.3 (5,422)	83.6 (5,254)	82.8 (5,394)	84.0 (5,298)	81.6 (4,842)	89.1 (116)	79.1 (9)	79.9 (9)
	F	2003	1	1	0	0	95,250	83.9 (2)	81.8 (1)	81.6 (2)	76.8 (2)	79.4 (2)	78.4 (2)	--	--	--	--
		2006	0	1	0	0	91,861	86.1 (1)	85.3 (1)	82.5 (1)	77.9 (1)	--	75.5 (1)	--	--	--	--
		2007	1	0	0	0	100,758	84.8 (1)	84.9 (1)	83.0 (1)	80.7 (1)	78.2 (1)	--	--	--	--	--
		2008	2	0	0	0	100,457	84.1 (2)	84.9 (2)	82.3 (2)	80.8 (2)	77.4 (1)	78.4 (2)	--	--	--	--
		2009	0	1	0	0	99,959	85.4 (1)	86.0 (1)	80.9 (1)	79.6 (1)	78.6 (1)	78.2 (1)	--	--	--	--
		2010	2	0	0	0	95,561	85.1 (1)	86.0 (2)	82.1 (2)	81.2 (2)	79.3 (2)	79.6 (2)	76.6 (1)	--	--	--
		2011	6	3	0	0	95,295	84.4 (9)	85.1 (9)	81.3 (9)	78.9 (6)	77.6 (4)	78.0 (8)	--	--	--	--
		2012	6	1	0	0	94,517	85.0 (7)	85.5 (7)	83.3 (7)	80.6 (5)	78.5 (6)	80.3 (6)	79.5 (2)	--	--	--
		2013	4	1	0	0	96,606	86.5 (5)	85.8 (4)	84.0 (5)	80.7 (4)	79.7 (4)	81.4 (5)	82.6 (4)	--	--	--
	PE	2003	301	0	0	0	115,614	90.3 (289)	89.6 (179)	86.4 (293)	80.7 (264)	82.5 (254)	81.9 (286)	79.7 (251)	90.2 (7)	80.8 (2)	74.3 (2)
		2004	1,490	126	0	0	118,536	90.9 (1,487)	90.1 (1,454)	86.7 (1,492)	82.0 (1,439)	82.9 (1,444)	83.0 (1,460)	81.1 (1,280)	89.9 (101)	81.3 (44)	80.1 (35)
		2005	2,107	312	4	4	118,983	91.1 (2,235)	90.2 (2,236)	86.6 (2,286)	81.8 (2,067)	81.9 (2,032)	81.9 (2,113)	80.8 (1,996)	89.9 (91)	81.1 (35)	79.4 (29)
		2006	2,248	387	3	3	119,613	91.3 (2,513)	90.2 (2,470)	86.6 (2,498)	81.5 (2,444)	80.9 (2,328)	81.8 (2,494)	79.6 (2,061)	89.6 (103)	79.9 (25)	78.7 (18)
		2007	2,248	177	0	0	120,351	91.2 (2,266)	90.1 (2,230)	86.7 (2,263)	81.9 (2,202)	81.0 (2,215)	82.1 (2,236)	79.6 (1,887)	89.0 (126)	79.7 (22)	77.7 (25)
		2008	1,799	370	4	4	118,782	90.7 (2,057)	89.9 (2,090)	86.3 (2,071)	81.4 (2,018)	80.7 (1,998)	81.8 (2,043)	79.6 (1,782)	89.0 (63)	80.2 (6)	79.2 (7)
		2009	2,394	480	8	8	118,099	90.6 (2,765)	89.9 (2,721)	86.0 (2,765)	81.6 (2,706)	80.7 (2,622)	81.8 (2,677)	79.5 (1,484)	88.9 (95)	79.2 (17)	80.3 (12)
		2010	2,323	536	7	7	120,099	91.5 (2,705)	90.7 (2,751)	87.2 (2,759)	82.6 (2,646)	82.1 (2,718)	82.6 (2,735)	79.7 (2,340)	89.6 (64)	81.5 (26)	80.0 (9)
		2011	2,338	557	2	2	119,240	90.9 (2,715)	90.3 (2,740)	86.2 (2,768)	81.8 (2,732)	81.0 (2,686)	82.1 (2,616)	79.2 (2,280)	89.6 (109)	79.9 (28)	79.4 (9)
		2012	2,153	719	9	9	118,912	90.2 (2,755)	90.1 (2,750)	87.7 (2,768)	83.3 (2,516)	82.2 (2,746)	84.0 (2,696)	80.6 (2,332)	89.1 (61)	80.2 (18)	79.9 (8)
		2013	1,450	448	3	3	118,573	89.5 (1,852)	89.4 (1,822)	87.9 (1,856)	83.5 (1,780)	82.5 (1,847)	83.7 (1,821)	81.6 (1,629)	89.5 (37)	77.7 (8)	79.6 (3)
B7378	A	2012	3	63	0	0	128,463	91.2 (63)	91.1 (66)	88.4 (65)	83.0 (66)	82.9 (66)	84.4 (66)	81.6 (60)	--	--	--
		2013	81	5	0	0	134,053	92.2 (82)	91.6 (81)	89.3 (84)	84.0 (82)	82.9 (83)	84.9 (82)	82.2 (81)	91.1 (2)	81.3 (1)	--
	E	2013	1	0	0	0	139,955	92.1 (1)	92.3 (1)	--	84.9 (1)	84.3 (1)	85.9 (1)	83.6 (1)	--	--	--

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Evening	Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
United Airlines																	
A319	A	2003	421	16	2	2	124,861	90.9 (427)	90.0 (307)	90.2 (426)	84.3 (415)	89.3 (377)	84.4 (425)	82.0 (411)	86.4 (7)	--	84.4 (1)
		2004	607	73	0	0	126,415	91.2 (620)	90.3 (609)	90.6 (622)	84.9 (618)	84.9 (577)	85.5 (609)	83.0 (592)	87.5 (47)	82.5 (14)	79.9 (14)
		2005	556	253	1	1	125,516	91.5 (733)	90.8 (725)	90.9 (745)	85.5 (696)	84.9 (606)	85.3 (660)	83.5 (723)	87.3 (46)	80.8 (24)	80.2 (14)
		2006	676	316	7	7	124,132	91.3 (958)	90.2 (950)	90.4 (954)	84.6 (956)	83.4 (910)	84.8 (959)	82.4 (899)	86.6 (33)	79.1 (4)	78.8 (6)
		2007	1,270	221	1	1	127,139	91.8 (1,391)	90.5 (1,383)	90.9 (1,398)	85.2 (1,374)	83.9 (1,397)	85.5 (1,379)	83.1 (1,312)	87.0 (71)	79.9 (11)	78.7 (12)
		2008	635	101	3	3	126,131	91.7 (706)	90.5 (703)	90.8 (707)	84.9 (696)	83.5 (701)	85.1 (698)	82.7 (699)	87.6 (19)	78.9 (2)	75.7 (2)
		2009	834	34	0	0	127,961	91.8 (828)	90.7 (811)	90.7 (830)	85.0 (816)	83.9 (819)	85.4 (808)	82.9 (586)	87.6 (32)	78.5 (6)	77.1 (5)
		2010	875	59	0	0	129,896	92.0 (866)	91.1 (887)	90.9 (898)	84.7 (866)	85.0 (904)	85.6 (883)	82.9 (863)	88.8 (23)	83.6 (5)	81.5 (7)
		2011	883	69	1	1	128,395	92.2 (846)	91.2 (865)	90.8 (888)	85.1 (886)	84.5 (885)	85.5 (811)	81.6 (774)	87.1 (57)	79.0 (13)	78.3 (5)
		2012	1,038	16	0	0	129,583	92.1 (1,002)	91.4 (993)	91.1 (1,008)	85.4 (940)	84.6 (1,015)	85.8 (958)	81.6 (857)	88.0 (22)	79.0 (8)	79.3 (6)
		2013	824	47	0	0	130,704	91.7 (826)	91.1 (811)	90.9 (839)	85.2 (794)	84.4 (838)	85.5 (821)	81.7 (714)	87.0 (27)	78.6 (1)	79.8 (4)
	AA	2003	446	1	0	0	124,726	91.1 (392)	89.8 (389)	90.3 (414)	85.3 (407)	84.2 (404)	85.3 (366)	83.4 (406)	88.2 (26)	80.9 (10)	81.2 (8)
	E	2003	101	38	0	0	116,410	90.0 (124)	88.9 (121)	89.2 (132)	84.2 (128)	83.4 (132)	84.3 (121)	81.5 (119)	88.6 (6)	86.2 (1)	81.0 (3)
		2004	1	3	0	0	131,210	90.0 (4)	89.3 (4)	89.1 (4)	83.5 (4)	84.2 (3)	83.5 (4)	80.9 (4)	--	--	--
	F	2004	1	0	0	0	109,384	87.3 (1)	85.0 (1)	86.0 (1)	80.0 (1)	77.6 (1)	79.1 (1)	--	--	--	--
		2005	0	1	0	0	103,581	88.1 (1)	88.0 (1)	86.8 (1)	82.4 (1)	81.2 (1)	81.5 (1)	77.9 (1)	--	--	--
		2009	1	0	0	0	104,076	89.1 (1)	88.2 (1)	88.1 (1)	81.9 (1)	76.3 (1)	79.4 (1)	--	--	--	--
		2011	1	0	0	0	107,139	87.7 (1)	87.8 (1)	87.0 (1)	81.3 (1)	81.3 (1)	80.4 (1)	--	--	--	--
A320	A	2003	238	132	0	0	130,635	90.8 (364)	89.8 (309)	89.8 (363)	84.1 (354)	84.1 (324)	84.5 (362)	82.6 (354)	88.3 (5)	81.4 (3)	79.8 (3)
		2004	870	234	0	0	134,051	91.7 (1,009)	90.8 (972)	90.6 (1,017)	85.0 (1,015)	84.9 (958)	86.4 (1,007)	83.8 (980)	87.5 (73)	80.4 (23)	79.8 (27)
		2005	639	280	0	0	133,106	91.9 (858)	90.7 (875)	90.7 (884)	85.1 (824)	84.3 (822)	85.7 (831)	85.1 (860)	87.0 (22)	78.5 (8)	79.1 (9)
		2006	467	161	1	1	133,646	91.7 (603)	90.5 (595)	90.3 (599)	84.6 (600)	83.5 (578)	85.3 (600)	83.6 (559)	87.0 (20)	83.8 (3)	84.1 (3)
		2007	317	38	0	0	131,623	91.6 (333)	90.4 (329)	90.2 (333)	84.7 (335)	83.2 (337)	85.3 (326)	83.1 (314)	85.6 (16)	80.7 (1)	--
		2008	625	140	0	0	133,617	92.1 (713)	90.9 (718)	90.5 (730)	85.0 (716)	83.7 (723)	85.6 (717)	83.7 (711)	88.1 (26)	80.2 (2)	80.4 (5)
		2009	1,264	126	1	1	139,419	92.7 (1,326)	91.5 (1,312)	90.9 (1,331)	85.0 (1,324)	84.4 (1,323)	86.1 (1,282)	84.1 (1,033)	88.7 (50)	82.9 (9)	81.8 (8)
		2010	1,756	247	2	2	139,680	92.6 (1,861)	91.6 (1,889)	90.9 (1,907)	84.4 (1,834)	85.3 (1,923)	85.9 (1,859)	84.0 (1,867)	89.5 (71)	80.6 (15)	82.4 (21)
		2011	2,013	197	3	3	140,186	93.1 (2,014)	92.1 (2,040)	90.9 (2,076)	85.0 (2,082)	84.8 (2,074)	86.0 (1,940)	82.3 (1,943)	88.5 (115)	82.2 (25)	80.0 (16)
		2012	2,179	73	1	1	142,792	93.2 (2,110)	92.6 (2,089)	91.3 (2,133)	85.2 (1,922)	84.8 (2,155)	86.3 (2,033)	82.6 (1,876)	90.5 (73)	81.5 (19)	81.7 (47)
		2013	1,623	66	0	0	143,048	92.9 (1,584)	92.2 (1,559)	91.2 (1,602)	85.2 (1,541)	84.7 (1,601)	86.1 (1,570)	83.0 (1,405)	90.3 (77)	81.0 (8)	80.0 (20)
	AA	2003	290	48	0	0	131,697	91.4 (295)	90.2 (297)	90.3 (309)	85.5 (312)	84.2 (311)	86.8 (273)	84.1 (317)	88.6 (15)	88.2 (13)	77.8 (3)
	E	2003	221	152	0	0	122,546	89.7 (309)	88.8 (327)	88.7 (341)	83.9 (338)	83.0 (337)	84.1 (272)	81.9 (335)	86.9 (18)	81.1 (16)	77.4 (13)
		2004	5	39	0	0	123,688	90.1 (41)	89.4 (42)	89.5 (42)	84.3 (42)	84.0 (41)	84.3 (41)	81.8 (39)	84.4 (2)	--	--
		2005	0	1	0	0	116,440	88.6 (1)	87.1 (1)	86.6 (1)	82.7 (1)	78.7 (1)	81.4 (1)	76.6 (1)	--	--	--
	F	2007	1	0	0	0	124,401	90.9 (1)	89.3 (1)	88.4 (1)	84.3 (1)	80.2 (1)	82.8 (1)	80.2 (1)	--	--	--
		2009	1	0	0	0	110,541	88.3 (1)	88.6 (1)	86.6 (1)	83.1 (1)	80.0 (1)	82.4 (1)	79.5 (1)	--	--	--
		2011	2	0	0	0	122,848	89.3 (2)	88.9 (2)	87.5 (2)	83.5 (2)	81.9 (2)	82.3 (2)	78.6 (1)	--	--	--
B7373	A	2003	5	0	0	0	103,439	94.1 (5)	92.4 (5)	91.3 (5)	85.5 (5)	86.5 (4)	86.7 (4)	83.8 (5)	--	--	--
		2004	4	0	0	0	103,186	95.4 (4)	94.1 (4)	92.0 (3)	86.3 (4)	89.9 (4)	89.1 (4)	87.4 (4)	--	--	--
		2006	6	12	0	0	101,998	94.1 (18)	92.5 (18)	91.9 (18)	85.9 (18)	85.3 (17)	87.1 (17)	83.6 (17)	--	--	--
		2008	252	0	0	0	107,801	95.3 (228)	93.7 (231)	92.8 (232)	86.4 (226)	85.9 (230)	87.5 (224)	84.0 (233)	92.1 (15)	81.2 (5)	79.3 (8)
		2009	216	6	0	0	107,932	95.1 (207)	93.5 (203)	92.0 (208)	86.5 (208)	85.9 (208)	87.3 (203)	83.7 (133)	91.6 (12)	82.9 (4)	80.2 (5)
B7375	A	2003	4	1	0	0	103,233	93.4 (4)	92.8 (4)	91.2 (4)	84.7 (3)	85.9 (3)	85.3 (5)	82.6 (4)	--	--	--
		2006	1	1	0	0	101,323	93.6 (2)	92.5 (2)	90.6 (2)	84.7 (2)	85.3 (2)	85.6 (2)	83.2 (2)	--	--	--
		2007	41	2	0	0	108,339	95.0 (42)	93.6 (41)	92.3 (43)	86.4 (40)	85.9 (42)	87.3 (42)	83.9 (40)	--	--	--
		2008	95	0	0	0	104,120	94.7 (79)	93.5 (80)	92.1 (84)	86.1 (84)	85.5 (79)	86.7 (79)	83.3 (83)	90.8 (8)	81.0 (3)	80.7 (5)
		2009	184	4	0	0	106,016	94.7 (176)	93.4 (171)	91.8 (176)	86.6 (173)	86.0 (177)	87.6 (171)	83.9 (78)	92.0 (10)	78.9 (3)	79.6 (5)
B7377	A	2011	190	25	0	0	135,737	95.2 (148)	94.2 (159)	92.5 (162)	85.3 (161)	85.0 (161)	85.9 (160)	82.8 (159)	91.2 (51)	82.1 (24)	81.7 (13)
		2012	1,599	274	2	2	138,164	95.5 (1,770)	94.5 (1,746)	92.9 (1,784)	85.6 (1,591)	85.3 (1,803)	86.5 (1,699)	83.2 (1,644)	92.0 (59)	79.9 (26)	80.8 (24)
		2013	1,020	192	3	3	136,629	95.2 (1,162)	94.2 (1,145)	92.6 (1,168)	85.1 (1,122)	84.7 (1,169)	85.7 (1,159)	82.9 (1,075)	91.0 (35)	79.1 (11)	79.3 (14)
	F	2013	1	0	0	0	119,305	92.8 (1)	91.7 (1)	89.7 (1)	84.4 (1)	82.5 (1)	82.1 (1)	83.5 (1)	--	--	--
B7378	A	2011	36	2	0	0	146,569	96.6 (24)	95.5 (24)	93.7 (26)	86.3 (25)	86.4 (26)	87.2 (26)	83.9 (26)	92.8 (10)	81.9 (9)	82.3 (4)
		2012	684	18	0	0	142,145	96.7 (628)	95.4 (632)	93.5 (644)	86.7 (575)	86.0 (647)	87.2 (615)	84.1 (582)	94.7 (34)	81.4 (27)	81.6 (20)
		2013	297	13	0	0	136,847	96.1 (291)	94.9 (292)	92.8 (298)	85.1 (286)	84.2 (294)	85.2 (295)	82.3 (276)	91.6 (10)	80.3 (5)	79.9 (4)
	F	2013	1	0	0	0	110,126	89.5 (1)	89.5 (1)	86.0 (1)	82.5 (1)	81.1 (1)	81.4 (1)	80.2 (1)	--	--	--
B7379	A	2012	1	0	0	0	133,042	96.1 (1)	95.7 (1)	91.1 (1)	82.3 (1)	82.4 (1)	83.4 (1)	80.0 (1)	--	--	--

John Wayne Airport Departures

Airline Aircraft	Class	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average GTOW	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
United Airlines (Continued)																	
B757	A	2003	857	0	0	0	204,269	94.2 (782)	92.7 (611)	91.7 (806)	84.7 (776)	85.4 (746)	86.2 (777)	83.4 (797)	91.4 (35)	83.7 (23)	78.6 (26)
		2004	865	3	0	0	201,956	93.9 (762)	92.6 (735)	91.5 (767)	84.8 (753)	85.7 (742)	86.1 (745)	83.2 (736)	90.3 (83)	85.3 (35)	80.3 (55)
		2005	1,489	18	0	0	198,994	93.7 (1,359)	92.4 (1,365)	91.4 (1,407)	84.6 (1,314)	84.6 (1,287)	85.6 (1,333)	83.5 (1,407)	89.9 (61)	80.0 (31)	78.9 (35)
		2006	1,808	21	0	0	196,234	93.6 (1,693)	92.0 (1,674)	90.7 (1,703)	84.0 (1,679)	83.9 (1,627)	85.4 (1,689)	82.8 (1,583)	90.3 (95)	81.5 (19)	79.3 (29)
		2007	1,606	8	0	0	196,654	93.9 (1,464)	92.2 (1,450)	91.1 (1,485)	84.3 (1,457)	84.1 (1,472)	85.9 (1,459)	82.8 (1,395)	89.7 (110)	80.9 (20)	78.5 (38)
		2008	1,172	13	0	0	194,565	93.7 (1,116)	92.2 (1,123)	91.1 (1,122)	84.5 (1,115)	84.0 (1,113)	85.8 (1,099)	85.6 (1,121)	91.1 (44)	80.0 (4)	78.6 (13)
		2009	986	46	0	0	191,524	92.8 (963)	91.6 (944)	90.1 (968)	84.0 (965)	83.7 (929)	85.3 (924)	82.6 (656)	89.2 (57)	79.7 (13)	77.6 (8)
		2010	730	5	0	0	193,388	93.6 (693)	92.4 (683)	91.0 (709)	84.1 (663)	85.3 (710)	85.7 (672)	82.8 (689)	91.2 (22)	78.8 (7)	77.5 (3)
		2011	408	49	0	0	194,761	94.6 (423)	93.4 (425)	92.3 (439)	86.6 (435)	85.7 (438)	86.4 (395)	82.6 (407)	91.0 (12)	81.5 (2)	79.5 (3)
		2012	474	32	7	7	200,819	94.9 (474)	94.1 (485)	93.2 (485)	87.0 (449)	86.0 (491)	87.2 (473)	83.0 (466)	90.6 (15)	79.3 (7)	84.4 (5)
		2013	340	13	0	0	204,661	94.8 (342)	93.9 (343)	93.3 (347)	87.0 (334)	86.0 (345)	87.2 (341)	83.1 (328)	91.3 (5)	79.0 (1)	81.3 (3)
	AA	2003	37	1	0	0	196,090	92.2 (38)	91.0 (37)	90.4 (35)	84.4 (37)	84.2 (37)	86.7 (33)	85.5 (36)	--	--	--
	E	2003	2,066	20	0	0	181,892	90.8 (1,955)	89.8 (1,632)	88.7 (2,007)	83.0 (1,907)	83.2 (1,868)	84.2 (1,904)	82.3 (1,959)	89.3 (50)	81.5 (28)	78.9 (21)
		2004	1,425	60	0	0	180,565	90.6 (1,361)	89.8 (1,338)	88.3 (1,354)	82.5 (1,341)	83.1 (1,281)	83.9 (1,336)	81.7 (1,313)	87.5 (87)	97.8 (23)	79.2 (21)
		2005	738	32	0	0	182,557	91.2 (701)	90.3 (702)	88.8 (698)	83.1 (665)	83.6 (632)	83.8 (670)	82.0 (701)	87.9 (36)	81.6 (11)	79.2 (12)
		2006	839	89	2	2	178,358	91.0 (871)	89.9 (859)	88.1 (877)	82.0 (845)	81.6 (818)	83.2 (859)	81.3 (805)	87.6 (35)	83.0 (9)	76.9 (8)
		2007	560	82	2	2	175,978	90.7 (589)	89.8 (570)	87.9 (588)	82.3 (572)	81.5 (548)	83.1 (579)	81.4 (550)	87.3 (45)	79.6 (3)	78.3 (6)
		2008	68	4	0	0	165,234	88.8 (70)	88.6 (70)	86.6 (69)	81.7 (70)	83.6 (64)	82.9 (68)	80.8 (70)	87.9 (2)	--	73.7 (1)
	F	2011	2	0	0	0	154,042	89.4 (2)	89.7 (2)	87.5 (2)	84.5 (1)	82.8 (1)	79.2 (2)	--	--	--	--
UPS																	
B757	A	2003	2	199	0	0	196,912	94.6 (190)	93.3 (186)	91.6 (190)	85.0 (185)	85.2 (178)	86.1 (180)	82.7 (189)	90.1 (5)	81.0 (1)	75.5 (1)
		2004	1	173	1	1	196,576	94.9 (164)	93.6 (165)	91.9 (165)	85.1 (166)	86.0 (152)	86.5 (166)	83.3 (154)	87.2 (9)	--	--
		2005	0	193	0	0	198,089	94.6 (183)	93.4 (186)	92.0 (187)	85.1 (177)	85.3 (168)	86.5 (173)	83.2 (181)	88.0 (5)	--	76.3 (1)
		2006	0	214	0	0	196,032	96.2 (207)	95.1 (208)	93.2 (205)	85.9 (206)	85.1 (197)	86.3 (207)	81.7 (192)	86.3 (6)	--	--
		2007	1	208	0	0	190,045	95.9 (199)	94.7 (196)	93.0 (200)	86.0 (197)	84.8 (198)	86.1 (200)	81.6 (179)	88.1 (7)	--	76.3 (2)
		2008	0	172	0	0	182,472	95.1 (164)	93.9 (166)	92.6 (163)	85.4 (161)	84.0 (163)	85.8 (164)	81.8 (162)	85.8 (6)	81.2 (1)	--
		2009	0	216	0	0	185,980	95.1 (210)	94.0 (208)	92.2 (208)	85.3 (209)	84.3 (207)	85.9 (206)	81.9 (142)	86.8 (6)	--	--
		2010	2	204	0	0	194,216	96.4 (194)	95.3 (199)	93.2 (199)	85.2 (190)	86.3 (200)	86.0 (200)	81.7 (191)	87.4 (6)	--	80.8 (2)
		2011	0	208	0	0	196,204	96.3 (198)	95.6 (199)	93.6 (197)	86.2 (200)	86.1 (199)	86.6 (190)	82.6 (189)	89.9 (8)	80.3 (1)	76.9 (1)
		2012	2	204	0	0	194,783	95.6 (202)	95.2 (201)	93.3 (201)	86.0 (181)	85.6 (203)	86.9 (198)	81.8 (183)	88.8 (3)	--	--
		2013	0	137	0	0	198,060	95.7 (134)	95.3 (133)	93.3 (133)	85.9 (129)	85.8 (133)	86.5 (131)	81.9 (128)	91.8 (2)	--	78.8 (1)
	F	2005	0	2	0	0	133,650	88.2 (2)	88.7 (2)	86.3 (2)	81.0 (1)	80.7 (2)	79.8 (2)	76.4 (1)	--	--	--
		2009	0	1	0	0	151,200	89.5 (1)	88.9 (1)	87.9 (1)	79.5 (1)	79.8 (1)	85.7 (1)	82.2 (1)	--	--	--
US Airways																	
A319	A	2003	449	0	0	0	144,511	94.7 (366)	93.1 (325)	94.3 (377)	86.8 (372)	85.9 (375)	87.6 (352)	84.6 (380)	92.3 (55)	82.0 (19)	80.9 (26)
A320	A	2003	2	0	0	0	146,889	95.5 (2)	93.4 (2)	93.6 (2)	85.9 (2)	83.9 (2)	84.4 (1)	82.3 (2)	--	--	--
Virgin America																	
A319	A	2009	469	163	0	0	118,685	93.5 (628)	91.9 (627)	91.3 (623)	85.4 (628)	82.6 (617)	83.2 (591)	79.5 (216)	87.3 (1)	--	--
		2010	23	28	0	0	121,328	93.5 (50)	91.9 (50)	91.6 (50)	86.0 (50)	83.4 (50)	83.8 (49)	79.5 (45)	87.3 (1)	--	--
A320	A	2009	337	44	0	0	131,483	95.0 (364)	93.4 (358)	93.0 (363)	86.5 (361)	83.7 (355)	84.3 (352)	79.6 (319)	88.4 (13)	--	--

John Wayne Airport Arrivals

Airline / Aircraft	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Air Canada															
A319	2010	27	138	2	66	81.7 (1)	82.9 (1)	79.1 (1)	--	--	77.3 (1)	--	92.0 (166)	79.0 (1)	82.0 (158)
	2011	2	0	1	18	80.8 (1)	82.4 (1)	81.1 (1)	76.9 (1)	77.6 (1)	80.5 (1)	--	92.0 (3)	--	78.7 (1)
E190	2010	27	0	0	40	78.0 (1)	79.5 (1)	--	--	--	--	--	91.9 (27)	81.1 (1)	82.3 (26)
Alaska Airlines															
B7374	2003	1,759	243	155	95	85.5 (53)	83.3 (52)	93.6 (66)	79.8 (46)	81.4 (62)	89.7 (46)	82.0 (21)	94.4 (2,043)	88.8 (226)	83.1 (1,405)
	2004	1,933	641	252	99	85.7 (177)	83.0 (167)	94.3 (187)	79.9 (145)	82.5 (183)	90.2 (192)	82.3 (53)	94.4 (2,560)	91.0 (201)	83.4 (1,834)
	2005	1,816	519	449	112	86.6 (111)	84.1 (105)	94.3 (114)	80.2 (93)	82.5 (86)	90.4 (114)	95.1 (26)	94.8 (2,561)	84.1 (119)	83.7 (1,887)
	2006	2,248	626	384	108	85.1 (117)	82.6 (100)	93.8 (121)	79.2 (63)	80.7 (87)	89.7 (118)	79.1 (17)	95.0 (3,080)	83.9 (233)	83.9 (2,096)
	2007	1,319	406	287	108	84.9 (106)	82.7 (92)	93.6 (112)	79.6 (50)	80.8 (76)	89.5 (111)	80.0 (15)	95.1 (1,874)	85.0 (108)	83.9 (1,430)
	2008	245	48	25	107	85.2 (12)	82.4 (9)	94.2 (12)	79.7 (6)	80.7 (11)	89.6 (12)	80.2 (3)	94.7 (305)	83.9 (4)	83.8 (234)
	2009	60	18	4	113	84.9 (4)	81.4 (4)	94.2 (4)	78.9 (2)	80.8 (4)	90.1 (4)	--	94.5 (77)	84.8 (6)	83.3 (48)
	2010	56	17	3	122	84.7 (2)	80.7 (2)	93.8 (2)	--	79.8 (2)	90.7 (2)	--	95.0 (72)	83.7 (8)	84.5 (48)
	2011	41	12	2	116	85.0 (3)	91.6 (3)	93.8 (3)	78.5 (2)	80.4 (2)	88.6 (3)	--	94.7 (52)	76.9 (1)	83.5 (33)
	2012	28	7	5	127	86.1 (1)	82.8 (1)	94.8 (1)	78.8 (1)	80.9 (1)	90.7 (1)	--	94.6 (39)	87.2 (3)	84.1 (27)
	2013	16	7	0	129	84.8 (1)	81.4 (1)	93.0 (1)	--	80.0 (1)	90.5 (1)	--	94.9 (22)	89.0 (1)	83.3 (18)
B7377	2003	2,438	624	218	96	83.5 (90)	81.5 (77)	91.9 (103)	81.1 (29)	79.5 (54)	87.5 (79)	84.4 (16)	92.3 (3,137)	90.8 (248)	81.7 (2,009)
	2004	1,376	222	63	90	84.2 (135)	82.2 (120)	91.9 (140)	80.2 (42)	80.7 (127)	88.0 (141)	93.7 (17)	92.2 (1,476)	92.8 (96)	81.8 (1,001)
	2005	1,738	138	33	96	83.8 (81)	82.1 (70)	91.8 (87)	85.1 (25)	81.5 (49)	87.5 (84)	87.1 (9)	92.4 (1,739)	83.6 (64)	82.2 (1,320)
	2006	1,781	238	62	95	83.3 (102)	82.3 (88)	91.6 (114)	79.4 (22)	78.9 (58)	87.3 (115)	79.4 (3)	92.6 (1,929)	82.4 (74)	81.9 (1,298)
	2007	1,907	409	122	100	82.3 (121)	82.5 (93)	91.4 (128)	77.8 (11)	79.0 (39)	87.3 (128)	90.3 (8)	92.8 (2,275)	85.9 (71)	82.0 (1,675)
	2008	1,722	506	56	101	83.1 (84)	81.3 (64)	91.8 (89)	79.7 (19)	80.6 (35)	88.1 (90)	81.1 (6)	92.5 (2,143)	82.2 (120)	81.8 (1,450)
	2009	2,330	805	199	101	82.4 (131)	81.8 (103)	90.8 (133)	80.1 (17)	79.0 (48)	86.9 (129)	84.3 (3)	92.1 (3,173)	82.2 (154)	81.3 (2,069)
	2010	2,385	776	196	110	83.5 (99)	81.6 (85)	91.2 (105)	79.4 (19)	79.2 (41)	87.5 (104)	79.9 (5)	92.3 (3,185)	82.1 (176)	81.8 (1,981)
	2011	2,566	928	215	114	83.2 (149)	81.2 (127)	91.5 (163)	87.5 (22)	79.1 (72)	87.6 (157)	79.7 (7)	92.2 (3,516)	83.1 (143)	81.6 (1,966)
	2012	2,154	705	218	116	83.7 (118)	81.7 (104)	91.3 (124)	79.5 (33)	79.0 (61)	87.9 (124)	82.4 (7)	92.2 (2,907)	83.1 (211)	81.8 (1,754)
	2013	1,352	421	118	118	82.6 (66)	80.2 (58)	91.1 (71)	77.8 (12)	78.7 (28)	87.7 (69)	88.9 (6)	92.3 (1,792)	81.7 (73)	81.8 (1,140)
B7378	2005	63	1	0	140	--	--	--	--	--	--	--	93.8 (61)	67.3 (1)	81.6 (37)
	2006	1	0	0	116	--	--	--	--	--	--	--	92.6 (1)	--	76.0 (1)
	2007	366	68	7	130	83.2 (9)	82.1 (7)	92.8 (9)	78.8 (3)	80.2 (4)	88.5 (9)	--	93.9 (429)	88.5 (6)	82.1 (309)
	2008	392	219	48	123	81.9 (5)	79.4 (5)	91.6 (5)	--	78.2 (2)	88.8 (5)	--	93.6 (649)	82.3 (25)	82.0 (460)
	2009	512	84	1	126	84.0 (7)	82.3 (7)	93.0 (7)	78.5 (4)	80.0 (6)	89.2 (7)	79.7 (1)	93.2 (582)	80.9 (18)	81.8 (448)
	2010	394	37	8	142	89.8 (5)	86.1 (6)	92.6 (6)	83.5 (4)	80.4 (5)	89.5 (6)	--	93.5 (433)	82.3 (21)	82.8 (272)
	2011	300	52	25	145	83.4 (13)	81.1 (11)	92.0 (15)	83.5 (9)	79.6 (10)	88.0 (14)	--	93.4 (356)	82.3 (12)	81.9 (219)
	2012	355	101	14	148	85.0 (12)	84.8 (12)	93.7 (12)	82.3 (2)	81.0 (10)	89.5 (12)	77.0 (2)	93.7 (451)	82.4 (25)	82.5 (276)
	2013	243	92	46	148	84.8 (9)	83.0 (8)	92.7 (9)	80.1 (6)	80.0 (8)	88.4 (9)	90.2 (1)	93.9 (373)	83.0 (29)	82.1 (223)
Aloha Air															
B7377	2003	492	739	58	95	83.5 (40)	82.0 (36)	92.2 (47)	82.6 (15)	80.1 (32)	88.0 (36)	85.4 (2)	92.6 (1,216)	89.7 (132)	81.9 (779)
	2004	581	545	133	103	83.7 (94)	81.5 (86)	91.9 (95)	78.6 (29)	81.2 (90)	88.3 (96)	81.1 (3)	92.5 (1,137)	83.0 (133)	82.0 (708)
	2005	694	642	166	99	83.9 (47)	81.5 (47)	92.0 (50)	83.6 (16)	80.3 (32)	88.1 (48)	87.2 (4)	92.8 (1,391)	82.6 (79)	82.2 (889)
	2006	601	1,129	28	92	83.6 (73)	82.6 (65)	92.1 (87)	79.7 (24)	79.2 (45)	87.8 (87)	95.0 (4)	92.7 (1,641)	81.4 (151)	82.0 (985)
	2007	543	1,079	45	91	83.2 (101)	81.0 (79)	91.8 (102)	79.2 (22)	78.8 (49)	87.6 (102)	94.8 (3)	92.9 (1,542)	89.1 (102)	82.0 (991)
American Airlines															
B7378	2003	1,292	458	269	106	84.7 (56)	86.7 (61)	92.4 (72)	80.3 (30)	80.3 (58)	88.6 (54)	83.1 (15)	93.5 (1,879)	90.5 (70)	83.0 (1,747)
	2004	2,370	818	286	113	85.0 (245)	84.5 (228)	92.8 (255)	79.6 (117)	81.2 (241)	88.9 (256)	85.3 (32)	93.4 (3,124)	91.3 (80)	83.1 (2,896)
	2005	2,093	684	70	128	85.0 (116)	81.8 (111)	92.7 (124)	79.9 (52)	81.4 (88)	88.6 (121)	83.1 (10)	93.9 (2,583)	89.7 (51)	83.3 (2,574)
	2006	2,344	569	143	134	85.0 (131)	84.1 (112)	92.6 (141)	80.4 (65)	79.9 (99)	88.7 (135)	86.3 (13)	94.1 (2,839)	84.2 (24)	83.5 (2,748)
	2007	2,381	381	221	131	84.4 (161)	83.5 (139)	92.5 (161)	81.6 (45)	79.9 (84)	88.4 (165)	81.2 (12)	94.2 (2,754)	93.0 (57)	83.4 (2,662)
	2008	2,255	353	184	128	84.5 (87)	82.3 (79)	92.4 (92)	80.3 (31)	80.1 (60)	88.5 (96)	80.4 (9)	93.8 (2,615)	82.4 (30)	83.3 (2,545)
	2009	2,930	632	331	131	85.2 (150)	83.0 (135)	91.9 (149)	82.0 (61)	80.2 (93)	88.1 (147)	83.4 (11)	93.6 (3,706)	81.0 (39)	82.8 (3,538)
	2010	2,763	604	360	136	86.2 (88)	84.5 (85)	92.6 (95)	82.0 (52)	80.8 (74)	88.5 (97)	82.4 (7)	93.8 (3,531)	84.4 (39)	83.3 (3,492)
	2011	2,712	535	362	143	83.9 (129)	82.0 (120)	92.2 (136)	79.3 (48)	80.0 (95)	89.1 (131)	78.8 (11)	93.7 (3,429)	87.9 (31)	83.1 (3,291)
	2012	2,840	596	368	145	84.5 (92)	83.7 (82)	92.6 (92)	79.7 (42)	80.1 (74)	89.4 (98)	82.2 (13)	93.7 (3,609)	81.4 (100)	83.4 (3,523)
	2013	2,153	503	265	140	83.3 (71)	81.3 (61)	91.9 (74)	78.8 (32)	79.3 (44)	88.7 (74)	87.3 (6)	93.6 (2,807)	82.4 (29)	83.2 (2,730)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
American Airlines (Continued)															
B757	2003	2,498	1,049	60	127	85.4 (83)	84.4 (83)	93.1 (93)	81.8 (37)	80.7 (53)	88.9 (66)	87.2 (16)	94.6 (3,406)	92.9 (91)	83.1 (3,303)
	2004	164	146	15	125	83.9 (23)	80.7 (22)	92.1 (23)	79.6 (7)	80.0 (19)	88.3 (24)	90.4 (2)	94.2 (291)	91.5 (8)	82.8 (285)
	2005	403	332	33	164	83.2 (6)	86.1 (6)	91.5 (6)	78.6 (1)	79.8 (1)	86.4 (6)	82.4 (1)	94.9 (717)	88.5 (7)	83.2 (731)
	2006	676	446	83	159	83.7 (39)	83.3 (37)	92.9 (40)	77.6 (7)	78.6 (17)	88.4 (41)	78.4 (1)	94.9 (1,146)	82.8 (12)	83.4 (1,101)
	2007	669	312	105	167	83.1 (61)	84.1 (55)	92.3 (61)	83.9 (6)	80.8 (27)	88.5 (63)	90.3 (8)	95.0 (1,005)	81.0 (7)	83.4 (990)
	2008	588	328	24	162	84.5 (24)	82.8 (23)	92.8 (28)	79.8 (10)	82.9 (15)	88.7 (28)	80.2 (3)	94.8 (886)	81.5 (6)	83.1 (877)
	2009	543	283	38	162	84.2 (32)	82.5 (30)	92.1 (31)	81.2 (8)	79.2 (14)	88.2 (28)	77.3 (1)	94.5 (829)	80.4 (13)	83.0 (794)
	2010	654	304	29	154	83.3 (20)	81.3 (21)	92.6 (22)	79.3 (4)	79.2 (8)	88.9 (21)	--	94.7 (940)	87.9 (7)	83.1 (899)
	2011	438	277	46	161	83.9 (23)	82.3 (19)	92.2 (22)	77.4 (5)	80.0 (6)	87.8 (24)	79.1 (2)	94.6 (733)	82.2 (5)	82.9 (697)
	2012	289	149	16	154	83.8 (14)	80.7 (12)	92.7 (14)	80.2 (2)	79.7 (7)	89.5 (14)	--	94.4 (424)	88.3 (3)	83.1 (411)
MD80	2003	227	268	1	96	82.7 (19)	84.4 (17)	92.2 (24)	79.7 (4)	79.6 (14)	89.1 (19)	85.6 (10)	92.6 (452)	85.1 (27)	82.4 (330)
	2004	661	254	0	104	82.6 (72)	80.5 (65)	93.3 (74)	78.1 (18)	80.6 (72)	89.9 (76)	92.8 (21)	92.8 (799)	85.1 (25)	82.6 (729)
	2005	974	154	1	107	83.4 (47)	87.9 (42)	93.4 (47)	79.2 (11)	80.8 (29)	89.9 (49)	86.3 (7)	93.1 (1,021)	84.9 (26)	83.4 (941)
	2006	816	101	2	96	82.2 (41)	80.8 (32)	92.5 (51)	79.2 (7)	80.0 (21)	89.3 (51)	85.2 (4)	93.1 (841)	81.8 (19)	83.2 (698)
	2007	762	210	0	101	82.5 (61)	80.7 (48)	93.3 (63)	78.9 (6)	79.8 (16)	88.3 (64)	79.9 (5)	93.4 (892)	98.2 (18)	83.3 (755)
	2008	423	120	2	93	81.7 (8)	88.7 (8)	91.8 (7)	78.5 (1)	79.1 (3)	88.9 (7)	--	93.2 (519)	83.6 (6)	83.6 (475)
	2009	5	0	0	57	--	--	--	--	--	--	--	93.2 (5)	--	81.2 (4)
	2010	2	0	0	2	--	--	--	--	--	--	--	92.8 (2)	--	79.1 (2)
	2012	1	0	0	0	84.1 (1)	80.4 (1)	95.4 (1)	--	--	85.9 (1)	--	--	--	--
American Eagle Airlines															
E140	2003	2,733	564	8	32	82.4 (40)	84.7 (31)	87.1 (69)	91.7 (6)	80.8 (6)	83.8 (59)	85.2 (11)	87.8 (3,165)	90.6 (194)	78.3 (1,621)
	2004	2,328	506	19	34	79.0 (87)	80.0 (66)	86.9 (185)	82.0 (2)	80.8 (10)	82.7 (193)	88.7 (25)	87.4 (2,586)	92.9 (188)	78.6 (1,247)
	2005	2,676	626	61	36	80.3 (67)	85.4 (47)	87.0 (122)	81.4 (4)	81.4 (18)	82.4 (123)	98.8 (20)	87.7 (3,103)	87.0 (118)	78.8 (1,531)
	2006	3,112	683	157	35	79.8 (55)	81.1 (51)	86.6 (147)	83.7 (2)	78.6 (2)	82.1 (152)	89.9 (3)	87.6 (3,736)	81.6 (143)	78.6 (1,525)
	2007	2,371	555	36	33	83.6 (40)	84.8 (35)	86.5 (135)	83.1 (4)	84.5 (6)	81.9 (139)	90.2 (7)	87.8 (2,796)	86.0 (84)	78.0 (1,251)
	2008	2,379	502	29	33	80.1 (43)	83.0 (27)	86.5 (96)	79.8 (1)	81.5 (1)	82.6 (98)	82.8 (4)	87.3 (2,761)	82.9 (86)	78.0 (1,062)
	2009	2,576	618	14	34	80.7 (18)	80.7 (27)	86.0 (95)	81.2 (1)	--	81.6 (94)	87.0 (4)	87.3 (3,084)	81.1 (97)	78.5 (1,203)
American West															
A319	2003	911	430	20	97	83.8 (22)	84.6 (15)	87.4 (25)	81.3 (11)	80.0 (10)	82.4 (19)	87.5 (7)	91.1 (1,317)	88.3 (28)	82.0 (1,267)
	2004	318	131	2	106	85.1 (25)	86.1 (13)	89.2 (28)	83.5 (1)	82.4 (10)	85.0 (29)	92.6 (2)	90.8 (416)	93.5 (6)	81.9 (394)
	2005	738	116	43	97	82.5 (24)	83.0 (18)	88.5 (34)	80.1 (1)	80.8 (10)	84.0 (36)	98.9 (7)	90.9 (824)	76.2 (6)	82.3 (818)
	2006	1,182	301	161	103	82.2 (41)	82.8 (27)	88.6 (55)	81.3 (6)	79.5 (6)	84.4 (54)	80.0 (3)	91.0 (1,577)	83.0 (7)	82.1 (1,529)
	2007	896	447	108	102	85.1 (53)	86.4 (20)	88.7 (70)	82.9 (11)	82.4 (9)	84.2 (70)	82.1 (6)	91.2 (1,361)	84.8 (11)	81.9 (1,335)
	2008	926	258	4	96	80.6 (32)	84.0 (22)	88.4 (41)	78.9 (4)	79.3 (4)	84.3 (41)	80.1 (5)	91.1 (1,132)	81.6 (17)	81.8 (1,108)
	2009	1,326	326	5	83	82.7 (54)	83.4 (36)	88.6 (69)	80.8 (14)	80.7 (13)	84.5 (69)	88.7 (3)	90.7 (1,589)	83.4 (14)	81.3 (1,527)
	2010	203	184	0	98	80.2 (5)	83.1 (2)	88.4 (6)	77.9 (1)	--	84.9 (6)	--	91.0 (371)	90.6 (3)	81.4 (362)
	2011	421	155	2	97	81.9 (23)	80.8 (15)	89.1 (32)	94.6 (3)	81.7 (2)	85.4 (31)	--	90.8 (539)	80.4 (3)	81.1 (507)
	2012	871	344	0	111	83.7 (28)	84.1 (17)	89.6 (34)	82.8 (4)	81.8 (5)	86.1 (35)	79.1 (2)	90.9 (1,143)	81.8 (13)	81.4 (1,118)
	2013	633	138	1	111	82.9 (15)	82.9 (10)	88.7 (20)	84.2 (2)	82.6 (3)	84.9 (19)	82.0 (2)	90.8 (743)	80.4 (6)	81.4 (703)
A320	2003	1,159	126	54	111	82.0 (42)	81.5 (29)	89.9 (47)	81.4 (7)	78.3 (7)	85.9 (28)	84.9 (6)	91.6 (1,262)	92.7 (37)	82.2 (1,238)
	2004	1,000	125	133	121	82.8 (97)	84.1 (60)	90.4 (104)	88.0 (13)	80.2 (48)	86.1 (104)	88.4 (15)	91.5 (1,126)	87.7 (31)	82.3 (1,072)
	2005	735	504	106	104	81.8 (51)	82.5 (34)	89.6 (55)	80.1 (6)	80.2 (17)	85.5 (52)	86.5 (9)	91.6 (1,240)	84.1 (12)	82.3 (1,242)
	2006	763	119	72	123	82.4 (40)	81.8 (25)	89.9 (46)	83.0 (4)	79.4 (7)	85.4 (47)	87.8 (4)	91.7 (880)	82.8 (7)	82.5 (860)
	2007	939	221	37	111	82.1 (62)	82.2 (32)	89.9 (69)	81.6 (2)	79.8 (6)	85.2 (73)	78.6 (3)	91.9 (1,096)	92.4 (18)	82.1 (1,081)
	2008	603	315	172	103	82.4 (34)	83.7 (15)	89.4 (40)	82.3 (7)	80.0 (10)	85.0 (41)	78.6 (5)	91.6 (1,031)	81.1 (7)	81.8 (1,029)
	2009	682	226	231	110	81.6 (33)	83.5 (19)	89.2 (42)	81.1 (7)	79.0 (7)	85.5 (40)	78.9 (1)	91.4 (1,092)	83.0 (15)	81.5 (1,050)
	2010	654	11	0	117	84.3 (17)	84.6 (16)	89.4 (21)	84.0 (6)	82.7 (6)	85.8 (22)	79.7 (3)	91.5 (633)	82.3 (8)	81.9 (602)
	2011	431	111	6	131	82.6 (26)	83.2 (19)	89.7 (33)	81.0 (3)	79.8 (6)	86.3 (31)	78.2 (3)	91.4 (514)	87.0 (3)	81.6 (486)
	2012	469	264	8	133	83.0 (16)	83.7 (13)	89.9 (19)	82.8 (2)	81.5 (5)	86.9 (19)	81.4 (3)	91.6 (704)	79.5 (18)	81.8 (678)
	2013	196	103	3	126	82.2 (11)	80.8 (7)	90.0 (14)	--	--	86.1 (14)	--	91.3 (284)	78.2 (2)	81.4 (261)
A321	2009	16	18	2	137	--	--	--	--	--	--	--	92.0 (36)	--	81.7 (36)
	2010	27	178	15	138	81.3 (4)	78.0 (3)	90.3 (6)	--	78.6 (1)	86.6 (6)	--	91.7 (214)	80.7 (2)	81.9 (212)
	2011	57	226	11	149	83.9 (7)	85.3 (5)	90.0 (8)	80.3 (3)	83.7 (2)	86.1 (8)	78.9 (1)	91.5 (287)	92.3 (2)	82.0 (272)
	2012	74	43	4	149	81.4 (3)	78.8 (3)	89.7 (4)	81.0 (1)	--	86.2 (3)	--	91.8 (117)	79.0 (6)	82.3 (112)
	2013	100	111	9	170	89.0 (1)	87.5 (2)	86.7 (2)	84.7 (1)	85.1 (2)	87.3 (1)	80.5 (2)	92.4 (217)	76.5 (1)	82.5 (213)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Evening	Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
American West (Continued)															
B7373	2003	638	619	228	90	86.1 (48)	84.2 (51)	94.3 (53)	80.6 (32)	81.7 (50)	89.8 (47)	85.0 (17)	95.2 (1,399)	82.4 (21)	83.1 (1,269)
	2004	559	351	159	103	86.2 (92)	83.5 (85)	94.6 (93)	80.3 (68)	82.7 (87)	90.6 (91)	82.3 (27)	95.3 (960)	88.9 (16)	83.4 (882)
	2005	601	336	222	104	86.2 (48)	84.7 (47)	94.7 (51)	79.9 (41)	82.2 (42)	90.8 (50)	81.0 (12)	95.5 (1,068)	83.0 (11)	83.7 (1,014)
	2006	396	582	52	81	85.8 (41)	83.1 (38)	94.2 (44)	79.9 (29)	81.4 (35)	90.3 (42)	78.4 (6)	95.5 (970)	82.9 (5)	83.7 (907)
	2007	151	146	232	106	85.4 (19)	81.6 (19)	94.3 (19)	78.6 (9)	80.6 (14)	91.1 (18)	77.1 (1)	95.9 (502)	79.3 (1)	83.9 (475)
	2008	177	110	141	100	85.0 (9)	82.5 (10)	93.4 (10)	81.8 (4)	80.2 (10)	90.4 (10)	--	95.7 (409)	79.8 (5)	83.4 (390)
	2009	135	361	1	89	85.9 (16)	83.2 (16)	93.5 (16)	79.9 (12)	80.4 (15)	90.9 (15)	83.0 (3)	95.2 (481)	79.8 (1)	83.2 (432)
	2010	531	277	1	106	86.5 (20)	84.0 (19)	94.0 (21)	81.2 (16)	81.0 (20)	90.1 (22)	79.7 (5)	95.5 (764)	81.5 (8)	84.2 (711)
	2011	512	163	0	116	85.3 (9)	82.3 (9)	94.3 (9)	78.5 (6)	80.6 (8)	90.4 (9)	--	95.6 (659)	82.6 (7)	83.6 (603)
B757	2003	11	2	0	112	--	--	--	--	--	--	--	94.8 (13)	--	82.3 (12)
	2005	292	0	0	168	88.0 (5)	89.0 (3)	91.3 (5)	83.3 (4)	81.3 (3)	87.8 (4)	--	95.2 (269)	93.8 (2)	83.4 (276)
	2006	265	197	53	132	84.5 (22)	85.2 (20)	93.5 (26)	78.5 (9)	79.2 (17)	89.2 (27)	76.8 (1)	94.9 (482)	83.0 (2)	83.3 (457)
	2007	208	230	20	136	85.0 (30)	82.8 (30)	92.8 (32)	80.5 (10)	78.7 (16)	88.3 (31)	--	95.0 (424)	85.1 (2)	83.5 (409)
	2008	323	21	5	113	86.2 (14)	83.6 (10)	93.4 (14)	79.8 (8)	81.0 (10)	89.6 (14)	81.4 (2)	94.7 (320)	82.1 (5)	83.3 (324)
	2009	237	0	0	90	86.9 (13)	85.3 (12)	93.0 (12)	84.3 (3)	80.3 (7)	88.6 (11)	--	94.2 (218)	76.3 (2)	83.0 (217)
	2010	14	0	0	68	--	--	--	--	--	--	--	94.7 (13)	--	83.2 (14)
	2011	15	1	0	123	87.4 (1)	83.8 (1)	97.9 (1)	79.0 (1)	83.1 (1)	--	--	94.2 (15)	--	83.0 (15)
	2012	4	0	0	148	--	--	--	--	--	--	--	95.0 (4)	78.8 (1)	82.9 (4)
	2013	2	0	0	112	--	--	--	--	--	--	--	94.7 (1)	--	82.0 (2)
Compass Airlines															
E170	2012	62	18	1	69	91.8 (2)	91.8 (2)	90.8 (2)	85.2 (2)	87.3 (1)	85.2 (2)	84.1 (1)	91.6 (79)	90.1 (1)	80.9 (71)
E175	2012	410	173	2	68	82.0 (16)	80.1 (13)	89.5 (19)	80.7 (4)	78.9 (6)	86.1 (19)	--	91.6 (536)	83.3 (7)	81.2 (506)
Continental															
B7373	2006	1	2	0	127	--	--	--	--	--	--	--	93.2 (3)	--	83.8 (3)
	2008	0	2	0	99	--	--	--	--	--	--	--	95.7 (2)	--	84.1 (2)
B7375	2003	586	78	99	90	85.2 (22)	82.5 (21)	93.6 (27)	79.2 (17)	80.6 (26)	89.4 (20)	84.3 (14)	94.2 (709)	88.3 (17)	83.5 (694)
	2004	481	16	1	97	85.2 (29)	81.6 (24)	93.6 (28)	79.9 (18)	81.5 (27)	89.2 (29)	82.8 (7)	94.2 (452)	97.3 (10)	83.4 (432)
	2005	607	27	54	100	85.3 (16)	83.9 (15)	93.6 (18)	79.9 (11)	81.8 (13)	89.7 (16)	81.8 (5)	94.2 (639)	83.6 (10)	84.0 (635)
	2006	531	204	108	107	85.4 (28)	84.2 (23)	93.1 (28)	80.9 (13)	80.6 (20)	88.6 (28)	77.7 (3)	94.3 (803)	81.4 (4)	84.0 (767)
	2007	14	7	6	114	84.0 (9)	81.4 (7)	92.9 (9)	78.0 (2)	79.5 (5)	88.8 (9)	77.4 (1)	93.7 (18)	--	83.8 (17)
	2009	1	0	0	119	--	--	--	--	--	--	--	94.4 (1)	--	82.5 (1)
B7377	2003	987	490	48	98	83.0 (27)	79.6 (22)	91.1 (31)	79.0 (6)	80.2 (16)	86.7 (23)	82.4 (3)	92.7 (1,453)	93.7 (42)	82.4 (1,413)
	2004	760	415	183	103	83.4 (89)	81.4 (83)	91.8 (97)	79.0 (20)	80.0 (85)	87.6 (98)	88.4 (18)	92.5 (1,233)	93.5 (22)	82.4 (1,158)
	2005	844	442	185	113	83.3 (53)	80.8 (43)	92.1 (57)	79.4 (15)	81.1 (28)	87.9 (56)	86.4 (5)	92.7 (1,337)	84.5 (17)	82.9 (1,354)
	2006	953	522	194	115	83.5 (59)	84.7 (47)	91.6 (61)	80.3 (15)	79.7 (23)	87.3 (58)	78.3 (4)	92.8 (1,582)	81.4 (12)	82.8 (1,523)
	2007	1,298	782	253	114	83.4 (89)	82.1 (62)	91.0 (97)	81.9 (15)	79.6 (21)	87.1 (97)	78.8 (3)	92.9 (2,209)	94.9 (17)	82.6 (2,116)
	2008	1,266	564	123	114	84.5 (43)	83.1 (37)	91.9 (46)	81.7 (15)	81.2 (21)	88.2 (47)	82.4 (7)	92.7 (1,863)	82.0 (14)	82.4 (1,826)
	2009	1,529	599	9	117	83.1 (70)	81.6 (60)	90.7 (72)	79.8 (15)	79.1 (27)	86.9 (70)	86.8 (6)	92.4 (2,039)	81.4 (28)	82.4 (1,946)
	2010	1,521	768	15	112	83.0 (41)	81.3 (42)	90.6 (48)	82.6 (4)	79.7 (13)	86.8 (50)	79.7 (2)	92.4 (2,202)	84.2 (31)	82.3 (2,047)
	2011	1,262	773	32	113	82.4 (29)	80.1 (24)	90.9 (28)	79.8 (6)	79.1 (13)	87.0 (34)	77.4 (4)	92.2 (2,019)	98.1 (31)	82.0 (1,823)
B7378	2003	2	0	0	152	--	--	--	--	--	--	--	94.1 (2)	--	85.0 (2)
	2005	5	0	0	97	--	--	--	--	--	--	--	93.6 (5)	--	82.7 (4)
	2006	1	1	0	125	--	--	--	--	--	--	--	94.5 (2)	--	86.4 (2)
	2007	1	2	0	115	82.0 (1)	78.6 (1)	92.6 (1)	--	76.9 (1)	87.4 (1)	--	94.7 (2)	--	84.2 (2)
	2008	6	21	85	131	83.4 (6)	80.4 (4)	92.4 (7)	78.7 (2)	79.1 (4)	87.4 (8)	--	93.3 (104)	81.7 (2)	82.4 (98)
	2009	44	81	294	139	83.5 (18)	81.0 (16)	91.9 (19)	77.9 (3)	79.2 (11)	88.2 (19)	81.6 (1)	93.3 (401)	85.0 (6)	82.5 (372)
	2010	227	60	296	144	83.5 (13)	82.6 (12)	92.2 (16)	83.0 (5)	79.9 (12)	89.1 (15)	79.3 (1)	93.5 (554)	84.3 (5)	82.9 (533)
	2011	311	29	245	141	85.2 (20)	84.4 (18)	92.0 (19)	82.7 (8)	81.8 (13)	88.1 (19)	77.4 (2)	93.4 (563)	81.7 (4)	82.8 (535)
B757	2003	2	0	0	182	--	--	--	--	--	--	--	95.1 (2)	--	85.6 (2)
Delta Airlines															
A319	2010	1,322	367	234	106	80.5 (28)	79.7 (29)	89.8 (39)	79.3 (1)	77.1 (3)	86.3 (38)	78.0 (1)	91.5 (1,854)	80.6 (28)	81.7 (1,801)
	2011	2,109	479	83	107	81.2 (87)	81.3 (57)	90.4 (99)	83.3 (8)	78.7 (21)	86.7 (96)	82.0 (7)	91.3 (2,533)	87.9 (25)	81.6 (2,412)
	2012	1,494	195	1	116	83.5 (35)	83.0 (24)	90.9 (38)	82.1 (3)	79.6 (14)	87.3 (40)	81.1 (4)	91.5 (1,619)	83.0 (48)	81.9 (1,568)
	2013	1,031	104	0	117	81.6 (23)	81.1 (13)	90.0 (28)	86.5 (1)	82.3 (3)	86.5 (28)	83.0 (3)	91.6 (1,081)	80.8 (10)	81.9 (1,060)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Evening	Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Delta Airlines (Continued)															
A320	2010	172	6	5	109	83.4 (2)	81.1 (1)	91.0 (2)	76.1 (1)	77.4 (1)	87.7 (2)	--	91.8 (180)	78.2 (3)	81.8 (177)
	2011	14	1	1	120	83.9 (2)	80.6 (2)	93.0 (2)	80.4 (1)	79.5 (1)	91.0 (2)	--	91.7 (13)	--	81.4 (13)
	2012	14	2	0	113	--	--	--	--	--	87.3 (1)	--	91.9 (13)	78.0 (3)	83.4 (13)
	2013	6	1	0	125	--	--	--	--	--	--	--	92.2 (7)	--	82.8 (7)
B7373	2004	321	1	0	107	85.5 (14)	82.2 (14)	94.4 (14)	78.9 (13)	82.2 (14)	89.9 (15)	99.4 (9)	94.6 (297)	92.3 (5)	83.2 (286)
	2005	503	0	1	102	85.7 (17)	82.5 (17)	94.2 (20)	80.2 (17)	83.6 (12)	90.5 (19)	87.5 (3)	94.8 (434)	82.5 (4)	83.9 (455)
	2006	4	0	0	101	--	--	--	--	--	--	--	94.2 (4)	--	84.1 (4)
	2007	3	0	1	48	--	--	--	--	--	--	--	92.8 (4)	--	81.2 (4)
	2008	11	0	0	68	82.5 (1)	79.3 (1)	91.7 (1)	--	76.4 (1)	88.1 (1)	--	93.7 (10)	--	83.2 (10)
B7377	2007	1	0	0	150	--	--	--	--	--	--	--	94.3 (1)	--	85.5 (1)
	2008	221	10	57	108	83.3 (18)	81.8 (13)	91.2 (23)	84.6 (5)	81.2 (5)	88.2 (22)	81.6 (1)	92.7 (261)	81.4 (3)	82.1 (241)
	2009	515	186	156	111	83.5 (25)	82.1 (23)	90.5 (26)	80.0 (5)	79.9 (10)	86.9 (25)	80.8 (2)	92.5 (828)	81.0 (6)	82.1 (761)
	2010	976	393	157	108	81.9 (33)	80.4 (30)	90.8 (39)	79.0 (4)	78.2 (10)	86.8 (39)	81.4 (4)	92.6 (1,459)	87.0 (16)	82.5 (1,410)
	2011	1,115	383	187	109	82.8 (64)	82.8 (54)	91.0 (68)	81.0 (16)	78.8 (29)	87.1 (65)	81.0 (7)	92.3 (1,603)	83.1 (13)	82.1 (1,532)
	2012	687	126	109	114	84.0 (25)	81.3 (22)	91.3 (28)	80.2 (6)	80.0 (17)	87.7 (27)	81.3 (3)	92.4 (864)	88.3 (20)	82.3 (847)
	2013	4	1	0	122	--	--	--	--	--	--	--	91.6 (5)	--	81.4 (5)
B7378	2003	402	10	0	126	85.9 (7)	84.7 (7)	92.0 (8)	82.7 (4)	81.7 (6)	88.5 (7)	78.8 (1)	93.9 (390)	85.5 (8)	83.3 (388)
	2004	40	0	0	102	84.7 (8)	81.7 (8)	93.0 (9)	79.3 (5)	80.5 (9)	89.3 (9)	82.4 (2)	93.1 (29)	--	82.9 (29)
	2005	55	4	0	101	--	89.0 (1)	94.9 (1)	78.7 (1)	83.2 (1)	90.8 (1)	84.7 (1)	93.7 (52)	83.0 (2)	83.6 (55)
	2006	131	1	0	114	83.9 (9)	81.4 (9)	92.4 (9)	81.2 (5)	79.0 (7)	88.2 (11)	86.0 (1)	93.9 (116)	80.5 (1)	83.1 (110)
	2007	27	10	2	43	87.7 (2)	87.2 (2)	88.9 (2)	84.0 (1)	82.7 (1)	83.1 (1)	77.6 (1)	93.4 (35)	--	82.8 (35)
	2008	190	11	1	103	83.5 (13)	81.0 (12)	92.2 (12)	77.0 (5)	79.6 (11)	87.9 (14)	84.7 (1)	93.6 (180)	--	82.9 (179)
	2009	204	115	27	103	87.0 (7)	85.6 (7)	91.0 (7)	83.4 (3)	81.9 (4)	86.9 (7)	79.2 (1)	93.3 (340)	76.4 (3)	82.9 (321)
	2010	195	11	8	119	89.2 (5)	92.0 (2)	92.9 (5)	83.9 (3)	83.2 (5)	89.4 (5)	80.5 (1)	93.5 (196)	82.8 (7)	83.1 (197)
	2011	35	8	2	84	--	--	--	--	--	--	--	93.2 (44)	--	82.9 (38)
	2012	19	4	2	88	--	--	--	--	--	--	--	93.2 (24)	--	83.6 (23)
	2013	5	2	0	116	--	--	--	--	--	--	--	93.3 (7)	--	81.5 (5)
B757	2003	718	358	9	141	83.0 (36)	83.6 (31)	91.8 (37)	82.3 (9)	79.5 (18)	86.9 (28)	85.0 (8)	94.3 (1,015)	94.6 (21)	83.1 (996)
	2004	883	602	13	130	83.2 (83)	80.4 (75)	92.2 (90)	80.8 (6)	80.6 (77)	87.7 (93)	99.8 (14)	94.0 (1,365)	97.2 (38)	82.9 (1,316)
	2005	976	459	136	144	84.5 (55)	85.2 (49)	92.0 (61)	81.3 (12)	80.6 (34)	88.7 (61)	85.9 (5)	94.6 (1,437)	87.5 (9)	83.4 (1,461)
	2006	674	533	269	140	83.0 (64)	80.9 (50)	92.1 (64)	79.2 (8)	79.4 (11)	87.6 (65)	88.1 (1)	94.1 (1,385)	84.9 (11)	83.0 (1,340)
	2007	923	305	111	151	83.1 (74)	81.7 (61)	91.8 (74)	81.5 (2)	77.7 (11)	87.3 (75)	80.5 (2)	94.5 (1,240)	87.6 (8)	83.3 (1,213)
	2008	722	191	131	163	85.6 (19)	83.5 (15)	91.9 (19)	80.8 (4)	80.2 (6)	87.4 (19)	83.9 (2)	94.8 (995)	83.3 (14)	83.4 (986)
	2009	586	75	110	159	82.2 (34)	79.4 (32)	91.4 (35)	76.4 (4)	78.3 (8)	87.4 (34)	82.4 (2)	94.1 (727)	82.7 (7)	82.7 (702)
	2010	157	14	6	163	82.1 (1)	79.4 (1)	92.7 (1)	--	77.0 (1)	87.4 (1)	--	94.3 (173)	--	82.8 (171)
	2011	20	2	0	130	--	--	--	--	--	--	--	93.6 (21)	--	82.3 (20)
	2012	341	178	12	163	83.9 (8)	81.9 (8)	91.7 (8)	78.9 (1)	79.6 (1)	87.5 (8)	--	94.3 (511)	80.3 (12)	83.2 (502)
	2013	477	240	23	163	82.8 (16)	79.3 (15)	92.0 (16)	81.6 (2)	77.0 (3)	88.0 (15)	84.8 (1)	94.3 (711)	82.3 (3)	83.2 (695)
MD90	2003	1,039	3	195	114	81.8 (31)	84.7 (23)	89.7 (43)	81.2 (6)	78.9 (9)	85.2 (34)	84.3 (16)	90.4 (1,151)	94.3 (32)	81.0 (1,140)
	2004	588	0	0	110	80.7 (36)	79.2 (21)	89.9 (47)	81.6 (2)	79.0 (19)	85.6 (47)	94.9 (14)	90.2 (509)	95.3 (19)	81.3 (498)
	2005	679	1	0	119	81.8 (20)	81.4 (14)	89.9 (23)	81.8 (2)	81.3 (10)	85.7 (23)	86.9 (4)	90.5 (610)	82.4 (1)	81.5 (629)
	2006	737	5	90	123	79.9 (23)	80.2 (12)	88.9 (33)	81.7 (3)	76.9 (1)	84.6 (34)	81.4 (2)	90.6 (764)	81.2 (4)	81.6 (753)
	2007	587	169	88	122	83.7 (25)	82.7 (13)	89.4 (39)	85.5 (2)	82.8 (4)	84.6 (39)	93.8 (2)	90.7 (789)	81.3 (2)	81.2 (764)
	2008	751	213	13	107	86.2 (24)	86.2 (19)	89.5 (27)	81.8 (9)	81.4 (8)	85.2 (30)	83.1 (3)	90.5 (932)	81.5 (7)	81.1 (899)
	2009	699	161	12	107	80.7 (28)	83.3 (17)	89.2 (48)	82.5 (3)	81.7 (3)	85.1 (47)	88.0 (2)	90.2 (816)	79.1 (6)	80.8 (763)
	2010	108	15	60	107	79.5 (2)	--	89.6 (3)	--	--	85.3 (4)	--	90.1 (172)	89.6 (1)	80.9 (155)
Express Jet															
CL60	2003	160	1	50	53	82.0 (4)	85.2 (2)	86.0 (5)	--	--	82.1 (4)	--	89.0 (202)	79.9 (4)	80.1 (166)
	2004	515	9	213	53	81.0 (35)	84.0 (22)	88.7 (48)	78.4 (1)	79.0 (10)	84.8 (52)	83.8 (3)	89.0 (675)	100.2 (14)	80.5 (583)
	2005	54	213	40	60	82.4 (9)	84.1 (5)	89.5 (11)	84.2 (1)	82.0 (4)	84.9 (11)	--	89.4 (289)	81.3 (3)	80.7 (267)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Operations Evening	Operations Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
FedEx															
A300	2003	11	0	0	2	--	--	--	--	--	--	--	94.2 (11)	--	84.5 (9)
	2004	9	0	0	2	--	--	92.3 (1)	--	81.0 (1)	89.9 (1)	--	95.7 (8)	--	84.8 (8)
	2005	1	0	0	2	--	--	--	--	--	--	--	94.7 (1)	--	82.4 (1)
	2006	45	0	0	2	--	--	--	--	--	--	--	96.7 (44)	--	86.4 (43)
	2007	118	0	0	2	89.7 (6)	87.9 (6)	93.2 (6)	84.2 (3)	82.2 (5)	89.2 (6)	83.8 (3)	96.2 (107)	82.0 (2)	85.5 (102)
	2008	138	0	0	2	82.9 (5)	83.1 (6)	91.6 (6)	79.1 (2)	80.7 (5)	88.5 (6)	82.4 (1)	95.8 (131)	82.6 (3)	85.6 (130)
	2009	183	0	0	2	84.0 (3)	80.5 (3)	94.9 (3)	76.6 (1)	79.8 (2)	89.9 (3)	--	95.7 (177)	80.0 (5)	85.2 (169)
	2010	243	2	0	2	83.9 (4)	81.8 (5)	95.6 (5)	82.1 (1)	80.3 (3)	90.3 (5)	80.3 (1)	95.8 (235)	83.0 (1)	85.5 (227)
	2011	252	0	0	2	86.9 (9)	85.4 (10)	92.7 (10)	80.9 (5)	79.1 (7)	88.8 (11)	76.8 (1)	95.4 (239)	84.7 (3)	85.2 (227)
	2012	226	2	0	2	86.3 (8)	85.5 (8)	92.4 (8)	81.7 (3)	80.8 (7)	89.3 (8)	78.8 (2)	95.3 (217)	79.3 (8)	85.0 (208)
	2013	105	0	0	2	83.2 (1)	81.4 (1)	92.8 (1)	--	78.3 (1)	89.4 (1)	89.3 (1)	95.4 (101)	79.8 (1)	85.2 (100)
A306	2012	21	0	0	2	--	--	--	--	--	--	--	95.9 (21)	--	85.0 (20)
	2013	62	1	0	2	--	--	--	--	--	--	--	95.5 (61)	83.2 (1)	85.0 (61)
A310	2003	217	0	0	2	86.6 (5)	83.8 (4)	93.0 (6)	81.5 (5)	81.7 (4)	89.4 (5)	88.6 (6)	96.4 (208)	81.5 (5)	85.3 (192)
	2004	166	1	0	2	87.0 (7)	83.1 (7)	91.8 (6)	82.1 (6)	82.0 (5)	89.0 (7)	80.5 (1)	96.6 (156)	96.9 (1)	85.8 (138)
	2005	198	0	0	2	87.6 (9)	81.6 (10)	93.4 (10)	82.9 (7)	81.4 (8)	89.3 (8)	95.4 (2)	97.2 (176)	81.8 (3)	86.1 (175)
	2006	181	0	0	2	86.5 (8)	81.2 (9)	95.1 (8)	80.6 (3)	80.9 (4)	90.6 (8)	81.9 (1)	96.6 (159)	79.6 (5)	86.0 (155)
	2007	92	0	0	2	82.9 (2)	79.6 (2)	92.3 (2)	75.6 (1)	--	87.4 (2)	--	96.1 (87)	--	85.8 (81)
	2008	52	0	0	2	86.3 (1)	84.6 (1)	93.9 (1)	84.9 (1)	82.7 (1)	93.8 (1)	82.9 (1)	95.9 (49)	78.3 (1)	85.5 (50)
	2009	71	1	0	2	84.0 (2)	81.3 (2)	90.9 (2)	82.1 (2)	78.8 (2)	88.4 (2)	--	95.3 (69)	--	85.1 (64)
	2010	2	0	0	2	--	--	--	--	--	--	--	95.6 (2)	--	83.0 (2)
	2011	1	0	0	2	--	--	--	--	--	--	--	97.2 (1)	--	85.1 (1)
	2012	1	0	0	2	--	--	--	--	--	--	--	95.8 (1)	--	83.7 (1)
	2013	1	0	0	2	--	--	--	--	--	--	--	93.8 (1)	--	82.3 (1)
Frontier Airlines															
A318	2004	12	20	1	104	80.7 (2)	76.2 (1)	90.2 (2)	--	78.1 (1)	85.2 (2)	--	92.1 (31)	--	82.4 (29)
	2005	332	147	2	103	81.4 (10)	79.5 (5)	90.4 (10)	--	78.9 (4)	89.2 (11)	112.8 (1)	91.9 (445)	88.5 (7)	82.3 (452)
	2006	2	4	0	111	--	--	89.1 (1)	--	--	84.3 (1)	--	93.1 (5)	--	84.7 (5)
	2007	1	3	1	108	--	--	--	--	--	--	--	92.6 (5)	--	82.1 (5)
	2008	46	3	5	110	82.3 (6)	84.6 (3)	90.0 (6)	79.3 (1)	83.0 (1)	86.1 (5)	80.9 (1)	92.0 (48)	79.6 (2)	82.0 (45)
	2009	65	37	13	107	79.2 (2)	--	89.8 (2)	--	76.6 (1)	86.2 (2)	--	91.5 (111)	80.4 (1)	81.5 (100)
	2010	23	81	35	107	81.2 (2)	80.4 (1)	91.0 (2)	--	--	87.9 (2)	--	91.6 (130)	--	81.8 (127)
	2011	13	29	2	116	82.6 (3)	79.2 (3)	90.7 (2)	--	77.1 (1)	86.9 (3)	--	92.0 (41)	--	81.8 (36)
	2012	9	168	7	120	82.0 (2)	77.6 (1)	90.7 (2)	--	77.7 (1)	87.5 (2)	--	92.0 (181)	--	81.8 (166)
	2013	3	5	0	126	--	--	--	--	--	--	--	91.9 (8)	--	81.9 (8)
A319	2003	102	1	23	95	79.0 (1)	--	89.6 (1)	--	--	83.0 (1)	--	91.9 (119)	91.7 (4)	81.9 (110)
	2004	283	92	110	89	81.8 (48)	81.0 (35)	90.8 (55)	84.1 (3)	79.1 (36)	86.4 (55)	86.8 (10)	91.7 (423)	88.2 (8)	82.2 (399)
	2005	68	58	281	86	81.9 (18)	79.6 (13)	90.3 (21)	81.3 (1)	80.1 (12)	86.3 (21)	85.2 (3)	91.8 (375)	90.4 (2)	82.3 (368)
	2006	358	290	322	103	81.4 (32)	79.9 (26)	90.5 (40)	78.4 (2)	77.0 (6)	86.2 (41)	--	92.0 (921)	83.1 (8)	82.5 (883)
	2007	528	276	299	112	80.9 (37)	80.1 (17)	90.0 (49)	87.8 (1)	77.7 (4)	85.9 (49)	78.6 (1)	92.3 (1,032)	83.5 (10)	82.5 (1,008)
	2008	513	226	263	114	82.1 (26)	82.2 (20)	90.0 (33)	80.0 (5)	79.8 (9)	86.5 (33)	84.4 (2)	92.0 (942)	79.9 (8)	82.2 (934)
	2009	697	276	332	117	81.3 (47)	79.8 (31)	89.9 (53)	78.9 (3)	79.9 (5)	86.5 (49)	81.3 (1)	91.8 (1,242)	81.9 (9)	81.9 (1,174)
	2010	750	227	311	117	85.4 (22)	83.5 (19)	90.5 (28)	84.5 (3)	80.2 (9)	86.7 (27)	--	92.0 (1,227)	84.5 (11)	82.2 (1,196)
	2011	773	289	319	123	81.7 (47)	80.3 (35)	90.4 (56)	79.1 (9)	78.4 (16)	86.7 (54)	79.0 (4)	91.9 (1,307)	81.0 (11)	82.1 (1,224)
	2012	711	186	282	132	83.2 (26)	81.2 (26)	90.5 (32)	82.2 (5)	79.8 (7)	87.1 (32)	78.0 (3)	91.9 (1,118)	81.4 (29)	82.4 (1,055)
	2013	568	23	195	137	81.0 (10)	81.4 (5)	89.9 (12)	--	77.4 (2)	86.4 (11)	--	92.1 (762)	79.7 (5)	82.4 (708)
A320	2011	2	1	0	130	--	--	--	--	--	--	--	91.3 (3)	--	80.7 (2)
	2012	0	1	0	172	--	--	--	--	--	--	--	92.5 (1)	--	85.4 (1)
B7373	2003	43	17	24	100	82.9 (1)	78.5 (1)	90.7 (1)	--	78.8 (1)	84.9 (1)	--	94.0 (83)	78.8 (1)	83.3 (79)
	2004	136	74	64	99	81.9 (4)	80.6 (3)	92.8 (3)	77.9 (3)	80.9 (4)	89.5 (4)	--	93.9 (262)	93.7 (2)	85.0 (255)
	2005	1	0	0	98	--	--	--	--	--	--	--	92.3 (1)	--	84.2 (1)
Interjet															
A320	2012	175	0	0	96	83.4 (5)	82.7 (5)	89.5 (4)	80.7 (1)	78.8 (2)	85.8 (4)	--	91.8 (167)	77.4 (1)	82.9 (142)
	2013	492	1	0	107	82.6 (18)	82.8 (16)	90.5 (20)	80.4 (2)	83.0 (3)	87.3 (20)	85.7 (6)	91.9 (467)	81.3 (10)	82.4 (403)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Evening	Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Mesa Airlines															
CL60	2003	1,033	21	0	40	80.6 (20)	81.7 (15)	88.3 (29)	77.4 (1)	76.9 (1)	87.2 (23)	88.0 (7)	89.5 (976)	96.6 (28)	79.3 (752)
	2004	166	60	0	46	80.8 (6)	79.0 (5)	88.1 (9)	--	78.3 (2)	84.8 (10)	--	89.2 (212)	80.8 (4)	78.8 (134)
	2007	0	1	0	54	--	--	--	--	--	--	--	89.9 (1)	--	77.6 (1)
CRJ9	2004	419	303	7	68	80.7 (27)	79.9 (14)	89.4 (30)	--	78.6 (13)	85.6 (31)	--	89.6 (678)	101.4 (4)	81.3 (620)
	2005	302	296	2	70	80.0 (17)	78.4 (9)	89.3 (21)	--	78.3 (6)	85.5 (21)	97.9 (4)	89.8 (556)	81.9 (3)	81.1 (524)
	2006	349	256	0	78	80.9 (15)	82.9 (9)	88.8 (19)	--	79.8 (1)	84.3 (19)	--	90.0 (571)	--	81.5 (520)
	2007	302	247	0	74	80.8 (12)	83.2 (8)	89.0 (22)	--	--	84.8 (22)	--	90.1 (515)	87.3 (3)	80.8 (481)
	2008	302	152	0	64	80.5 (10)	81.2 (4)	88.9 (12)	--	--	84.9 (13)	79.0 (2)	89.7 (429)	82.2 (8)	80.5 (399)
	2009	1,082	100	78	53	79.9 (26)	79.2 (15)	88.5 (42)	--	--	85.1 (40)	84.7 (1)	89.0 (1,203)	80.8 (21)	79.9 (1,021)
	2010	631	46	32	55	79.8 (12)	78.8 (7)	89.1 (16)	--	--	85.7 (16)	81.7 (1)	89.2 (682)	79.3 (6)	80.2 (576)
	2011	358	2	0	48	80.8 (10)	81.0 (9)	88.7 (16)	--	94.1 (2)	84.5 (16)	80.9 (1)	89.1 (326)	80.2 (4)	80.0 (293)
	2012	305	1	0	51	85.1 (7)	83.6 (5)	88.4 (10)	87.0 (1)	80.3 (1)	85.0 (8)	--	89.0 (281)	79.5 (6)	80.0 (250)
	2013	168	40	0	58	79.2 (4)	77.8 (1)	88.7 (8)	--	--	84.8 (9)	--	89.3 (196)	--	80.1 (171)
Midwest Express															
B717	2003	98	0	0	48	76.7 (1)	--	88.9 (1)	--	81.1 (1)	83.0 (1)	--	88.4 (94)	100.2 (5)	79.7 (82)
	2004	432	0	0	52	79.0 (19)	79.5 (13)	87.2 (31)	87.8 (2)	77.9 (5)	83.0 (32)	86.9 (6)	88.3 (374)	90.2 (14)	79.5 (339)
	2005	118	0	0	73	78.5 (8)	77.9 (3)	87.7 (11)	--	79.5 (2)	84.4 (11)	89.4 (2)	88.7 (101)	--	80.6 (100)
Northwest Airlines															
A319	2003	833	447	8	109	84.4 (27)	84.2 (26)	90.9 (35)	82.0 (5)	83.3 (6)	87.2 (30)	84.9 (4)	91.5 (1,224)	95.1 (33)	81.9 (1,199)
	2004	660	370	16	111	82.4 (59)	79.4 (49)	90.8 (70)	79.0 (7)	78.8 (43)	86.9 (70)	85.8 (13)	91.3 (952)	96.0 (23)	81.9 (921)
	2005	727	410	25	112	81.4 (35)	80.7 (27)	90.8 (39)	84.4 (1)	79.9 (18)	87.5 (39)	86.0 (7)	91.5 (1,076)	87.3 (10)	82.0 (1,083)
	2006	802	137	0	113	80.9 (29)	85.0 (23)	90.5 (39)	84.2 (3)	79.6 (6)	87.2 (38)	--	91.7 (882)	85.2 (12)	82.2 (850)
	2007	741	120	1	112	80.0 (31)	83.7 (21)	90.0 (48)	84.5 (1)	77.1 (2)	86.6 (49)	--	91.8 (790)	89.6 (4)	82.3 (786)
	2008	632	141	1	112	81.5 (19)	81.8 (11)	90.6 (24)	78.7 (1)	81.6 (1)	86.5 (25)	82.2 (1)	91.6 (723)	80.5 (12)	81.9 (731)
	2009	958	170	0	113	81.0 (38)	85.7 (24)	90.2 (41)	78.9 (2)	78.7 (7)	86.8 (40)	81.2 (4)	91.4 (1,078)	81.8 (11)	81.5 (1,037)
	2010	70	12	0	107	81.4 (3)	82.5 (3)	90.2 (4)	80.9 (1)	--	86.7 (3)	--	91.7 (78)	--	81.4 (68)
A320	2003	20	7	2	130	82.8 (4)	78.6 (3)	92.5 (5)	82.4 (3)	79.1 (4)	--	86.8 (4)	91.8 (22)	--	81.2 (21)
	2004	7	7	0	108	80.6 (2)	--	91.2 (2)	--	77.7 (1)	87.2 (2)	--	91.8 (12)	--	81.8 (11)
	2005	12	1	1	120	82.7 (3)	83.3 (2)	91.1 (2)	78.1 (1)	78.4 (1)	87.8 (3)	--	92.8 (9)	--	82.4 (11)
	2006	19	1	0	116	81.5 (1)	79.4 (1)	92.1 (1)	--	--	89.7 (1)	--	92.2 (19)	--	82.9 (19)
	2007	3	0	0	132	--	--	--	--	--	--	--	92.8 (3)	--	82.9 (3)
	2009	9	1	0	108	--	--	--	--	--	--	--	92.2 (10)	--	81.5 (9)
	2010	2	0	0	119	--	--	--	--	--	--	--	91.5 (2)	--	81.6 (2)
Skywest															
CL60	2003	124	324	0	43	79.7 (5)	82.9 (6)	88.9 (9)	--	--	84.8 (8)	--	89.4 (429)	80.2 (7)	78.2 (320)
	2004	93	510	9	50	79.5 (21)	79.1 (10)	88.7 (34)	92.4 (1)	77.7 (4)	84.2 (35)	82.7 (3)	89.2 (570)	--	78.0 (380)
	2005	17	341	3	49	80.0 (8)	78.4 (3)	88.3 (10)	--	78.2 (2)	83.8 (10)	81.9 (1)	89.5 (341)	85.2 (2)	78.0 (258)
	2006	123	473	33	47	79.7 (19)	79.2 (9)	89.1 (29)	--	--	84.7 (29)	--	89.6 (593)	80.8 (3)	78.2 (396)
	2007	314	149	16	47	79.3 (21)	80.2 (11)	88.3 (28)	78.3 (1)	--	83.5 (29)	79.7 (1)	89.6 (448)	83.2 (5)	78.4 (276)
	2008	19	2	1	47	--	--	--	--	--	--	--	89.3 (22)	82.7 (1)	77.3 (11)
	2009	456	13	1	46	80.6 (8)	79.0 (7)	88.3 (13)	--	--	84.6 (12)	--	88.9 (454)	88.6 (5)	77.7 (259)
	2010	345	1	0	45	79.0 (10)	77.4 (3)	88.6 (13)	--	--	85.2 (13)	--	88.9 (326)	87.6 (3)	79.0 (115)
	2011	4	0	0	45	--	--	--	--	--	--	--	88.9 (4)	--	80.6 (1)
	2012	0	2	0	49	--	--	--	--	--	--	--	89.2 (2)	--	--
	2013	1	0	0	35	--	--	--	--	--	--	--	87.9 (1)	--	--
CRJ2	2013	0	1	0	39	--	--	--	--	--	--	--	88.5 (1)	--	--
CRJ7	2004	31	0	0	63	79.2 (8)	78.9 (4)	88.7 (9)	--	77.7 (3)	84.6 (9)	80.1 (2)	88.9 (22)	77.7 (2)	80.4 (15)
	2005	579	0	0	58	79.7 (18)	79.1 (13)	89.1 (22)	79.0 (1)	79.9 (11)	85.8 (26)	88.0 (3)	89.0 (525)	82.3 (12)	80.8 (407)
	2006	640	0	0	60	79.0 (21)	78.1 (11)	88.5 (30)	--	--	84.4 (31)	98.1 (2)	89.0 (592)	80.6 (26)	80.6 (393)
	2007	701	1	0	54	82.8 (24)	82.9 (11)	88.2 (44)	81.4 (3)	80.7 (2)	83.6 (46)	81.2 (3)	89.0 (644)	89.7 (26)	79.9 (473)
	2008	986	47	7	54	81.1 (25)	81.9 (15)	88.4 (39)	79.8 (2)	--	84.3 (40)	81.5 (2)	88.5 (979)	81.0 (29)	79.4 (773)
	2009	1,559	71	6	61	78.4 (21)	78.8 (18)	88.0 (42)	--	--	84.1 (43)	--	88.3 (1,573)	81.4 (38)	79.3 (1,079)
	2010	1,509	27	26	63	80.5 (22)	81.9 (13)	87.9 (35)	81.6 (2)	--	83.8 (36)	78.0 (1)	88.3 (1,499)	81.2 (44)	80.0 (804)
	2011	1,533	42	12	63	80.7 (40)	80.6 (23)	88.0 (69)	80.2 (5)	78.4 (4)	83.7 (71)	83.6 (2)	88.2 (1,499)	81.5 (22)	79.5 (816)
	2012	1,161	121	0	63	80.6 (13)	80.4 (10)	88.2 (27)	--	--	84.4 (27)	84.7 (1)	88.4 (1,227)	82.5 (39)	79.9 (637)
	2013	631	88	1	63	80.9 (5)	81.3 (4)	87.2 (18)	80.2 (1)	--	82.9 (18)	84.7 (2)	88.2 (684)	79.8 (12)	79.0 (391)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Evening	Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Skywest (Continued)															
CRJ9	2007	1	0	0	70	--	--	--	--	--	--	--	89.4 (1)	--	80.6 (1)
	2010	1	0	0	48	--	--	--	--	--	--	--	89.5 (1)	--	79.6 (1)
	2013	4	2	0	74	--	--	--	--	--	--	--	89.1 (6)	75.5 (1)	78.2 (4)
E120	2003	1,234	247	312	21	81.6 (43)	80.5 (18)	86.7 (58)	82.0 (7)	78.4 (3)	83.3 (48)	87.6 (8)	89.0 (1,701)	90.7 (140)	78.9 (840)
	2004	1,021	236	259	21	80.8 (100)	85.5 (45)	86.8 (111)	83.2 (5)	79.0 (18)	82.1 (115)	85.6 (9)	88.9 (1,363)	88.3 (104)	79.1 (674)
	2005	1,125	274	284	21	81.0 (64)	79.8 (29)	87.0 (69)	80.2 (5)	80.2 (16)	82.4 (67)	98.3 (7)	89.2 (1,565)	83.2 (76)	79.4 (865)
	2006	1,209	311	299	19	81.7 (70)	81.3 (34)	86.4 (71)	88.6 (2)	82.2 (2)	82.2 (75)	82.9 (1)	89.1 (1,726)	82.4 (105)	78.8 (803)
	2007	1,091	303	248	19	80.8 (81)	81.7 (30)	86.1 (82)	76.6 (1)	78.1 (2)	81.7 (83)	91.9 (2)	89.3 (1,538)	93.0 (53)	78.6 (824)
	2013	1	0	0	27	--	--	--	--	--	--	--	87.7 (1)	--	--
Skywest Commuter															
CRJ9	2012	203	82	1	70	79.0 (2)	77.6 (1)	87.8 (3)	--	--	84.1 (3)	--	89.0 (277)	78.2 (4)	79.5 (232)
	2013	449	220	4	70	78.8 (9)	78.4 (5)	88.3 (15)	--	--	85.2 (15)	84.4 (3)	89.0 (642)	80.5 (5)	79.7 (530)
Southwest Airlines															
B7373	2003	80	20	5	102	87.7 (2)	83.1 (1)	95.1 (2)	81.9 (2)	82.0 (2)	92.2 (2)	78.2 (1)	94.6 (101)	83.1 (5)	83.3 (68)
	2004	55	17	1	97	--	--	--	--	--	--	--	94.3 (72)	89.0 (5)	82.8 (55)
	2006	188	12	0	88	83.2 (6)	80.9 (6)	92.2 (5)	77.8 (2)	78.9 (3)	87.8 (6)	82.5 (1)	94.5 (191)	84.3 (5)	82.7 (159)
	2007	10	0	0	102	82.8 (3)	79.7 (3)	93.1 (3)	78.4 (1)	78.3 (2)	89.2 (3)	--	94.6 (7)	--	83.5 (6)
	2008	0	1	0	85	87.5 (1)	81.8 (1)	94.1 (1)	81.5 (1)	82.7 (1)	93.9 (1)	76.7 (1)	--	--	--
	2009	2	0	0	111	--	--	--	--	--	--	--	94.4 (2)	--	82.2 (2)
	2011	0	2	0	97	--	--	--	--	--	--	--	94.4 (2)	--	82.3 (2)
	2013	0	1	0	87	--	--	--	--	--	--	--	91.7 (1)	--	--
B7375	2003	3,016	832	2	100	85.4 (104)	83.1 (95)	94.1 (120)	80.5 (75)	81.3 (114)	91.1 (92)	84.5 (29)	94.7 (3,634)	90.2 (349)	83.3 (2,529)
	2004	461	170	2	94	85.1 (45)	82.5 (39)	93.6 (47)	80.2 (29)	81.8 (45)	90.1 (48)	81.1 (19)	94.4 (576)	84.5 (53)	83.4 (402)
	2005	1	0	0	116	--	--	--	--	--	--	--	95.2 (1)	--	--
B7377	2003	3,584	831	172	106	83.4 (124)	82.5 (110)	92.1 (137)	81.9 (48)	79.9 (93)	88.5 (107)	84.9 (26)	92.6 (4,352)	88.7 (311)	81.9 (2,954)
	2004	5,730	1,313	163	106	83.5 (494)	82.2 (454)	92.1 (522)	79.6 (154)	80.8 (487)	88.5 (515)	90.1 (67)	92.5 (6,474)	92.1 (428)	81.9 (4,554)
	2005	7,436	1,516	67	109	83.8 (328)	82.5 (293)	91.9 (359)	79.2 (107)	81.1 (205)	88.5 (360)	96.3 (42)	92.6 (8,216)	91.0 (262)	83.4 (6,545)
	2006	8,523	2,138	289	105	83.0 (460)	82.0 (404)	91.5 (502)	79.4 (108)	78.7 (221)	87.7 (493)	85.5 (32)	92.7 (10,193)	82.5 (317)	81.9 (7,623)
	2007	9,069	2,049	222	110	82.9 (605)	81.0 (517)	91.5 (626)	80.2 (101)	78.7 (229)	87.6 (634)	87.9 (38)	92.9 (10,487)	88.8 (269)	82.1 (8,315)
	2008	7,326	2,153	348	107	83.8 (295)	82.3 (256)	91.9 (304)	80.7 (81)	80.5 (155)	88.4 (311)	84.0 (20)	92.7 (9,299)	81.8 (247)	81.7 (7,246)
	2009	11,401	3,248	329	100	83.1 (498)	81.4 (457)	91.2 (502)	80.5 (96)	79.1 (218)	87.8 (493)	85.0 (25)	92.4 (14,297)	82.2 (419)	82.1 (10,545)
	2010	11,406	3,354	479	107	83.6 (344)	82.8 (334)	91.3 (377)	79.7 (99)	78.9 (204)	87.9 (374)	83.1 (24)	92.5 (14,533)	83.1 (495)	82.0 (10,318)
	2011	11,488	3,372	680	107	83.4 (614)	81.4 (566)	91.6 (641)	79.3 (171)	79.6 (334)	88.2 (627)	84.4 (35)	92.4 (14,719)	83.1 (407)	81.6 (10,027)
	2012	12,302	3,274	869	108	84.1 (405)	82.4 (358)	91.6 (420)	79.6 (122)	79.6 (272)	88.4 (409)	81.0 (35)	92.5 (15,696)	82.3 (746)	81.8 (10,957)
	2013	8,988	2,159	748	110	82.8 (274)	82.0 (237)	90.9 (279)	79.0 (48)	78.8 (109)	87.5 (275)	87.3 (25)	92.5 (11,407)	82.7 (352)	81.8 (8,216)
B7378	2012	5	60	0	164	--	--	--	--	--	--	--	93.6 (63)	--	81.5 (54)
	2013	41	42	3	142	83.4 (3)	83.5 (3)	90.3 (3)	76.1 (1)	82.2 (2)	86.6 (3)	--	93.3 (83)	76.2 (1)	82.2 (66)
United Airlines															
A319	2003	773	191	48	90	81.3 (34)	90.5 (21)	89.2 (44)	79.8 (3)	82.2 (5)	85.5 (33)	79.5 (7)	90.8 (938)	87.2 (33)	81.3 (801)
	2004	491	175	25	96	81.3 (32)	83.5 (17)	89.0 (42)	82.1 (2)	79.6 (16)	85.2 (41)	86.7 (6)	90.7 (642)	95.3 (18)	81.5 (539)
	2005	487	261	51	104	80.6 (36)	79.4 (22)	89.5 (37)	--	78.4 (10)	85.1 (38)	102.1 (4)	90.9 (740)	82.3 (13)	81.6 (650)
	2006	759	209	26	107	81.7 (21)	81.2 (13)	89.5 (29)	80.5 (1)	77.9 (2)	84.8 (28)	88.6 (1)	91.1 (957)	85.8 (11)	81.2 (798)
	2007	1,123	338	47	105	81.1 (49)	80.8 (21)	88.8 (62)	81.1 (4)	81.9 (6)	84.7 (60)	77.7 (2)	91.2 (1,424)	88.5 (25)	81.2 (1,259)
	2008	469	181	94	109	83.5 (8)	85.1 (6)	88.1 (15)	82.5 (4)	78.5 (3)	82.5 (16)	77.7 (1)	91.1 (724)	81.6 (10)	81.0 (649)
	2009	418	316	138	105	81.0 (27)	83.2 (12)	88.5 (30)	80.7 (4)	80.3 (4)	84.7 (31)	--	90.7 (838)	81.8 (15)	80.5 (685)
	2010	475	203	251	104	81.9 (13)	83.1 (6)	88.8 (17)	80.4 (1)	81.3 (1)	85.6 (18)	--	90.9 (894)	81.5 (18)	80.7 (723)
	2011	466	243	259	101	81.5 (28)	80.2 (16)	89.3 (40)	79.1 (3)	76.3 (1)	86.0 (39)	80.4 (3)	90.7 (924)	83.2 (8)	80.7 (667)
	2012	639	229	185	107	81.9 (25)	79.3 (19)	89.8 (28)	81.7 (2)	79.0 (3)	86.4 (28)	--	90.8 (998)	81.7 (33)	80.8 (766)
	2013	632	188	48	110	83.3 (23)	85.3 (12)	88.4 (28)	80.1 (5)	81.4 (5)	85.0 (27)	82.0 (4)	90.8 (827)	80.3 (17)	80.9 (569)

John Wayne Airport Arrivals

Airline / Aircraft	Year	Operations: Day	Operations: Evening	Operations: Night	Average PAX	Average SENEL (Number of Events): 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
United Airlines (Continued)															
A320	2003	759	287	36	110	82.6 (29)	82.0 (22)	90.2 (39)	84.9 (3)	81.3 (5)	86.9 (28)	88.4 (3)	91.3 (1,029)	84.8 (40)	81.1 (887)
	2004	880	219	52	110	81.3 (76)	80.3 (41)	90.2 (82)	82.6 (2)	78.6 (43)	86.1 (80)	92.3 (11)	91.2 (1,036)	89.7 (31)	81.5 (927)
	2005	654	223	37	124	85.7 (20)	88.0 (10)	90.0 (20)	81.7 (4)	80.3 (9)	86.1 (21)	95.0 (2)	91.6 (853)	80.7 (7)	81.6 (820)
	2006	451	134	51	122	80.5 (9)	86.0 (4)	89.0 (17)	82.1 (1)	--	85.1 (18)	78.5 (2)	91.5 (603)	82.2 (5)	81.7 (546)
	2007	216	42	89	108	79.9 (12)	79.8 (6)	88.6 (16)	--	80.2 (1)	84.3 (15)	81.8 (2)	91.5 (325)	76.9 (2)	81.4 (292)
	2008	451	175	148	114	82.2 (25)	82.4 (18)	90.3 (28)	81.4 (5)	81.1 (5)	86.9 (29)	80.3 (1)	91.3 (736)	81.0 (12)	81.1 (663)
	2009	836	300	268	116	81.5 (33)	82.3 (15)	89.2 (35)	80.2 (3)	81.0 (1)	85.9 (34)	79.6 (1)	91.2 (1,362)	80.3 (25)	80.9 (1,142)
	2010	1,161	568	277	120	81.1 (42)	84.7 (23)	89.8 (49)	80.9 (2)	76.3 (1)	85.9 (51)	83.0 (1)	91.4 (1,909)	82.2 (39)	81.2 (1,572)
	2011	1,332	538	323	122	82.3 (66)	81.9 (39)	89.7 (85)	80.7 (6)	80.3 (8)	86.2 (83)	82.3 (2)	91.3 (2,093)	81.9 (40)	81.0 (1,758)
	2012	1,489	443	306	121	81.9 (58)	81.9 (42)	90.0 (65)	79.2 (1)	78.1 (10)	86.6 (64)	--	91.3 (2,128)	81.9 (62)	81.2 (1,744)
	2013	982	506	207	127	82.6 (42)	84.3 (13)	89.4 (49)	81.7 (4)	81.5 (4)	85.5 (48)	81.6 (4)	91.3 (1,637)	80.8 (26)	81.4 (1,324)
B7373	2003	5	0	0	53	--	--	--	--	--	--	--	94.6 (5)	--	83.5 (5)
	2004	3	2	0	101	--	--	--	--	--	--	--	94.8 (5)	81.0 (1)	84.3 (3)
	2006	17	1	0	92	--	--	--	--	--	--	--	95.1 (17)	84.4 (1)	82.5 (16)
	2008	191	54	8	92	85.6 (17)	83.1 (17)	94.6 (17)	79.7 (10)	81.6 (16)	90.4 (16)	80.1 (1)	94.7 (232)	83.0 (7)	82.9 (191)
	2009	119	54	45	100	84.0 (11)	81.1 (10)	92.9 (11)	77.7 (6)	80.1 (9)	89.4 (11)	--	94.7 (206)	78.6 (2)	82.6 (182)
B7375	2003	3	0	0	104	--	--	--	--	--	--	--	95.2 (3)	--	82.6 (2)
	2006	2	0	0	103	--	--	--	--	--	--	--	95.6 (2)	--	82.1 (2)
	2007	42	3	0	110	--	--	--	--	--	--	--	95.2 (43)	83.9 (1)	82.7 (39)
	2008	64	30	3	92	87.2 (7)	83.4 (7)	93.6 (7)	83.2 (3)	82.1 (7)	90.4 (7)	84.7 (1)	94.3 (91)	77.2 (1)	82.9 (72)
	2009	168	18	5	97	84.9 (7)	82.7 (6)	93.6 (7)	77.9 (4)	80.8 (6)	89.0 (7)	--	94.4 (181)	80.1 (4)	82.9 (161)
	2012	0	1	0	113	--	--	--	--	--	--	--	91.9 (1)	--	--
B7377	2011	147	66	7	110	83.4 (46)	81.3 (42)	91.5 (52)	82.1 (12)	80.0 (18)	87.8 (49)	82.6 (4)	91.6 (170)	81.7 (2)	81.7 (143)
	2012	1,172	595	99	112	82.9 (34)	85.2 (32)	91.2 (40)	79.5 (11)	80.2 (14)	87.7 (41)	81.0 (6)	92.0 (1,779)	82.3 (43)	82.3 (1,665)
	2013	768	338	112	111	83.8 (35)	82.8 (27)	90.4 (36)	82.7 (5)	80.9 (11)	86.5 (37)	85.8 (7)	92.1 (1,167)	80.6 (11)	82.1 (1,052)
B7378	2011	10	4	22	133	83.3 (7)	80.4 (7)	92.1 (7)	78.8 (3)	80.8 (5)	89.2 (7)	--	92.8 (29)	78.7 (1)	82.4 (24)
	2012	306	246	150	140	84.4 (23)	83.8 (20)	92.5 (24)	78.5 (11)	80.1 (20)	89.4 (24)	79.4 (4)	93.3 (661)	84.6 (12)	82.9 (619)
	2013	117	116	75	135	83.4 (7)	81.0 (7)	92.1 (7)	77.1 (2)	77.8 (4)	88.1 (7)	--	93.5 (300)	82.0 (7)	83.1 (268)
B7379	2012	0	1	0	122	--	--	--	--	--	--	--	92.7 (1)	--	82.9 (1)
B757	2003	2,406	516	62	119	84.1 (64)	82.9 (62)	93.1 (79)	82.3 (18)	79.6 (45)	89.7 (55)	83.9 (20)	94.7 (2,829)	95.7 (87)	83.0 (2,566)
	2004	1,761	449	127	124	84.4 (172)	81.8 (156)	93.2 (175)	79.0 (32)	80.6 (157)	89.2 (178)	93.0 (23)	94.6 (2,105)	90.7 (106)	83.0 (1,790)
	2005	1,625	396	230	136	84.7 (88)	84.4 (83)	93.4 (98)	81.9 (24)	82.3 (49)	89.3 (98)	93.8 (10)	94.7 (2,037)	80.4 (34)	83.2 (1,893)
	2006	1,557	747	453	131	83.7 (121)	80.5 (104)	92.7 (119)	78.4 (14)	78.3 (42)	88.8 (123)	77.7 (4)	94.8 (2,568)	82.6 (62)	83.0 (2,298)
	2007	1,348	586	337	135	83.4 (138)	81.7 (109)	92.4 (137)	80.9 (9)	79.9 (30)	87.9 (140)	88.7 (7)	95.0 (2,105)	92.7 (24)	83.0 (1,930)
	2008	694	362	194	135	84.3 (28)	81.4 (24)	93.2 (27)	79.2 (7)	79.7 (14)	89.2 (30)	87.1 (1)	95.0 (1,189)	83.5 (14)	82.9 (1,117)
	2009	555	275	205	143	82.9 (60)	80.3 (52)	92.3 (61)	79.3 (4)	79.6 (14)	88.2 (59)	79.1 (3)	94.5 (965)	81.8 (17)	82.4 (869)
	2010	303	254	176	155	83.9 (17)	81.0 (14)	93.0 (17)	77.1 (4)	79.2 (9)	89.3 (17)	--	94.7 (695)	81.9 (7)	82.8 (650)
	2011	130	228	103	152	84.5 (4)	80.7 (5)	93.2 (5)	78.2 (1)	78.3 (5)	89.0 (6)	79.9 (1)	94.7 (450)	82.4 (12)	82.4 (394)
	2012	150	276	86	165	84.1 (10)	80.6 (8)	92.8 (12)	82.8 (2)	80.5 (3)	88.3 (12)	--	94.7 (496)	83.3 (9)	82.9 (441)
	2013	153	159	43	165	--	--	--	--	--	--	--	94.9 (349)	81.7 (4)	82.9 (321)
UPS															
B757	2003	196	1	0	2	83.6 (2)	82.7 (3)	92.1 (4)	76.7 (1)	79.3 (2)	87.1 (3)	--	94.6 (188)	83.9 (8)	83.4 (180)
	2004	173	0	0	2	83.1 (8)	80.7 (6)	91.3 (8)	76.1 (1)	80.5 (6)	86.5 (8)	--	94.2 (163)	87.6 (1)	83.5 (158)
	2005	191	3	0	2	84.4 (8)	82.4 (8)	92.4 (8)	77.1 (2)	80.0 (6)	87.7 (8)	82.8 (1)	94.3 (181)	--	83.3 (174)
	2006	214	2	0	2	83.2 (7)	80.6 (6)	91.0 (7)	--	79.0 (3)	85.3 (8)	--	94.3 (207)	76.9 (1)	83.1 (199)
	2007	208	1	0	2	86.4 (7)	86.9 (6)	90.7 (7)	83.0 (2)	83.3 (1)	85.7 (7)	--	94.9 (198)	82.9 (2)	83.0 (183)
	2008	174	0	0	2	82.9 (2)	83.8 (4)	90.1 (4)	82.6 (2)	82.3 (1)	86.9 (4)	82.4 (1)	94.6 (167)	82.1 (5)	82.5 (153)
	2009	215	2	0	2	83.0 (5)	80.4 (4)	89.8 (5)	--	78.1 (1)	86.2 (5)	90.3 (1)	94.5 (211)	83.3 (1)	82.5 (195)
	2010	206	1	0	2	83.9 (5)	82.8 (5)	90.8 (6)	76.0 (1)	78.2 (2)	87.6 (6)	--	94.6 (198)	--	82.5 (190)
	2011	205	4	0	2	83.4 (8)	80.9 (8)	92.4 (8)	79.4 (4)	81.2 (4)	88.4 (8)	--	94.9 (200)	85.2 (5)	83.2 (191)
	2012	205	2	0	2	84.6 (4)	82.0 (5)	91.1 (4)	--	--	89.0 (3)	--	94.3 (200)	81.2 (9)	82.8 (194)
	2013	134	3	0	2	84.3 (1)	79.7 (1)	90.9 (1)	--	--	89.0 (1)	--	94.5 (134)	83.0 (2)	82.7 (127)
US Airways															
A319	2003	227	213	5	104	83.6 (12)	86.5 (12)	90.8 (15)	86.8 (1)	81.0 (4)	86.2 (10)	82.0 (3)	92.0 (424)	99.2 (8)	82.0 (407)
A320	2003	1	0	1	106	--	--	--	--	--	--	--	91.8 (2)	--	80.7 (2)

John Wayne Airport Arrivals

Airline Aircraft	Year	Operations Day	Evening	Night	Average PAX	Average SENEL (Number of Events) 1S	2S	3S	4S	5S	6S	7S	8N	9N	10N
Virgin America															
A319	2009	514	109	7	78	85.6 (3)	88.6 (3)	89.0 (3)	--	78.6 (3)	88.4 (1)	--	91.5 (625)	81.7 (17)	81.8 (488)
	2010	39	8	4	83	81.7 (1)	81.3 (1)	89.5 (1)	--	76.7 (1)	87.2 (1)	--	91.8 (50)	--	82.2 (38)
A320	2009	290	86	10	114	82.8 (15)	82.3 (10)	90.7 (16)	84.1 (1)	79.4 (5)	86.9 (15)	--	91.6 (369)	84.2 (13)	81.8 (251)
	2010	379	82	13	88	81.2 (9)	81.9 (6)	90.8 (11)	--	78.2 (2)	86.8 (11)	--	91.6 (442)	83.9 (18)	82.2 (331)
WestJet															
B7377	2010	5	0	0	2	--	--	--	--	--	--	--	93.0 (5)	--	82.5 (5)
	2011	380	0	0	102	83.1 (10)	82.8 (8)	90.2 (10)	77.3 (3)	78.2 (3)	87.0 (10)	--	92.3 (368)	80.7 (15)	81.7 (293)
	2012	545	0	0	107	84.3 (13)	85.2 (12)	89.6 (13)	80.8 (3)	79.2 (6)	87.3 (11)	78.4 (1)	92.5 (534)	81.1 (24)	82.3 (418)

APPENDIX B
SINGLE EVENT AIRCRAFT NOISE IN LAGUNA BEACH

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This section presents analysis of single event noise over the City of Laguna Beach in response to comments from the City and from residents concerning over flights of the City.

B.1 Flight Tracks Over Laguna Beach

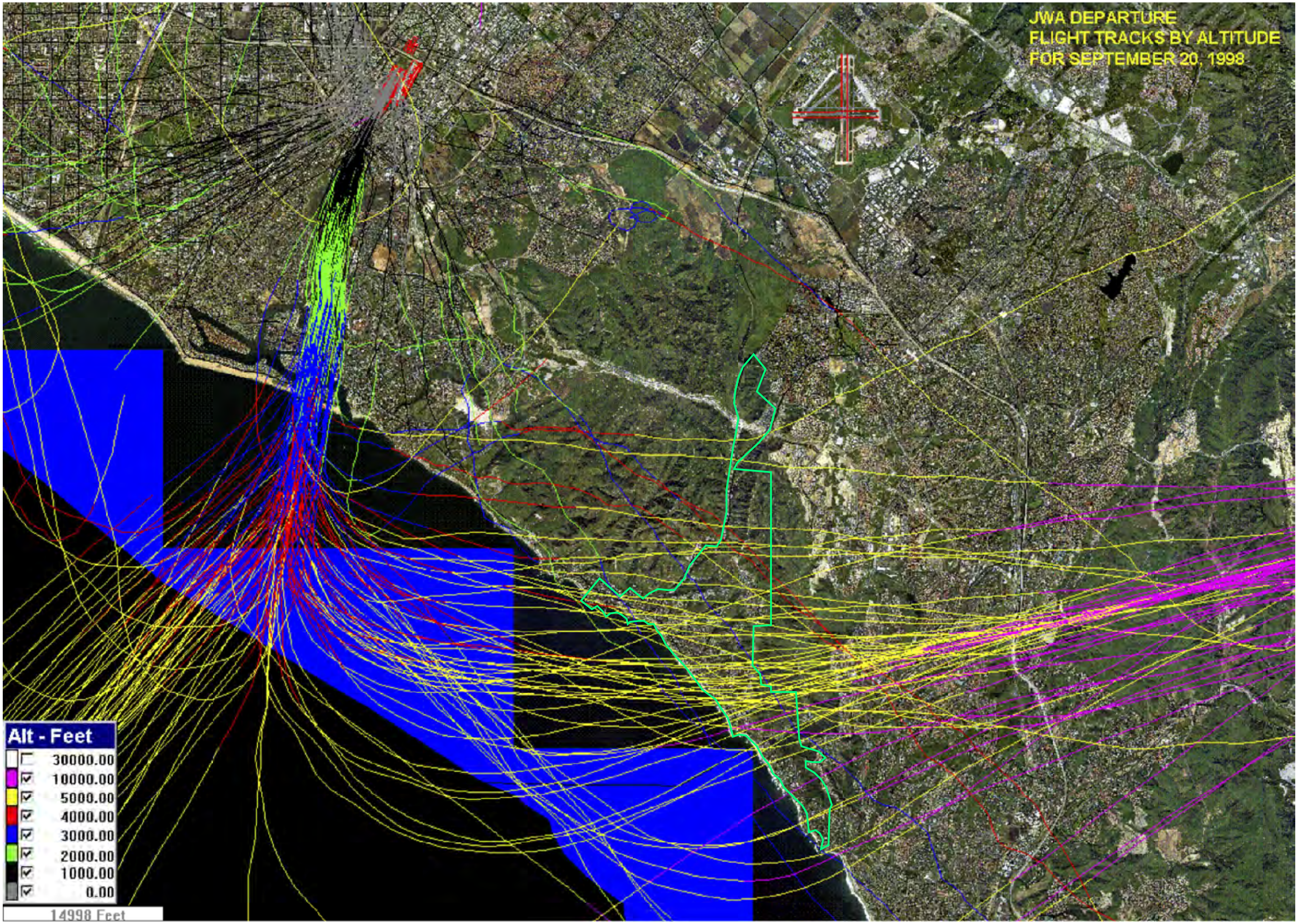
Four snapshots of flight tracks over Laguna Beach are shown in Figures 32 through 35. The flight tracks are color coded for altitude and the approximate boundary of the City of Laguna Beach is shown in light green. These were taken in September of 1998, 2000, 2007, and 2013. Each day corresponds to a Sunday because it was the only day that the radar tracks from 1998 and 2000 were available. The number of aircraft operations on Sundays is similar to the rest of the week, except for Saturday when there are fewer flights.

B.2 Location of Tracks

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 John Wayne Airport. These procedures were introduced by the FAA and are the sole responsibility of the FAA; i.e., John Wayne Airport 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 GPS or inertial guidance systems.

In terms of number of flights, John Wayne Airport operations peaked in the year 2007 and operations have decreased since that time. Recent upticks in air carrier operations are still well below year 2007 levels.

In examining the 4 years of snapshots, there is 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.



L&B

Figure 32
Flight Tracks From The Year 1998

John Wayne Airport (JWA) Settlement Agreement Amendments

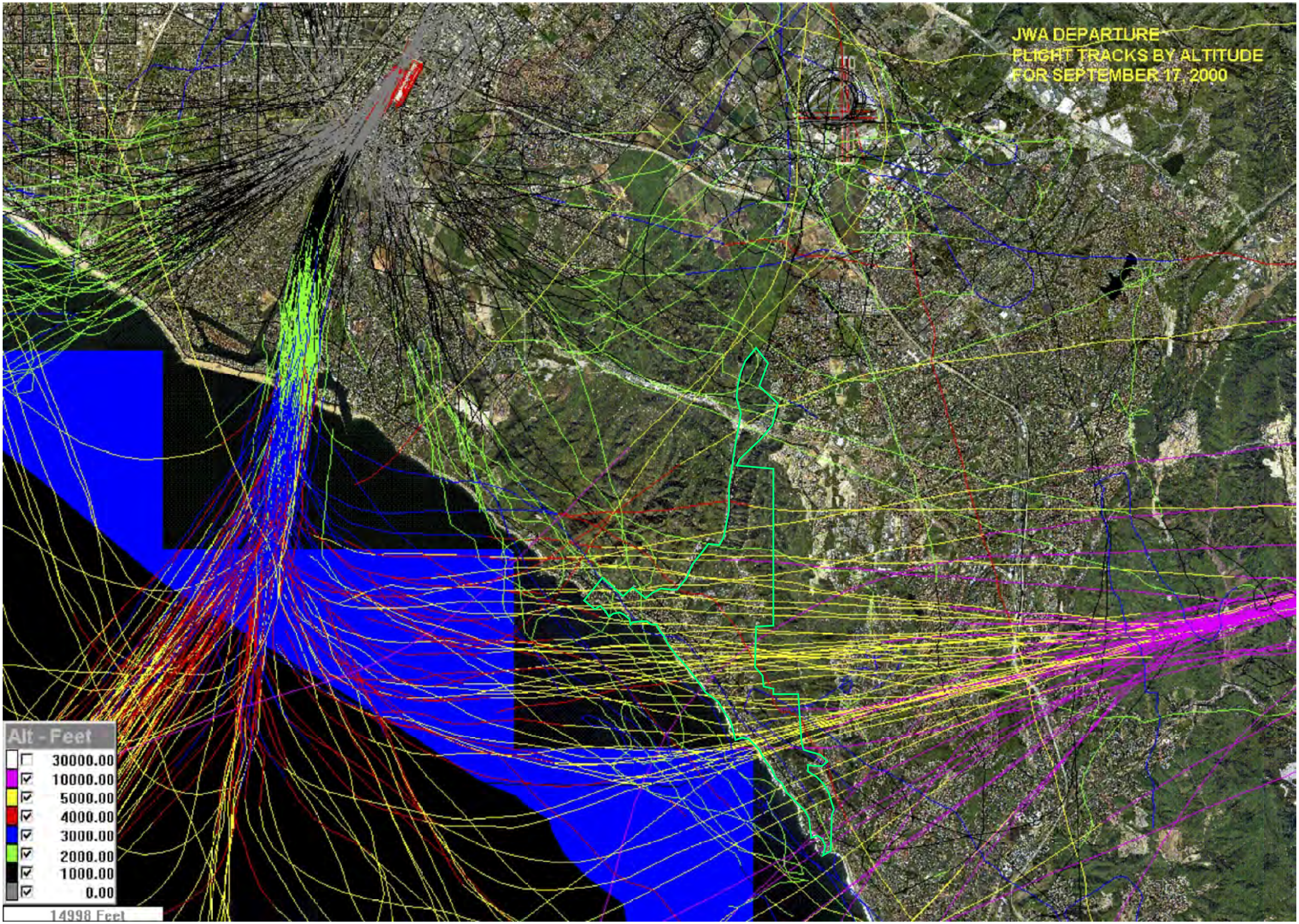


Figure 33
Flight Tracks From The Year 2000

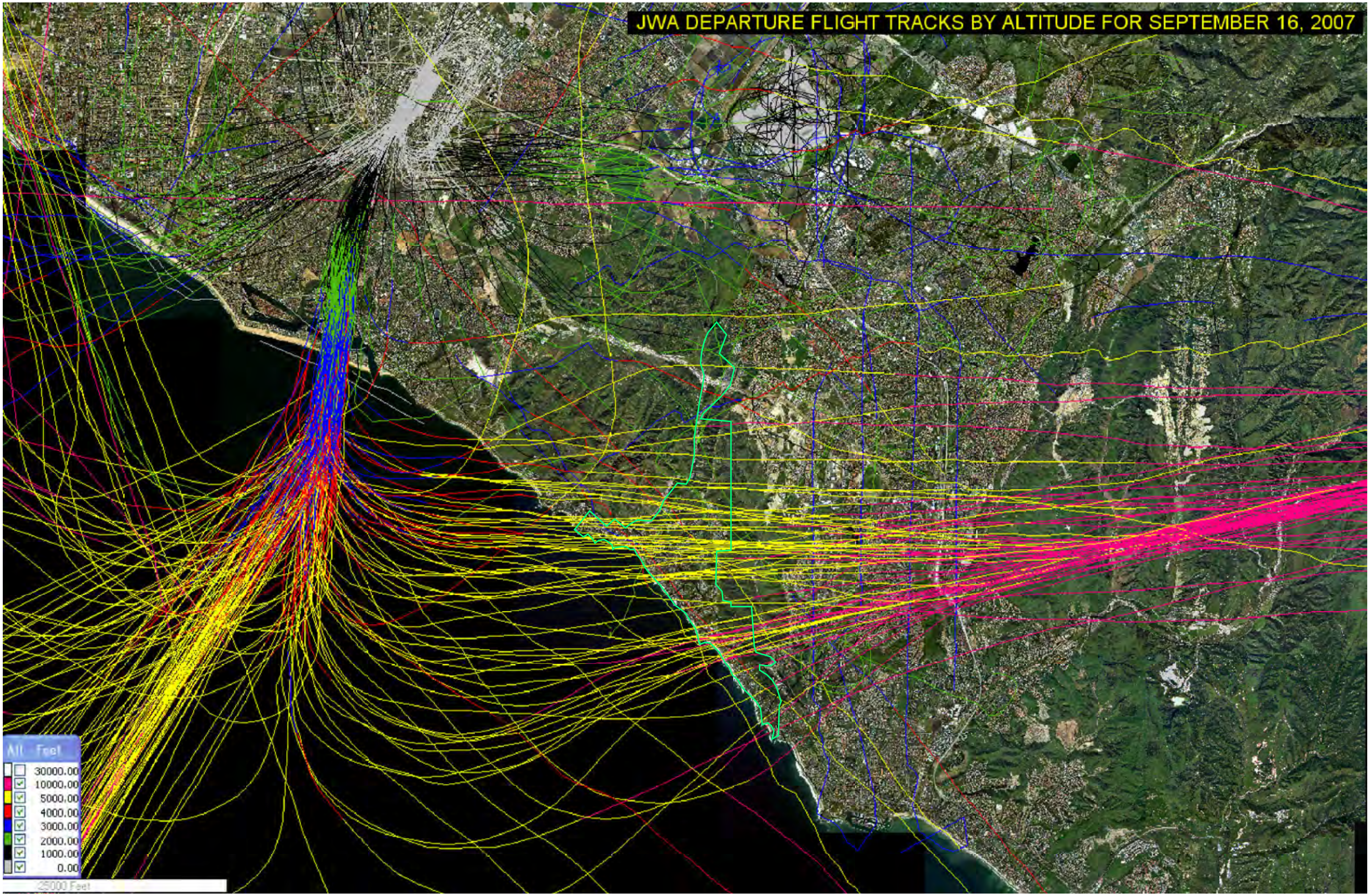


Figure 34
Flight Tracks From The Year 2007

John Wayne Airport (JWA) Settlement Agreement Amendments

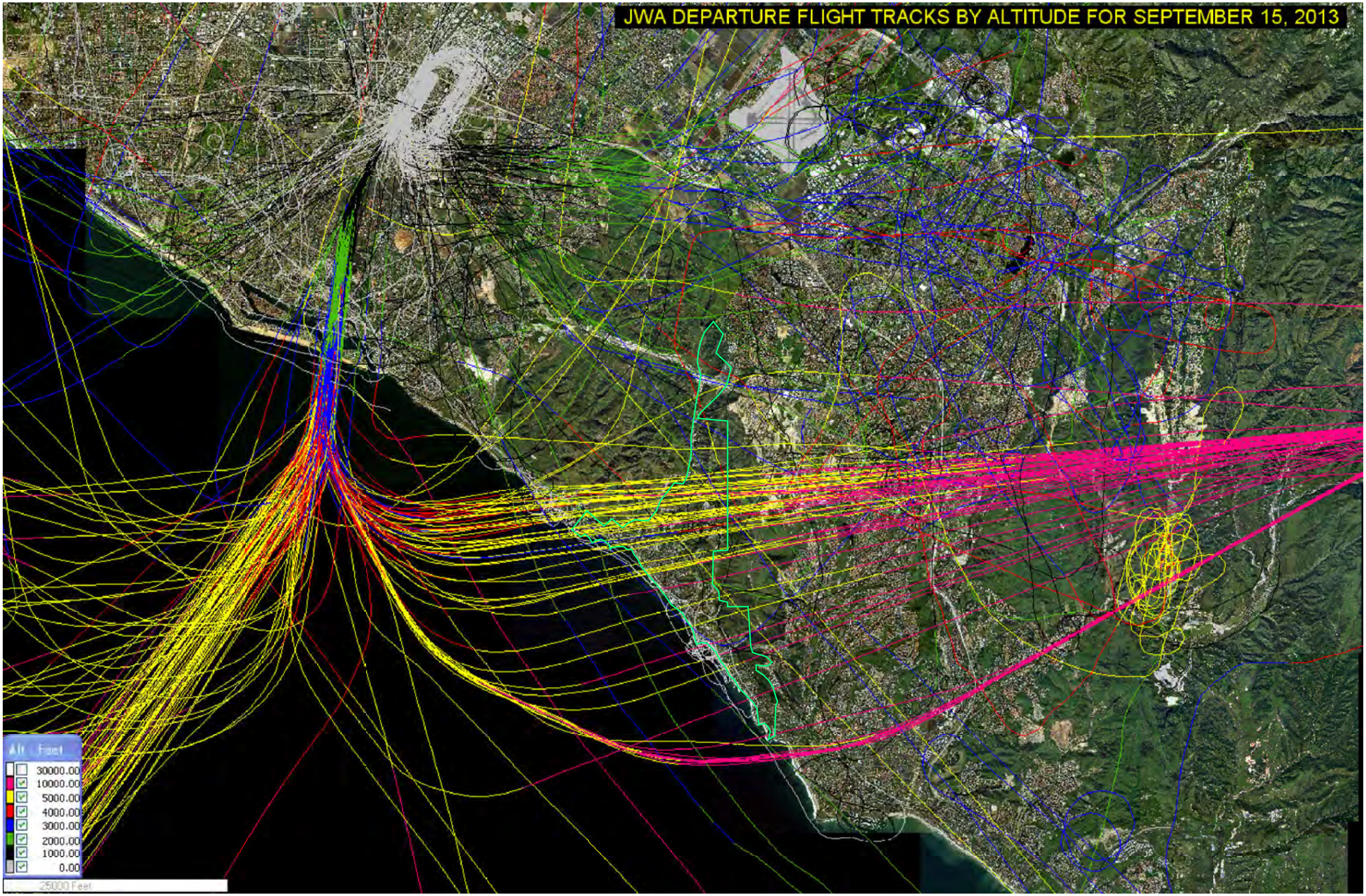


Figure 35
Flight Tracks From The Year 2013

John Wayne Airport (JWA) Settlement Agreement Amendments

B.3 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 figures turn from yellow to magenta. Figure 35 shows that this transition occurred closer to the coastline and Laguna Beach 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 RNP flight tracks. Figure 36 shows the altitudes for Sunday, September 16, 2013 over the Top of the World neighborhood. The altitudes shown are above sea level, so given the elevation of Top of the World; the approximate height over Top of the World is about 1,000 feet less than shown in Figure 36.

A review of radar data from individual departures showed that some aircraft would hold their altitude to between 5,700 feet and 7,000 feet once it was reached 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 held their altitude would typically cross 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 of Laguna Beach. The aircraft then start climbing again at various points, sometimes directly over the city and sometimes further inland. Those aircraft that held their altitude were doing so at the direction of air traffic control to ensure enough spacing from other aircraft flying at higher altitudes parallel to the coastline.

B.4 Single Event Noise

In order to estimate the flyover noise, three specific points were selected for analysis. These points are in Canyon Acres, Top of the World, and Arch Beach Heights. 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.

The maximum noise level at each of these locations during a fly over by the most commonly used aircraft at JWA, the Boeing 737-700, was computed using the INM. The noise levels were calculated for two flight profiles with flight tracks that passed directly overhead of the analysis locations. One flight profile represented flights subject to altitude holds from air traffic control. In this case, the aircraft would hold their altitude at 5,700 feet once it was reached and then resume their climb as they were passing overhead of each of the analysis locations. This results in an estimate of the worst-case maximum noise levels from the aircraft over flights. The second flight profile did not include a level segment and assumed that the departing aircraft climbed to their cruising altitude without air traffic control restrictions. This represents the typical maximum aircraft overflight noise level at these sites.

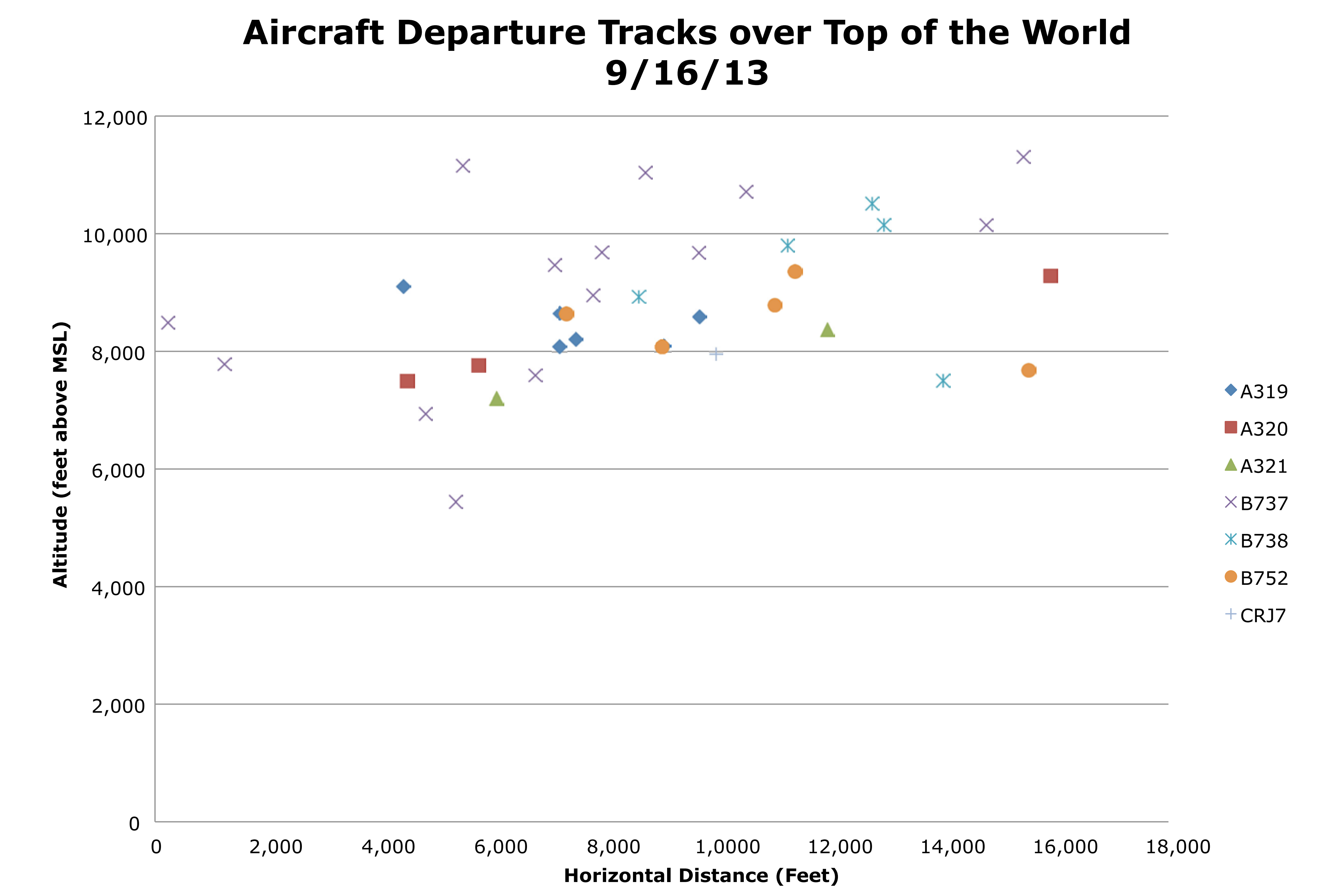


Figure 36
Sample Day of Air Carrier Elevations Over Laguna Beach

Note that maximum noise level was estimated because it represents the instantaneous maximum heard during a flyover. These locations are too far from the Airport and too far outside the regulatory threshold of 65 dB CNEL to reliably estimate CNEL at these locations. Moreover, it is the aircraft noise level during the flyover that is of concern to residents, not the 24-hour average. Table 35 shows the estimated maximum noise level from such a flyover at these three locations. Maximum noise levels are presented for two conditions, with an FAA required altitude hold and a typical departure.

Table 35
Maximum Single Event Aircraft Overflight Maximum 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

Note that the data in Table 35 represent the maximum noise levels when the aircraft are directly overhead as well as when the aircraft are overflying the two other receptor locations. The noise level is highest when the aircraft are directly overhead and are loudest at the higher elevations in the City. These maximum noise levels, in the range of 62 dBA to 67 dBA are noise levels that not exceptional in terms of other ambient noises such as cars, trucks, motorcycles, etc. are typical of the noise level of 67 dBA. These three areas of Laguna Beach, excepting the parts of Canyon Acres nearest Laguna Canyon Road, do enjoy low ambient noise levels and thus the aircraft noise is more intrusive than it would be in a more urban area. Even though some residents consider these aircraft flyovers intrusive, the noise levels do not exceed any County, State, or Federal standard or guideline for environmental noise in residential areas.

Effect of the Project and Alternatives

Neither the Proposed Project nor any of the Project Alternatives will affect the location of flight tracks over Laguna Beach or the altitudes. The number of flights will increase commensurate with the increase ADDs associated with the Proposed Project and each Alternative.

Table 36 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 (10 pm for air carrier departures, 11 pm for air carrier arrivals). Clearly, Alternative C Phases 2 and 3 would result in a considerable increase 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. It should be pointed out that 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.

Table 36
Percent Increase in Total Air Carrier/Cargo Departures

Alt	Phase	Average Daily Departures (Class A and E)	% Increase
No Project		146	0
Proposed Project	1	146	0
	2	158	8
	3	168	15
Alt A	1	142	-3
	2	148	2
	3	165	13
Alt B	1	143	-2
	2	172	18
	3	199	37
Alt 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 annual passengers (MAP) remains constant. This results in a decrease in Class E operations due to larger load factors for Class A aircraft.

Based radar tracks from the first week of September 2013 there were between two and five flights headed to LAX that overflew Laguna Beach between 11:00 p.m. and 1:00 a.m. every day except Tuesday when there were none. The most over flights during this period occurred on Sunday with five. There were three overflights on Monday and Thursday and two each on Wednesday Friday and Saturday. The altitude of these flights was between 7,200 feet and 11,200 feet MSL. The maximum noise levels generated by these aircraft would be somewhat lower than the Typical Departure Type shown in Table 35. Under a typical aircraft departure from JWA, aircraft are between 7,000 and 9,000 as they fly over Laguna Beach.

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APPENDIX C
TRAFFIC NOISE LEVEL INCREASES OVER EXISTING CONDITIONS

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Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
	Sensitive Use?	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
Red Hill Ave																					
North of Macarthur Blvd	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
South of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Main St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Main St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Paularino Ave	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Paularino Ave	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Baker St	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Baker St	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Santa Ana Ave																					
North of Bristol St	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
South of Bristol St	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Mesa Dr	Y	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
South of Mesa Dr	Y	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
North of Del Mar Ave	Y	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6
South of Del Mar Ave	Y	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Macarthur Blvd																					
West of Red Hill Ave	N	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6
East of Red Hill Ave	N	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.8
North of Main St	N	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8
South of Main St	N	0.1	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.5	0.4	0.4	0.4	0.5	0.7	0.5	0.6	0.6	0.7	0.8
North of I-405 Nb Ramps	N	0.1	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.5	0.3	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.6	0.7
South of I-405 Nb Ramps	N	0.1	0.2	0.2	0.4	0.5	0.2	0.2	0.2	0.2	0.6	0.4	0.4	0.4	0.5	0.7	0.5	0.6	0.6	0.8	0.9
North of I-405 Sb Ramps	N	0.1	0.2	0.2	0.4	0.5	0.2	0.2	0.2	0.2	0.6	0.4	0.4	0.4	0.5	0.7	0.5	0.6	0.6	0.8	0.9
South of I-405 Sb Ramps	N	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.3	0.4	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.6
North of Michelson Dr	N	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.5	0.5
South of Michelson Dr	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4
North of Campus Dr	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5
South of Campus Dr	N	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6
North of Birch St	N	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.7
South of Birch St	N	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.6	0.6	0.7	0.7
West of Von Karman Ave	N	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6
East of Von Karman Ave	N	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6
West of Jamboree Rd	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
East of Jamboree Rd	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6
North of Bison Ave	Y	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
South of Bison Ave	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
North of Ford Rd-Bonita Canyon	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
South of Ford Rd-Bonita Canyon	Y	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
	Sensitive Use?	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
Von Karman Ave																					
North of Michelson Dr	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.7
South of Michelson Dr	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
North of Campus Dr	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Campus Dr	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7
North of Macarthur Rd	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Macarthur Rd	N	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Jamboree Rd																					
North of I-405 Nb Ramps	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of I-405 Nb Ramps	N	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
North of I-405 Sb Ramps	N	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of I-405 Sb Ramps	Y	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
North of Michelson Dr	Y	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6
South of Michelson Dr	Y	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
North of Campus Dr	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
South of Campus Dr	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Birch St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of Birch St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of Macarthur Blvd	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
South of Macarthur Blvd	N	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.8
North of North Bristol St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5
South of North Bristol St	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5
North of South Bristol St	N	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of South Bristol St	N	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
North of Bayveiw Way	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
South of Bayveiw Way	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
North of University Dr-Eastbluff D	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
South of University Dr-Eastbluff D	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
North of Bison Ave	Y	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
South of Bison Ave	Y	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
North of Eastbluff Dr-Ford Rd	Y	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
South of Eastbluff Dr-Ford Rd	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Bayview Pl																					
South of South Bristol St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bayveiw Way																					
West of Jamboree Rd	Y	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
East of Jamboree Rd	N	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
University Dr-Eastbluff Dr																					
East of Jamboree Rd	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
West of Jamboree Rd	Y	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
Eastbluff Dr-Ford Rd																					
West of Jamboree Rd	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
East of Jamboree Rd	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise Sensitive Use?	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
		No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
Ford Rd-Bonita Canyon Dr																					
West of Macarthur Blvd	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
East of Macarthur Blvd	Y	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Bison Ave																					
West of Jamboree Rd	Y	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
East of Jamboree Rd	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
West of Macarthur Blvd	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
East of Macarthur Blvd	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Main St																					
West of Red Hill Ave	N	0.1	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.6	0.5	0.6	0.6	0.6	0.8	0.7	0.8	0.8	0.9	***1.0***
East of Red Hill Ave	N	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.6	0.6	0.6	0.6	0.7	0.9	0.8	0.9	0.9	***1.0***	***1.1***
West of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4
East of Macarthur Blvd		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
Michelson Dr																					
West of Macarthur Blvd	N	0.5	0.8	0.9	***1.2***	***1.6***	0.5	0.5	0.5	0.5	***1.6***	0.5	0.8	0.7	***1.0***	***1.7***	0.6	***1.0***	***1.0***	***1.4***	***1.7***
East of Macarthur Blvd	N	0.2	0.3	0.4	0.5	0.7	0.3	0.3	0.3	0.3	0.8	0.4	0.5	0.5	0.6	0.9	0.6	0.7	0.7	0.9	***1.0***
West of Von Karman Ave	N	0.3	0.5	0.5	0.7	0.9	0.5	0.5	0.5	0.5	***1.1***	0.9	***1.0***	***1.0***	***1.1***	***1.4***	***1.2***	***1.4***	***1.4***	***1.6***	***1.7***
East of Von Karman Ave	N	0.2	0.3	0.4	0.5	0.6	0.4	0.4	0.4	0.4	0.8	0.7	0.8	0.7	0.8	***1.1***	0.9	***1.0***	***1.1***	***1.2***	***1.3***
West of Jamboree Rd	Y	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.8	0.9
East of Jamboree Rd	Y	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7
Campus Dr																					
East of Jamboree Rd	Y	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7
West of Jamboree Rd	N	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7
East of Von Karman Ave	N	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.6	0.7	0.7	0.7	0.7	0.9	0.9	0.9	0.9	***1.0***
West of Von Karman Ave	N	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9
East of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7
West of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7
North of Airport Wy	N	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.8	0.8
South of Airport Wy	N	0.2	0.4	0.4	0.7	0.9	0.3	0.3	0.3	0.3	***1.0***	0.5	0.7	0.6	0.8	***1.2***	0.7	0.9	0.9	***1.2***	***1.3***
North of Quail St	N	0.2	0.4	0.5	0.7	0.9	0.4	0.4	0.4	0.4	***1.0***	0.5	0.7	0.6	0.8	***1.2***	0.7	0.9	0.9	***1.2***	***1.3***
South of Quail St	N	0.2	0.4	0.4	0.7	0.9	0.4	0.4	0.4	0.4	***1.0***	0.5	0.7	0.6	0.8	***1.1***	0.7	0.9	0.9	***1.1***	***1.3***
North of North Bristol St	N	0.2	0.4	0.4	0.7	0.9	0.3	0.3	0.3	0.3	***1.0***	0.5	0.6	0.6	0.8	***1.1***	0.7	0.9	0.9	***1.1***	***1.3***
South of North Bristol St	N	0.1	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.5	0.3	0.4	0.4	0.4	0.6	0.4	0.5	0.5	0.7	0.7
North of South Bristol St	N	0.1	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.5	0.3	0.4	0.4	0.4	0.6	0.4	0.5	0.5	0.6	0.7
South of South Bristol St	N	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4

Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
	Sensitive Use?	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
Irvine Ave																					
North of Mesa Dr	Y	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.5
South of Mesa Dr	Y	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
North of University Dr	Y	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
South of University Dr	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
North of 22Nd St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of 22Nd St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
North of 20Th St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
South of 20Th St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
North of 19Th St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of 19Th St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
North of 17Th St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of 17Th St	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6
Airport Wy																					
West of Campus Dr	N	***1.1***	***2.0***	***2.1***	***3.0***	***3.6***	***1.2***	***1.2***	***1.2***	***1.2***	***3.7***	***1.3***	***1.9***	***1.6***	***2.4***	***3.8***	***1.4***	***2.3***	***2.4***	***3.3***	***3.9***
Quail St																					
West of Campus Dr	N	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
East of Campus Dr	N	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Birch St																					
East of Jamboree Rd	N	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***	***3.5***
West of Jamboree Rd	N	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7	***1.0***	***1.0***	***1.0***	***1.0***	***1.0***
East of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.4	0.6	0.6	0.6	0.6	0.6	0.8	0.9	0.9	0.9	0.9
West of Macarthur Blvd	N	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7
North of North Bristol St	N	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5
South of North Bristol St	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
North of South Bristol St	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
South of South Bristol St	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.5	0.5
Mesa Dr																					
East of Irvine Ave	Y	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
West of Irvine Ave	Y	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
East of Santa Ana Ave	Y	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.4	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8
West of Santa Ana Ave	Y	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7
East of Newport Blvd (NB)	Y	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8
West of Newport Blvd (NB)	N	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.9
East of Newport Blvd (SB)	N	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.8	0.9	0.9	0.9	***1.0***	***1.1***	***1.2***	***1.2***	***1.2***	***1.3***
West of Newport Blvd (SB)	N	0.4	0.4	0.4	0.4	0.4	0.7	0.7	0.7	0.7	0.8	***1.1***	***1.3***	***1.3***	***1.3***	***1.3***	***1.5***	***1.6***	***1.6***	***1.6***	***1.6***
University Dr																					
West of Irvine Ave	Y	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.8
East of Irvine Ave	Y	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
	Sensitive Use?	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
Del Mar Ave																					
West of Santa Ana Ave	Y	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.6	0.5	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9
East of Santa Ana Ave	Y	0.2	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.6	0.5	0.7	0.7	0.7	0.7	0.6	0.8	0.8	0.8	0.9
West of Newport Blvd (NB)	Y	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.1	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3
East of Newport Blvd (NB)	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
West of Newport Blvd (SB)	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
East of Newport Blvd (SB)	N	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Paularino Ave																					
West of Red Hill Ave	N	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
East of Red Hill Ave	N	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Baker St																					
West of Red Hill Ave	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
East of Red Hill Ave	N	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Bristol St																					
West of Santa Ana Ave	Y	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.6	0.6	0.6	0.7	0.8	0.9	0.9	0.9	***1.0***	***1.0***
East of Santa Ana Ave	N	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.6	0.7	0.7	0.7	0.8	0.9	***1.0***	***1.0***	***1.0***	***1.1***
North Bristol St																					
West of Campus Dr	N	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6
East of Campus Dr	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6
West of Birch St	N	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.6
East of Birch St	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
South Bristol St																					
West of Campus Dr	N	0.1	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
East of Campus Dr	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5
West of Birch St	N	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
East of Birch St	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
West of Jamboree Rd	Y	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
East of Jamboree Rd	N	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.3	0.1	0.2	0.2	0.2	0.3	0.1	0.2	0.2	0.2	0.3
West of Bayview Pl	N	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
East of Bayview Pl	N	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
Newport Blvd (SB)																					
North of Mesa Dr	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
South of Mesa Dr	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
North of Del Mar Ave	N	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3
South of Del Mar Ave	N	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Newport Blvd (NB)																					
North of Mesa Dr	N	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.5	0.6	0.6
South of Mesa Dr	N	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4
North of Del Mar Ave	N	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
South of Del Mar Ave	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
22nd St																					
West of Irvine Ave	Y	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.8	0.9	0.9	0.9	0.9
East of Irvine Ave	Y	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Increase in Traffic Noise CNEL Level over Existing Conditions

	Adjacent Noise	Existing Conditons with:					Year 2016 with:					Year 2021 with:					Year 2026 with:				
	Sensitive Use?	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C	No Proj.	Proj.	Alt. A	Alt. B	Alt. C
20th St																					
West of Irvine Ave	Y	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.5	0.7	0.7	0.7	0.7	0.5	0.7	0.7	0.7	0.7
East of Irvine Ave	Y	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7
19th St																					
West of Irvine Ave	Y	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
East of Irvine Ave	Y	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.6	0.6
17th St																					
West of Irvine Ave	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
East of Irvine Ave	Y	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

APPENDIX D
FAA PROGRAM GUIDANCE LETTER 12-09, ELIGIBILITY AND JUSTIFICATION REQUIREMENTS FOR NOISE INSULATION PROJECTS

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U.S. Department of Transportation
Federal Aviation Administration

Memorandum

Subject: **ACTION:** Program Guidance Letter 12-09
AIP Eligibility and Justification Requirements for Noise Insulation Projects

Date: August 17, 2012

From: Joe Hebert for
Manager, Airports Financial Assistance Division, APP-500

Reply to Attn. of: Nancy S. Williams
202-267-8822

Jim Byers
202-267-3007

Manager, Airport Planning and Environmental, APP-400

To: PGL Distribution List

The reason for this PGL is to reconfirm the two-step requirement for AIP eligibility for residential and other noise insulation projects. The AIP Handbook interprets 14 CFR Part 150 to require that structures be located in the existing or forecast yearly day-night average (DNL) 65 decibel (dB) noise contour (or, under limited circumstances, a lower dB noise contour formally approved by a local government to determine compatibility of residences), *and* that noise insulation project be designed to achieve interior noise levels of 45 dB to qualify for federal funding.

1. Two-Step Requirement for AIP Eligibility.

FAA has become aware that there may be confusion and ambiguity in our guidance about the second step, that interior noise levels must be 45 dB or greater for a residence or other eligible structure, such as a school, to be eligible for AIP funding for noise insulation.

Title 14 CFR Part 150, Airport Noise Compatibility Planning, establishes the amount of noise reduction (NLR) that must be achieved through noise attenuation measures for a residence or school to be considered normally compatible with airport noise. See, Note 1 of Table 1, 14 CFR Part 150, Appendix A.[1] FAA Order 5100-38, the original AIP Handbook (Handbook) dated November 24, 1986 reflected this NLR requirement as a design objective for noise insulation projects. It clarified that residential noise insulation must be designed to achieve a 50 dB interior noise level when the project is completed (paragraph 711.) Later revisions to the Handbook lowered the design objective to 45 dB in all habitable rooms. The current Handbook continues to require that a residential noise insulation project be in the existing or forecast DNL 65 dB contour and be designed to

[1] It states that residences and schools are not normally considered compatible with airport noise levels above 65 DNL dB unless insulation projects to reduce outdoor to indoor noise by at least 25 to 30 dB have been incorporated. "Normal residential construction can be expected to provide a [noise level reduction] of 20 dB, thus the reduction requirements are often started as 5, 10, or 15 dB over standard construction…"

achieve target interior noise levels of 45 dB in habitable rooms to be eligible for AIP funding.[2] Accordingly, residences and schools that already have interior noise levels of less than 45 dB are not generally eligible for AIP funding, with some equitable exceptions.

2. Age of Structure.

The policy that the FAA will consider funding eligibility for noise insulation measures under 14 CFR Part 150 only for noncompatible development which existed as of October 1, 1998, remains unchanged. New incompatible land uses created by subsequent airport development may also be eligible for funding consideration.

3. Upcoming Revisions to FAA Advisory Circular 150/5020-1, Noise Control and Compatibility Planning for Airports.

The revision to FAA Advisory Circular 150/5020-1, Noise Control and Compatibility Planning for Airports is not part of this PGL.

4. APP-400 Review of Residential Sound Insulation Programs.

In FY 2013 The Office of Airport Planning and Programming will begin a review of regional compliance with this guidance to ensure program consistency.

5. Revisions to AIP Handbook.

Attachment 1 to this PGL contains the replacement paragraph 812 Noise Insulation Projects of FAA Order 5100-38C, the AIP Handbook, in its entirety, effective as of the date of this PGL.

6. Requirements for Ongoing Noise Insulation Programs.

Specific requirements for ongoing noise programs for Fiscal Years 2012, 2013, and 2014 have been developed. Attachment 2 details the specific requirements for ongoing noise insulation programs.

7. Communication with Residents and Others Impacted by Noise Insulation Programs.

Early communication with all residents that are in the DNL 65 dB contour is important. The Sponsor must explain the two-step requirements to residents that are *currently* in the DNL 65 dB contour.

Further, it is important for the residents to understand that if noise contours change, a neighborhood that was previously identified as potentially noise impacted may no longer be impacted. The sponsor must also explain how the program will be phased. The Sponsor must let residents know that final determinations of which residences will be noise insulated will only be made after sampling and testing has been completed. Clearly explaining the noise insulation

[2] "The design objective of a residential noise insulation project generally should be to achieve the requisite NLR when the project is completed. (This is mathematically equivalent to achieving a DNL of 45 dB in all habitable rooms.)" FAA Order 5100.38C, Paragraph 812b(1). This is mathematically equivalent to achieving a DNL of 4 dB because, application of 25 dB NLR to the 70 yearly DNL range in Table 1, Appendix A, Part 150, and application of 30 dB NLR to the 75 yearly DNL, both result in interior noise levels of 45 yearly DNL.

program process to residents will help prevent unrealistic expectations of residents who may later be found to be outside of the noise impact areas or whose homes already provide sufficient sound insulation.

8. Use of the Term ADO

For the purposes of this PGL, the term ADO means the FAA Airports District Office or Regional Office in regions that do not have Airports District Offices.

9. Applicability

The provisions set forth in this Program Guidance Letter do not apply to noise insulation projects for which construction has been completed. Construction being completed means that final payment has been made to the contractor doing the sound insulation work on the residence or public building. Paragraph 580 concerning environmental mitigation projects, which generally refers to Chapter 8 of the existing AIP Handbook on noise compatibility projects, does not change.[3]

10. Relationship to Type of Funding

The requirements of this PGL apply to AIP grant funded projects. Under 49 USC §40117(a)(3)(D) and (E), PFC funds may be used for noise compatibility planning and project, although the project only has to be ***approvable*** under 14 CFR Part 150, and does not necessarily have to have been ***approved*** under 14 CFR Part 150. This means that an airport does not have to have a 14 CFR Part 150 Record of Approval in order to conduct residential sound insulation projects using PFC funds.

Projects that are funded with airport revenue must meet the requirements of the 49 USC §47107(b)(1) and §47133; Grant Assurance 25, and the FAA policy for revenue use as described in 64 Federal Register 7696[4]. In general, the requirement is that the revenue must be used for the capital and operating expenses of the airport or local airport system. Sound insulating structures that are not adversely affected by aircraft noise would not be considered a capital or operating expenses of the airport.

[3] Consistent with past policy and interpretation of paragraph 580, airport sponsors have a reasonable period of time to implement substantial multi-year noise insulation projects that were a condition of approval in a record of decision for an AIP funded airport development project. Where structures in the project area no longer meet the qualifying criteria, airport sponsors may seek concurrence from ARP-1 that circumstances warrant special consideration. The sponsor must show that flexibility is needed to reasonably fulfill commitments in an environmental record of decision.

[4] The Federal Register Notice and grant assurances are published on the FAA website at the following address: http://www.faa.gov/airports/airport_compliance/
Title 49 of the United States Code is published on the U.S. House of Representatives website at the following address: http://uscode.house.gov/download/title_49.shtml

Attachments:

1. AIP Handbook Replacement Paragraph 812
2. Handling of Noise Insulation Programs Currently Underway

812. NOISE INSULATION PROJECTS.

a. Regulatory Background.

The Aviation Safety and Noise Abatement Act of 1979 (ASNA) directed FAA to identify land uses that are normally compatible with various noise exposure levels.

In response, FAA adopted the 14 Code of Federal Regulations Part 150, Airport Noise Compatibility Planning (14 CFR Part 150.) The adoption of the regulation was published in the Federal Register Notice 46 FR 8316 on page 69, on January 26, 1981.

14 CFR Part 150 under 49 US Code serves as the guidance for much of the AIP-funded noise compatibility program. 14 CFR Part 150 includes "Table 1 - Land Use Compatibility With Yearly Day-Night Average (DNL) Sound Levels" that defines compatible and noncompatible land uses and related structures.

b. General Requirements for AIP funding of Noise Insulation Projects

1. Only a noise-impacted noncompatible structure that is in the DNL 65 dB contour *and* the existing interior noise levels are 45 dB or greater with the windows closed can be included.

A noise-impacted noncompatible structure - typically a residence, place of worship, school, or hospital – must be both in the DNL 65 dB contour and be experiencing existing interior noise levels that are 45 dB or greater with the windows closed. (For schools, the 45 dB measurement may be based on the number of hours of the school day.) 46 Federal Register, page 8316, January 26, 1981, establishing the interim rule for Part 150 included the interior noise level. This was further clarified in 1992 by the Federal Interagency Committee on Noise (FICON) findings of 45 dB to be the interior noise level that will accommodate indoor conversations or sleep.[1] The 45 dB standard has been adopted by FAA for interior noise.

There are three ways that a structure can be considered for noise insulation.

A. The structure is located within a currently valid existing or forecast day/night average sound level (DNL)[2] 65 decibel (dB) or higher contour associated with operations at an airport on the FAA-accepted Noise Exposure Map (NEM)[3] and is in an approved program measure[4]. The

[1] Table 3.4 and Section 3.2.3 of the 1992 FICON report states that the indoor noise level of DNL 45 dB is identified as the protective level to protect speech interference.
[2] The FAA recognizes CNEL (community noise exposure level) as an alternative noise metric for California. For purposes of this guidance the metric DNL and CNEL can be used interchangeably.
[3] 14 CFR Part 150 section 150.21
[4] Per 49 USC 47504(c)

NEM is normally developed by an airport sponsor as part of a Part 150 study.

B. The structure is included in a noise mitigation program prepared by a State or local jurisdiction surrounding a medium or large hub airport that either has not prepared a 14 CFR Part 150 program or does not have an updated 14 CFR Part 150 program[5]; or

C. The structure is an adversely affected school or hospital. Under 49 United States Code §47504, an adversely affected school or a hospital may also be eligible; whether or not it is part of an airport sponsor's NCP.

Under 14 CFR Part 150, the FAA adopted the standard of DNL 65 dB, as the Federal land use compatibility guideline at which residential land uses are considered non-compatible with airport noise.

2. A lower local standard (e.g., DNL 60 dB) may be used for Part 150 purposes if the standard is formally adopted by the local jurisdiction for land-use compatibility and the airport sponsor has incorporated it[6] (although the interior noise level standard of 45 dB does not change). Where a lower local noise standard is adopted outside of the Part 150 process, 49 USC 47141 requires that the land use compatibility plan be developed cooperatively by the airport sponsor and local jurisdiction to be eligible for a grant. Additional information on these requirements is addressed in Paragraph 810.b. **Noise Exposure Maps used for Noise Insulation Programs must be Current.**

Noise contours change for many reasons, such as changes to aviation activity and changes to air traffic procedures. By law, FAA must rely on only those noise exposure maps that reflect current or reasonably projected conditions[7]. In 2005, FAA published Program Guidance Letter 05-04[8] which addressed the requirement for currently valid noise contours. In general, NEM's less than 5 years old are considered current, unless conditions have created a significant change that would affect noise contours.

NEM older than 5 years old must be certified by the sponsor and updated as required as discussed in the PGL.

The ADO must verify that the NEM showing the DNL 65 dB contour reflects the current or projected operational conditions at the airport and associated

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[5] Codified in 49 USC 47141.
[6] 14 CFR Part 150, Table 1 in Appendix A.
[7] 49 USC 47503
[8] Program Guidance Letter 05-04, About §§189, 322, and 324 in Vision 100-Century of Aviation Reauthorization Act: Guidance For Funding Mitigation Projects for Aircraft Noise less than 65 DNL, Public Availability of Noise Exposure Maps, and Determining Eligibility Of Airport Noise Compatibility Projects In Areas of Significantly Reduced Noise Exposure, June 3, 2005. Available online at http://www.faa.gov/airports/aip/guidance_letters/

noncompatible land uses.[9] The ADO must place a copy of the verification in the project files.

3. Only Eligible Sponsors can participate in Noise Insulation Programs.

Eligible sponsors include units of local government having jurisdiction over the project location, airport sponsors, and special purpose units of local government (e.g., school districts and hospitals).

4. Acquisition of Noise Easements is not required.

Sponsors are encouraged to obtain a noise easement in return for the noise insulation provided by the project, but it is not an AIP requirement. (See Paragraph 808).

c. Specific Eligibility and Justification Requirements and Limitations for a Noise Insulation Projects.

1. Specific Eligibility and Justification Requirements for Projects.

In order for a structure to be funded with AIP grant funding, the sponsor must demonstrate that the structure meets all of the criteria listed in Table 1.

Table 1 Structure-Specific Eligibility and Justification Requirements

The following requirement …	As described further …
The structure must be in the 65 dB or higher contour.	The structure must be located in a noise contour as described in paragraph b-1 and be current as described in b-2.
The interior noise level must be 45 dB or greater.	The windows-closed interior noise level of the structure must be 45 dB or greater. The measurement of interior noise levels is an average for all habitable spaces in a particular residential unit, or educational spaces in a school. A structure may have interior noise levels that are already below 45 dB. This depends on the type of construction (i.e., predominant building cladding and roofing materials, type of

[9] 49 USC 47503 (b) requires submission of revised noise maps if a change in the operation of the airport would establish a substantial new noncompatible use, or would significantly reduce noise over existing noncompatible uses that is not reflected in the existing conditions map or forecast map currently on file with the FAA. The requirement for determining currency of an NEM is addressed in 14 CFR Part 150.

The following requirement …	As described further …
	thermal insulation, type of doors and windows, etc.) Structures with an interior noise level that is less than 45 dB are not eligible for noise insulation even though they may be within the DNL 65 or higher dB contour.
Interior Noise Testing is based on Windows Closed.	All testing is done with the windows closed. This requirement applies whether or not the structure has a ventilation system or not.
Noise Insulation Measures are Limited to Specific Items.	Noise insulation measures are limited to window and door replacement, ceiling insulation, caulking, weather-stripping, and central air ventilation systems if the structure does not already have a central air ventilation system. The use of other measures is not allowable unless the ADO has approved the use of the measures in advance. In this case, the ADO must keep a copy of the Sponsor's request for use of other measures and a copy of the ADO approval of the request in the project files
The structure must have been constructed before October 1, 1998.	The structure must have been built prior to October 1, 1998[10] unless the sponsor has demonstrated to the ADO that no published noise contours existed at that time[11]. New incompatible land uses created by subsequent airport development may also be eligible for funding consideration.

[10] October 1, 1998 is the date included in the publication of the FAA Final Policy on Part 150 Approval of Noise Mitigation Measures: Effect on the Use of Federal Grants for Noise Mitigation Projects, Federal Register: April 3, 1998 (Volume 63, Number 64), Rules and Regulations, Page 16409-16414 "As of October 1, 1998, the FAA will approve under 14 CFR part 150 (part 150) only remedial noise mitigation for existing noncompatible development and only preventative noise mitigation in areas of potential new noncompatible development"

[11] Per the Federal Register FR Volume 63, Number 64, Page 16409-16414.

The following requirement …	As described further …
There must be at least a 5 dB noise level reduction.	Because the design objective for using AIP funds is to provide a discernable benefit to residents, the sponsor must demonstrate that a least 5 dB[12] noise level reduction will be achieved. If for any reason the 5 dB reduction cannot be achieved, the sponsor must provide a written request to the ADO. The ADO must receive APP-1 concurrence to proceed with the work. APP-1 concurrence will generally be limited to ventilation packages and cases of neighborhood equity or for older or poorly maintained residences where the 5 dB reduction may be difficult to achieve. These special circumstances are discussed in Table 4.
All building code requirements must be met.	Sponsors must certify to the ADO that the engineering plans and specifications for the noise insulation project conform to the local building code.
All required federal contract provisions must be met.	As required by all projects funded with AIP, the noise mitigation measures must meet all federal procurement and contract requirements, including the Buy American Preference requirements of Title 49 United States Code §50101.

2. Specific Sampling and Testing Requirements for Projects.

In order for a structure to be funded with AIP grant funding, the sponsor must follow the sampling and testing criteria listed in Table 2.

[12] Handbook of Environmental Acoustics, 1994. By James P. Cowan

Table 2 Sampling and Testing Requirements

For the following…	**The requirement is…**
Published Guidance	In 1992, FAA adopted guidance on testing frequency, sampling and other statistical measures that can be applied to a neighborhood to estimate the interior noise levels in the residences that are in the 65 dB contour[13]. This information is compiled into the Acoustical Testing Plan. Long standing agency policy is that an airport sponsor must use the 1992 guidance to establish the existing interior noise levels to determine whether or not the building qualifies for sound insulation using AIP.
Sponsor Requirements for submitting Testing Protocol to the ADO	The Sponsor must submit the proposed testing phase protocol to the ADO. The ADO has the option to review the sampling protocol. After ADO review or after the ADO has indicated that the protocol will not be reviewed, the Sponsor will then noise insulate the residences in the testing phase.
First Step – initial testing	The first step of a noise insulation program is generally the initial testing phase. In this phase, the Sponsor characterizes the neighborhood by characterizing the housing types and locations. The Sponsor will also describe the acoustical issues, number of residences to be tested and describe the acoustical criteria and testing methodology. Example: A Sponsor is starting a sound insulation program in a community near the airport. The Sponsor first conducts a windshield survey of the types of residences that are in the current phase. The windshield survey catalogs the types of residences in the neighborhood, notes similarities and differences in the age, construction type, size, number of levels, and types of housing (single family or multi-family). Once the Sponsor has characterized the diversity of the residences in the noise contour, it will select a representative sample of each type of residence for testing, which based on industry review is typically 10 to 30 percent. Testing in this case means that the sponsor develops a sound insulation package that the sponsor believes will reduce the interior

[13] Guidelines for Sound Insulation of Residences Exposed to Aircraft Noise, Oct. 1992. This document may be found on the FAA Airport Noise web site at : http://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentNumber/150_5000-9A

For the following…	**The requirement is…**
	noise level in the residence for each type of construction. Therefore, in a neighborhood where the residences are made of either brick or wood siding, the Sponsor will develop 2 different packages – one for the brick residences and one for the siding residences. The sponsor will then measure the interior noise levels and prepares a summary report detailing the effectiveness of the design package, make recommendations for any changes to the package, lists the before and after interior noise level data, and submits the package to the ADO. Reimbursement for initial and subsequent phase testing is limited to 10% of the residences of a particular type unless the Sponsor has provided the justification for the request to the ADO and the ADO has approved the request. The ADO must approve or disapprove a Sponsor request for reimbursement for testing more than 10%, but not more than 30%, of the residences of a particular construction type. The ADO may request APP-400 assistance in evaluating Sponsor requests. A copy of the Sponsor's written request and the ADO approval or disapproval must be kept in the project file. For requests for reimbursement for more than 30% of the residences of a particular type, the ADO must receive APP-400 approval. The request to APP-400 from the ADO must contain unless the Sponsor's justification for the request, and the ADO's recommendation for approval or disapproval.
Second Step - ADO and Sponsor Review of Initial Testing Results	The Sponsor should review the results to determine if additional residences should be tested. The ADO has the option to review and approve or disapprove all Sponsor revisions to the sampling program.

For the following…	The requirement is…
Special Circumstance – Resident Requests Specific Testing	Occasionally a resident may request that their residence be tested specifically. This may be because of the condition of the home, or because the resident believes that their residence will test differently than others. These additional tests are generally allowable. However if an additional residence is tested, it must be tested both before and after any noise insulation work to ensure the 5 dB NLR is achieved.
Final Step – Completing the Testing Phase	After the completion of the testing phase, the sound insulation program will begin for the neighborhood. In these later phases, the sponsor is still expected to test from 10 to 30 percent of each different category of residences in the phase to revalidate the design assumptions. The results of the revalidation testing must be submitted by the Sponsor to the ADO. The ADO has the option to review these test reports.

3. Limitations on Eligible Projects.

Noise insulation projects are designed to reduce interior noise due to aircraft noise in habitable rooms or classroom areas. These projects are also called noise attenuation, noise mitigation, noise compatibility, sound insulation or soundproofing projects.

These projects are not intended to compensate for inadequate maintenance, to bring nonconforming structures up to building code standards, or to improve the comfort or attractiveness of a building.

Table 3 Eligibility Limitations for Specific Circumstances

For the following specific circumstance...	The requirements for eligibility or allowability of costs are…
Mechanical, Electrical, Structural and Building Code Deficiencies	If it is determined in the course of designing a sound insulation project that a building needs improvements in order to conform to local building codes, only the costs of the sound insulation are allowable. The costs of the improvements that are not related to the sound insulation are not allowable. For example, if a resident constructed unpermitted work on a residence. In order to obtain a building permit for the sound insulation project, the local

For the following specific circumstance...	The requirements for eligibility or allowability of costs are…
	building code inspectors require that the resident must install a railing around a deck. The cost of installing the deck railing is not allowable because the residence did not meet building code requirements before the sound insulation project was started.
Residential Habitable Areas	Eligible projects may include noise insulation of only the habitable areas of residences such as living, sleeping, eating or cooking areas (single family and multifamily)[14]. Bathrooms, closets, halls, vestibules, foyers, stairways, unfinished basements storage or utility spaces are not considered to be habitable. Areas that are not allowed under local building code are not considered habitable. For example, a resident has converted part of a basement to a bedroom and the bedroom conversion does not meet the building code requirements to be categorized as a bedroom. The converted bedroom is not considered habitable space.
School Classrooms and Libraries.	Eligible projects may only include noise insulation of the parts of a school that are used for educational instruction. For schools, noise insulation is limited to classrooms and libraries. Areas that are used for incidental instruction, such as hallways, gymnasiums or cafeterias are not allowable. For schools, the usual design objective for classroom environment is a time-average A-weighted sound level of 45 dB resulting from aircraft operations during normal school hours. As with residential noise insulation, a school project must reduce existing noise levels by at least 5 dB for the same time-average school hour time frame.
Structures within the DNL 75 dB and higher noise contour	The ADO should not normally consider sound insulation projects for residences, schools, hospitals, places of worship, auditoriums, and concert halls within a DNL 75 dB or greater noise contour since these uses are never compatible in these noise contours. If a sponsor requests sound insulation in the

[14] Guidelines for Sound Insulation of Residences Exposed to Aircraft Noise, Oct. 1992. This document may be found on the FAA Airport Noise web site at : http://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentNumber/150_5000-9A

For the following specific circumstance...	The requirements for eligibility or allowability of costs are…
	DNL 75 dB contour, the ADO may consider consulting with APP-400 for guidance. The ADO must document any determination to sound insulate within the DNL 75 dB contour, including reasons for *not* seeking APP-400 guidance must be included in the project file. Where APP-400 was coordinated with, the results of that coordination must be included in the project file.
Mobile Homes or Mobile Classrooms	Mobile homes and Mobile Classrooms are not viable noise compatibility projects since their design and construction do not lend themselves to effective noise reduction measures.
Permanent Modular Buildings.	Some modular structures may be classified as permanent if they meet construction guidelines applied to permanent structures. The ADO must make a determination whether or not to noise insulate these structures on a case-by-case basis by the ADO. The ADO must coordinate the review of the structures with APP-400. The ADO must document any determination to sound insulate permanent modular buildings in the project files.
Ineligibility of Previously Insulated Residences.	It is important that a Sponsor ensure that people in sound insulated residences understand that ongoing maintenance and eventual replacement of the sound insulating measures become the resident's responsibility. AIP funds may only be applied to noise insulate residences a single time. While it is recognized that windows, ventilation systems, and noise insulation improvements will deteriorate over time, noise insulating a residence more than once is not an allowable AIP cost. Therefore, replacement of such components represents a normal home maintenance expense. This provision is reflected in Grant Special Condition K, Noise Projects on Privately Owned Property.

d. Special Circumstances.

The Part 150 regulation provides for special circumstances where residences that do not meet the requirements in Table 1 may be considered eligible for noise attenuation.

The ADO must receive APP-1 concurrence for the proposed treatment of the special circumstances. The ADO must document these special circumstances, including APP-1 approval, in the project file.

Table 4 Special Circumstances for Noise Insulation in Residences

For the following Special Circumstances…	**The Sponsor must determine and the ADO must concur…**
Block Rounding – *Residences that extends beyond the DNL 65 dB*	In determining the reasonable end point for noise insulation projects, the ADO must ensure that the end point is a logical breakpoint (e.g., neighborhood boundary, significant arterial surface street, highway, river, other physical or natural barrier or feature) or whether the end point extends unreasonably beyond a natural break. In these cases, the Sponsor must provide the ADO the proposed end point information. The sponsor must provide the ADO with a list of the specific residences (by address) that will be included in the program. These residences must be noted as “Included due to block rounding.” The ADO must review and either approve or disapprove including the residences in the noise insulation program. Note: The airport sponsor may elect not to employ the “block rounding” concept. In such a case it is recommended that the ADO notify APP-1 of the Sponsor’s decision not to block round. Once a residence is approved for block rounding, its interior noise levels will determine whether the residence qualifies for noise insulation or whether the residence is considered under the neighborhood equity provisions, below.
Neighborhood Equity – *Residence is in the DNL 65 dB contour, but is not experiencing interior noise levels 45 dB or greater.*	When a *few* residences that do not meet the interior noise level requirements are scattered among residences that do meet the interior noise level criteria, there will be confusion among the homeowners as to why one home is being insulated and another is not. The success of a noise compatibility program in a neighborhood relies on the support of the community. This community support may be lost if there is a sense that some residences are being denied noise insulation. To ensure community support, it may be reasonable to include provisions for neighborhood equity in a noise insulation project. In these cases, the Sponsor develops two sets of noise insulation packages. The standard noise insulation package will be prepared for residences that meet the interior noise criteria. A second package will be prepared consisting of other improvements such as caulking, weather stripping, installation of storm doors or ventilation packages for residences that are

For the following Special Circumstances…	The Sponsor must determine and the ADO must concur…
	not experiencing interior noise 45 dB or greater. In order for grant funding to be available for the secondary package, participation must be limited by FAA policy to less than 10 percent of the residences in the neighborhood, (as logically bounded by either streets or other geographic delineation), but by FAA policy in no case more than 20 residences total in a phase of the noise insulation program. Where there are more than 10 percent or 20 residences proposed for neighborhood equity packages, the costs of this work must be funded with other, non-federal, sources of funds. If a sponsor proposes the use of secondary packages for neighborhood equity, the Sponsor must provide a list to the ADO that outlines the number of residences that are proposed for noise insulation, breaking down the residences that meet criteria and those that do not. The Sponsor's report must also provide detailed information about the proposed neighborhood equity package including costs of the secondary package compared to the cost of a standard noise insulation package. The ADO must review and approve/disapprove the Sponsor's proposed neighborhood equity package to ensure that the use of the minimal neighborhood equity packages on non-eligible residences is required to allow successful completion of the overall noise insulation program in the neighborhood, thus allowing these residences to be noise insulated within the guidelines of AIP eligibility. The ADO must document the approval of the noise insulation package in the project files. In extremely rare cases, ADO may determine that the program will benefit by providing noise equity packages to more than the 10 percent/no more than 20 residence limit. In this instance, the ADO must receive APP-1 approval to exceed this limit. Use of the standard noise insulation package that is designed for residences experiencing noise levels 45 dB or greater for neighborhood equity is not allowable.
Noise Mitigation Package Consisting of Ventilation Only (Continuous Positive Ventilation System) *-For*	Because the interior noise measurements are conducted with "windows closed", there may be situations where a residence does not have an existing ventilation system, but relies on keeping the windows open for air circulation. A Continuous Positive Ventilation System is the allowable package for these residences. The sponsor

For the following Special Circumstances…	**The Sponsor must determine and the ADO must concur…**
Residences that do not have Continuous Positive Ventilation and when tested, demonstrate interior noise levels less than 45 dB.	must also provide detailed information about the ventilation package including costs of the package compared to the cost of a standard noise insulation package. The sponsor may recommend an air conditioning system in lieu of ventilation- only. Because a ventilation system is likely to increase utility and maintenance costs for the residence, the sponsor should provide information about utility and maintenance costs for the installed equipment to the residence owners.

Handling Noise Insulation Programs That Are Currently Underway

1. Applicability.

This attachment applies to all sponsors that have noise programs that are currently underway. The provisions set forth in this attachment do not apply to noise insulation projects for which construction has been completed. Construction being completed means that final payment has been made to the contractor doing the sound insulation work on the residence or public building.

Because of the inconsistent application of the two-step requirement for noise programs, FAA must confirm that the noise programs meet the published AIP requirements for noise insulation programs.

a. **Airport Review of Noise Programs Currently Underway Must be Complete by September 30, 2014.** All sponsors of noise insulation programs currently underway must review the testing, design, and construction plans against the restated noise insulation requirements in this PGL. This review must be completed by September 30, 2014.

   FAA anticipates that it will take some time for a Sponsor to review its ongoing program against the restated noise insulation requirements.

b. **During the Airport Review, Sponsors have the Option to Continue Ongoing Noise Program Work under the Terms and Agreements of that Specific Noise Program.** Rather than stop all noise insulation projects while sponsors are verifying their noise programs, FAA will allow programs to continue as described in the following paragraphs during the review period. This decision was made because stopping an ongoing noise program would disrupt those neighborhoods where construction is underway and delay providing relief to noise impacted residences, schools, or public buildings.

   However, the ongoing program must meet all existing program requirements for noise level reduction, noise contour, reporting and other factors defined in the ongoing noise program 14 CFR Part 150 Record of Approval.

2. Defining an Ongoing Program.

A program is considered ongoing if it meets the requirements in Table 1.

Table 1 Definition of an Ongoing Noise Insulation Program

A noise insulation program is considered to be "Ongoing"	If the following conditions are met…
Residential Noise Insulation Program	Residential noise insulation construction is underway: Construction took place in fiscal year 2010 or 2011 and construction is planned to continue in fiscal years 2012, 2013 or 2014; or Residential noise insulation construction is about to

Handling Noise Insulation Programs That Are Currently Underway

	start: The first phase of residential noise insulation construction is scheduled to begin in fiscal year 2012.
School or Public Building (Places of Worship, Medical Facility) Noise Insulation Program	A school or public building noise project at a specific school that started construction prior to the date of this PGL; or A school or public building noise project at a specific school for which construction procurement was completed prior to the date of this PGL.

3. Planned FY2012, 2013, and 2014 noise insulation projects.

In fiscal year 2012, 2013 and 2014, the FAA will allow a sponsor to complete the noise insulation of structures that the sponsor has contracted to noise insulate as planned, provided that all noise insulation projects undertaken during this time meet all required federal contract provisions, such as Buy American.

Any noise insulation project that is started during the review period must be completed prior to September 30, 2015. Projects for which construction is ongoing after September 30, 2015, must fully meet the AIP requirements, including experiencing pre-insulation interior noise levels 45 dB or greater.

Additional Costs Incurred to Conform to the PGL. During the program review period, a sponsor may incur additional project costs. Redesign costs to conform to the PGL are not eligible for reimbursement.

Additional costs for testing to determine pre-insulation or post-insulation interior noise levels will generally be eligible for AIP funding. As with any AIP project, the costs to repeat a test are not eligible for AIP funding.

Additional testing costs for projects that will be designed or go under construction after the transition period will generally be eligible for reimbursement.

4. Required Sponsor and ADO Actions:

Table 2 describes the required actions that sponsors and the ADO must take for projects that are continuing during the transition period.

Table 2 Required Sponsor and ADO Actions for Transition Period Projects

In the following time period or if the following circumstance exists…	The Sponsor must…	The ADO must…
Within 30 days after publication date of the PGL	Submit the Initial Report, which includes the following documents on projects that are ongoing or that	Concur or nonconcur with the sponsor's initial submittal. A copy of the ADOs concurrence

Handling Noise Insulation Programs That Are Currently Underway

In the following time period or if the following circumstance exists…	The Sponsor must…	The ADO must…
	will be underway during the transition period: **a.** Program and policy procedures manual **b.** Testing reports **c.** List of structures that will be undertaken during the period, including estimated start and completion of construction dates. The list must include: 1. Address 2. Year that structure was constructed 3. Location on the noise exposure map. **d.** Certification that all projects that will be designed or constructed during the transition period will comply with all required federal contract provisions, including Buy American. **e.** Certification that the ongoing program will meet all existing program requirements for noise level reduction, noise contour, reporting and other factors defined in the ongoing noise program 14 CFR Part 150 Record of Approval or environmental mitigation Record of Decision. If the ADO does not concur with the submittal, the sponsor must revise the submittal until a document that the ADO can concur with has been produced.	and the sponsor's initial submittal must be placed in the project file. If the ADO does not concur with the submittal, the ADO must provide comments to the sponsor so the sponsor can revise the transition plan. The ADO review will consist of determining whether the sponsor has provided the three items listed as required. The ADO has the option of coordinating the review with APP-400.
If the Sponsor anticipates incurring additional costs on projects during the transition period	Submit all cost data to the Airport's District Office (ADO) in advance of incurring the cost	The ADO must review the cost data and determine whether the costs can be reimbursed with AIP. If the costs are not reimbursable, the ADO must notify the sponsor that the costs will not be

Handling Noise Insulation Programs That Are Currently Underway

In the following time period or if the following circumstance exists…	The Sponsor must…	The ADO must…
		reimbursed.
Submit Bi-Annual Report By the following dates: 1. March 30, 2013 2. September 30, 2013 3. March 30, 2014 4. September 30, 2014 5. March 30, 2015 6. September 30, 2015 (final report)	Documentation in the Bi-Annual Report. Each report must include documentation on each of the residences in the program. The report must include: a. Address of the residences b. Year that residence was constructed c. Location of the residences on the noise exposure map. d. Pre-mitigation indoor noise level (if tested) e. Post-mitigation indoor noise level (if tested) f. A certification that the projects that are being designed or constructed during the transition period comply with all required federal contract provisions, including Buy American. g. Other information requested by the Region or ADO. Note: This progress report is not the same as the existing grant progress report which Sponsors are required to submit on a quarterly basis.	The ADO has the option to review the Bi-Annual Report. The ADO must place the report in the project file. The ADO review will consist of determining whether the sponsor has provided the items listed as required.

APPENDIX E
SANTA ANA HEIGHTS ACOUSTICAL INSULATION PLAN
INTERIOR NOISE MEASUREMENTS RESULTS

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John Wayne Airport

Acoustical Insulation Program

Noise Measurement data for all phases

JN 48974

Submitted By

Wyle Laboratories, Inc.

November 2005

wyle laboratories

128 Maryland Street • El Segundo, CA 90245-4115
(310) 322-1763

November 29, 2005

To: John Wayne Airport
3160 Airway Ave.
Costa Mesa, CA 92626

Attention: Carl Braatz

Subject: **John Wayne Airport Acoustical Insulation Program**
Noise measurement data for all phases

Reference: Phase 1 (1989) through Phase 10 (2005)

We have completed a thorough search of our archives for the noise measurement data for all phases of the subject Program since the first phase in 1989. Enclosed are the results for 378 dwelling units, including the post-mod interior CNEL data for each unit. The work on the residence at 2207 Golden Circle in Phase 10 is not complete and therefore its noise measurement data is not included.

Please contact me if you have any questions or comments.

Sincerely,

John Kaytor
Project Architect

Table 2

Summary of Noise Reduction Improvements in Phase 1
Santa Ana Heights Dwellings

No.	Dwelling Address	Room/Exposure		Modifications		Noise Reduction, dB			Interior CNEL dB Post Mod
				Windows	Doors	Before	After	Change	
1.	1501 Pegasus	Living Room	E	RSTC 35	RSTC 35	26.9	32.5	5.6	32.5
		Dining Room	E	RSTC 35	+ SGD	27.7	32.8	5.1	32.2
		Family Room	E	--	+ SGD	26.5	31.6	5.1	33.4
		Bed 1	E	RSTC 35	--	29.6	36.9	7.3	35.4
		Bed 2	E	RSTC 35	--	29.5	34.0	4.5	31.0
2.	20162 Redlands	Living Room	S	RSTC 35	RSTC 35	28.5	34.1	5.6	32.9
		Dining Room	E	RSTC 35	--	24.6	32.0	7.4	35.0
		Family Room	E	--	+ SGD	23.4	28.6	5.2	38.4
		Bed 2	S	RSTC 35	--	30.9	36.9	6.0	30.1
		Bed 3	E	RSTC 35	--	24.9	30.1	5.2	36.9
3.	1631 Orchard	Living Room	E	RSTC 35	RSTC 35	26.6	33.6	7.0	32.4
		Kitchen	E	RSTC 35	RSTC 35	23.3	31.5	8.2	34.5
		Family Room	E	--	RSTC 35 + SGD	28.2	33.6	5.4	32.4
		Bed 2	E	RSTC 35	--	25.6	31.6	6.0	34.4
		Bed 3	E	RSTC 35	--	27.8	32.9	5.1	33.1
4.	20122 Riverside	Living Room	S	RSTC 35	--	30.3	36.1	5.8	31.9
		Kitchen	E	RSTC 35	RSTC 35	23.0	29.3	6.3	38.7
		Family Room	E	--	+ SGD	24.2	32.7	8.5	35.3
		Bed 2	E	RSTC 35	--	29.9	38.2	8.3	29.8
		Bed 3	E	RSTC 35	--	26.7	32.9	6.2	35.1
		Bed 4	E	RSTC 35	--	28.3	33.4	5.1	34.6

Table 2 (Continued)

No.	Dwelling Address	Room/Exposure		Modifications: Windows	Modifications: Doors	Noise Reduction, dB: Before	Noise Reduction, dB: After	Noise Reduction, dB: Change	Interior CNEL dB Post Mod
5.	20121 Kline	Living Room	E	RSTC 40	RSTC 35	26.5	34.5	8.0	34.5
		Family Room	S	--	+ SGD	28.4	32.9	4.5	36.1
		Dining Room	S	RSTC 35	RSTC 35	32.8	36.6	3.8	32.4
		Bed 1	E	RSTC 40	--	26.2	36.3	10.1	32.7
		Bed 2	E	RSTC 40	--	26.6	32.2	5.6	36.8
		Bed 3	E	RSTC 40	--	32.2	37.1	4.9	31.9
6.	20281 Kline	Living Room	E	RSTC 35	RSTC 35	26.5	32.1	5.6	33.9
		Bed 1	E	RSTC 35	--	26.0	31.0	5.0	35.0
		Bed 2	E	RSTC 35	--	26.9	34.0	7.1	32.0
7.	2499 Anniversary Lane	Living Room	S	RSTC 35	RSTC 35	25.3	32.1	6.8	32.9
		Bed 1	E	RSTC 35	--	25.4	32.4	7.0	32.6
		Bed 2	E	RSTC 35	--	26.0	32.9	6.9	32.1
		Bed 3	E	RSTC 35	--	26.9	32.8	5.9	32.2
8.	2900 Paper Lane	Living Room	S	RSTC 35	RSTC 35	29.4	35.3	5.9	28.7
		Kitchen	E	RSTC 35	RSTC 35	21.8	29.2	7.4	34.8
		Bed 1	S	RSTC 35	--	30.0	36.3	6.3	27.7
		Bed 2	E	RSTC 35	--	29.6	34.2	4.6	29.8
		Bed 3	E	RSTC 35	--	32.9	36.8	3.9	27.2

Table 3

Summary of Noise Reduction Improvements in Phase 2
Santa Ana Heights Project
(County-Owned Dwellings)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
1621 Indus				
Living Room	26.4	30.9	4.5	36.1
Family Room	32.6	39.6	7.0	27.4
Dining Room	30.8	34.2	3.4	32.8
Kitchen	32.0	36.2	4.2	30.8
Bedroom 1	25.1	35.9	10.8	31.1
Bedroom 2	28.9	34.6	5.7	32.4
Bedroom 3	29.2	32.1	2.9	34.9
Bedroom 4	27.6	34.3	6.7	32.7
Bedroom 5	30.1	33.7	3.6	36.9
2223 Golden Circle				
Living Room	32.4	34.6	2.2	31.4
Dining Room	31.3	31.7	0.4	34.3
Kitchen	28.8	29.2	0.4	36.8
Bedroom 1	36.4	36.7	0.3	29.3
Bedroom 2	37.0	38.5	1.5	27.5
Bedroom 3	29.9	31.3	1.4	34.7
Bedroom 4	36.6	38.2	1.6	27.8
2250 Golden Circle	33.2			
Living	25.7	32.2	6.5	33.8
Kitchen	23.5	33.2	9.7	32.8
Bedroom 1	25.6	33.5	7.9	32.5
Bedroom 2	27.2	34.8	7.6	31.2
Bedroom 3	23.6	33.5	9.9	32.5
20102 Kline				
Family Room	28.0	31.3	3.3	38.7
Bedroom 3	27.4	38.0	10.6	32.0
Dining Room	27.5	36.1	8.6	33.9
Bedroom 2	28.3	36.7	8.4	33.3
Living Room	30.2	39.7	9.5	30.3
Bedroom 4	25.1	32.4	7.3	37.6
Work Room	32.8	41.6	8.8	28.4
Bedroom 1	33.3	38.2	4.9	31.8
Kitchen	20.2	31.0	10.8	39.0

Table 3 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
20141 Kline				
Dining Room	31.0	39.8	8.8	28.2
Bedroom 5	30.8	33.1	2.3 -	34.9
Living Room	26.4	34.5	8.1	33.5
Bedroom 2	26.2	39.4	13.2	28.6
Bedroom 1	24.7	33.7	9.0	27.7
Bedroom 4	31.3	33.1	1.8 -	34.9
Family Room	26.3	35.7	9.4	32.3
Bedroom 3	26.0	40.0	14.0	28.0
Kitchen	28.4	39.1	10.7	28.9
20151 Kline				
Bedroom 1	26.5	35.9	9.4	32.1
Bedroom 5	30.0	35.3	5.3	32.7
Kitchen	29.3	37.8	8.5	30.2
Family Room	32.6	39.8	7.2	28.2
Bedroom 3	31.1	37.5	6.4	30.5
Dining Room	27.9	41.3	13.4	26.7
Bedroom 4	32.2	38.9	6.7	29.1
Living Room	25.6	35.9	10.3	32.1
Bedroom 2	27.7	34.5	6.8	33.5
20081 Kline				
Family Room	29.7	33.1	3.4	36.9
Bedroom 2	29.1	34.4	5.3	35.6
Living Room	25.5	33.1	7.6	36.9
Bedroom 4	32.4	35.8	3.4	34.2
Bedroom 1	25.1	33.9	8.8	36.1
Bedroom 5	35.6	39.4	3.8	30.6
Dining Room	25.8	32.1	6.3	37.9
Bedroom 3	25.1	34.9	9.8	35.1
20291 Kline				
Living Room	24.5	33.1	8.6	32.9
Dining Room	21.5	30.6	9.1	35.4
Kitchen	19.6	31.3	11.7	34.7
Family Room	30.5	41.0	10.5	25.0
Bedroom 1	24.8	33.2	8.4	32.8
Bedroom 2	29.4	37.7	8.3	28.3

Table 3 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
20092 Kline				
Living Room	26.7	31.4	4.7	38.6
Dining Room	23.3	27.2	3.9	42.8
Kitchen	20.4	26.4	6.0	43.6
Family Room	22.9	29.2	6.3	40.8
Bedroom 1	33.6	38.8	5.3	31.2
Bedroom 2	26.9	35.0	8.1	35.0
Bedroom 3	35.8	40.9	5.1	23.1
Bedroom 4	25.2	29.1	3.9	40.9
Bedroom 5	27.2	33.0	5.8	37.0
1641 Orchard				
Living Room	28.5	37.8	9.3	28.2
Family Room	24.5	31.2	6.7	34.8
Dining Room	26.9	35.4	8.5	30.6
Kitchen	20.3	30.1	9.8	35.9
Bedroom 1	31.5	40.3	8.8	25.7
Bedroom 2	29.7	32.8	3.1	33.2
Bedroom 3	28.0	33.5	5.5	32.5
Bedroom 4	26.5	35.3	8.8	30.7
Bedroom 5	24.3	30.6	6.3	35.4
1552 Pegasus				
Living Room	28.7	38.3	9.6	26.7
Dining Room	24.2	36.8	12.6	28.2
Kitchen	27.8	33.3	5.5	31.7
Family Room	26.6	31.3	4.7	33.7
Bedroom 1	30.2	38.6	8.4	26.4
Bedroom 2	24.3	28.5	4.2	36.5
Bedroom 3	28.5	33.5	5.0	31.5
Bedroom 4	23.2	32.5	9.3	32.5
1662 Pegasus				
Living Room	29.2	34.5	5.3	32.5
Dining Room	28.2	34.7	6.5	32.3
Kitchen	25.8	34.0	8.2	33.0
Family Room	26.3	33.3	7.0	33.7
Bedroom 1	26.9	40.0	13.1	27.0
Bedroom 2	25.9	34.5	8.6	32.5
Bedroom 3	23.1	33.3	10.2	33.7
Bedroom 4	25.8	34.9	9.1	32.1
Bedroom 5	32.3	36.6	4.3	30.4

Table 3 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
2908 Silver Lane				
Living Room	30.1	36.1	6.0	28.9
Kitchen	21.8	31.3	9.5	33.7
Bedroom 1	25.6	36.1	10.5	28.9
Bedroom 2	24.9	30.5	5.6	34.5
Bedroom 3	31.2	34.5	3.3	30.5
2909 Silver Lane				
Living Room	30.1	34.4	4.3	30.6
Kitchen	25.1	28.6	3.5	36.4
Bedroom 1	29.8	33.5	3.7	31.5
Bedroom 2	29.7	31.8	2.1	33.2
Bedroom 3	27.9	37.5	9.6	27.5

Table 4

Summary of Noise Reduction Improvements in Phase 2
Santa Ana Heights Project
(Privately-Owned Dwellings)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
2139 Anniversary				
Living Room	26.8	40.6	13.8	26.4
Kitchen	24.9	33.2	8.3	33.8
Family Room	25.1	37.2	12.1	29.8
Bedroom 1	26.5	40.8	14.3	26.2
Bedroom 2	23.6	38.2	14.6	28.8
Bedroom 3	29.1	42.6	13.5	24.4
Bedroom 4	30.8	40+	9.2	27.0
Bedroom 5	28.4	43.7	15.3	23.3
2131 Anniversary				
Living Room	26.0	33.8	7.8	33.2
Kitchen	24.9	31.1	6.2	35.9
Studio	26.3	28.0	1.7	39.0
Bedroom 1	27.1	37.5	10.4	29.5
Bedroom 2	34.5	40.0	5.5	27.0
Bedroom 3	24.3	34.7	10.4	32.3
2215 Anniversary				
Living Room	32.5	32.9	0.4	33.1 -
Dining Room	29.4	32.9	3.5	33.1
Bedroom 1	31.0	38.6	7.6	27.4 -
Bedroom 2	31.2	38.4	7.2	27.6 -
Bedroom 3	33.8	38.1	4.3	27.3
2303 Anniversary				
Living Room	30.8	41.9	11.1	24.1
Kitchen	23.1	34.6	11.5	31.4
Bedroom 1	27.0	39.3	12.3	26.7
Bedroom 2	26.1	38.5	12.4	27.5
Bedroom 3	30.0	41.2	11.2	24.8
2123 Anniversary				
Living Room	29.9	36.4	6.5	29.6
Dining Room	27.7	38.9	11.2	27.1
Bedroom 1	30.9	38.0	7.1	28.0
Bedroom 2	37.1	44.6	7.5	21.4
Bedroom 3	30.9	40.7	9.8	25.3

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
20121 Cypress				
Living Room	30.5	36.3	5.8	28.7
Family Room	30.2	34.2	4.0	30.8
Dining Room	31.0	36.0	5.0	29.0
Bedroom 1	26.5	39.2	12.7	25.8
Bedroom 2	25.2	34.6	9.4	30.4
Bedroom 3	32.7	38.2	5.5	26.8
20201 Cypress				
Living Room	22.8	28.7	5.9	36.3
Dining Room	23.5	26.6	3.1	38.4
Kitchen	20.1	29.0	8.9	36.0
Office	27.9	32.0	4.1	33.0
Bedroom 1	27.2	35.7	8.5	29.3
Bedroom 2	35.5	41.7	6.2	23.3
2260 Golden Circle				
Living Room	30.5	34.7	4.2	31.3
Dining Room	30.7	No Mod.	--	
Kitchen	29.7	No Mod.	--	
Bedroom 1	29.0	34.0	5.0	32.0
Bedroom 2	32.0	No Mod.	--	
Bedroom 3	30.3	No Mod.	--	
2261 Golden Circle				
Living Room	30.6	36.6	6.0	29.4
Dining Room	31.3	43.0	11.7	23.0
Kitchen	32.4	40.7	8.3	25.3
Family Room	30.0	38.4	8.4	27.6
Bedroom 1	29.4	39.8	10.4	26.2
Bedroom 2	30.5	39.3	8.8	26.7
Bedroom 3	32.6	41.7	9.1	24.3
1671 Indus				
Living Room	30.6	40.1	9.5	28.9
Dining Room	30.5	42.1	11.6	26.9
Family Room	27.9	40.7	12.8	28.3
Kitchen	27.4	37.0	9.6	32.0
Bedroom 1	31.1	39.3	8.2	29.7
Bedroom 2	33.1	42.1	9.0	26.9
Bedroom 3	28.0	40.1	12.1	28.9
Bedroom 4	27.0	37.6	10.6	31.4

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
2916 Irvine				
Living Room	23.7	30.6	6.9	33.4
Dining Room	24.0	33.9	9.9	30.1
Kitchen	26.9	38.8	11.9	25.2
Bedroom 1	24.1	44.5	20.4	19.5
Bedroom 2	26.5	42.0	15.5	22.0
Bedroom 3	25.8	31.7	5.9	32.3
2834 Irvine				
Living Room	24.5	34.8	10.3	29.2
Dining Room	24.6	29.1	4.5	34.9
Kitchen	26.1	29.2	3.1	34.8
Bedroom 1	29.9	38.9	9.0	25.1
Bedroom 2	24.6	33.6	9.0	30.4
Living Room A	22.8	29.0	6.2	35.0
Bedroom 1A	24.8	29.0	4.2	35.0
20162 Kline				
Living Room	28.9	35.7	6.8	33.3
Dining Room	22.2	31.8	9.6	37.2
Kitchen	23.8	30.8	7.0	38.2
Family Room	24.0	32.4	8.4	36.6
Bedroom 1	38.7	43.2	7.1	25.8
Bedroom 2	31.2	45.8	14.6	23.2
Bedroom 3	33.6	40.6	7.0	28.4
Bedroom 4	24.9	36.6	11.7	32.4
1554 Orchard				
Living Room	14.0	33.0	19.0	31.0
Kitchen	21.0	27.8	6.8	36.2
Bedroom 1	27.4	34.6	7.2	29.4
Bedroom 2	33.4	36.0	2.6	28.0
1542 Orchard				
Living Room	24.4	34.7	10.3	34.3
Kitchen	21.1	26.6	5.5	37.4
Bedroom 1	34.6	42.8	8.2	21.2
Bedroom 2	35.9	42.6	6.7	21.4
1602 Orchard				
Living Room	26.2	37.3	11.1	28.7
Kitchen	26.1	32.3	6.2	33.7
Bedroom 1	20.2	41.6	21.4	24.4
Bedroom 2	31.3	39.9	8.6	26.1
Bedroom 3	22.8	36.5	13.7	29.5

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
1621 Orchard				
Living Room	30.4	36.9	6.5	29.1
Family Room	29.1	37.6	8.5	28.4
Bedroom 1	30.4	35.5	5.1	30.5
Bedroom 2	28.7	37.9	9.2	28.1
Bedroom 3	30.2	34.0	3.8	32.0
1731 Orchard				
Living Room	22.8	34.0	11.2	34.0
Bedroom 1	34.1	38.9	4.8	29.1
Bedroom 4	33.1	37.4	4.3	30.6
Bedroom 5	29.5	33.3	3.8	34.7
Bedroom 6	27.9	39.9	12.0	28.1
Bedroom 7	29.5	33.3	3.8	34.7
2192 Orchard				
Living Room	22.9	33.3	10.4	33.7
Kitchen	25.5	31.2	5.7	35.8
Bedroom 1	22.6	30.9	8.3	36.1
Bedroom 2	26.3	35.0	8.7	32.0
Bedroom 3	23.0	38.7	15.7	28.3
2212A Orchard				
Living Room	28.2	39.1	10.9	26.9
Kitchen	23.8	36.9	13.1	29.1
Bedroom 1	31.9	42.0	10.1	24.0
Bedroom 2	31.9	46.0	14.1	20.0
2212B Orchard				
Living Room	25.6	41.0	15.4	25.0
Kitchen	25.0	36.6	11.6	29.4
Bedroom 1	30.7	41.0	10.3	25.0
Bedroom 2	29.3	46.9	17.6	19.1
2202 Orchard				
Living Room	32.7	36.2	3.5	29.8
Dining Room	25.2	41.1	15.9	24.9
Kitchen	23.4	25.5	2.1	40.5
Bedroom 1	27.1	31.5	4.4	34.5
Bedroom 2	29.7	41.4	11.4	25.6
Bedroom 3	33.3	43.3	10.0	22.7

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
1572 Pegasus				
Living Room	30.1	44.4	14.3	20.6
Dining Room	29.0	42.9	13.9	22.1
Family Room	27.0	38.7	11.7	26.3
Bedroom 1	30.1	44.8	14.7	20.2
Bedroom 3	34.6	41.4	6.8	23.6
Bedroom 4	32.9	43.4	10.5	21.6
1571 Pegasus				
Living Room	28.4	38.1	9.7	27.9
Kitchen	26.3	33.1	6.8	32.9
Dining Room	26.8	33.1	6.3	32.9
Family Room	24.2	32.4	8.2	33.6
Bedroom 1	30.0	38.6	8.6	27.4
Bedroom 2	30.2	35.5	5.3	30.5
Bedroom 3	25.4	34.8	9.4	31.2
Bedroom 4	24.7	34.1	9.4	31.9
Bedroom 5	21.1	35.7	14.6	30.3
1592 Pegasus				
Living Room	31.3	40.3	9.2	25.7
Family Room	30.4	38.0	7.6	28.0
Dining Room	---	35.8	---	30.2
Kitchen	30.1	31.9	1.8	34.1
Bedroom 1	34.6	47.6	13.0	18.4
Bedroom 2	24.5	34.0	9.5	32.0
Bedroom 4	21.5	32.8	11.3	33.2
Bedroom 5	30.4	41.0	10.6	25.0
1591 Pegasus				
Living Room	30.4	38.7	8.3	27.3
Dining Room	28.6	39.3	10.7	26.7
Family Room	28.7	36.2	7.5	29.8
Kitchen	27.0	39.4	12.4	26.6
Bedroom 1	31.1	41.9	10.8	24.1
Bedroom 2	35.8	38.1	2.3	27.9
Bedroom 3	23.8	35.4	11.6	30.6

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
1601 Pegasus				
Living Room	28.5	37.6	9.1	28.4
Family Room	26.8	31.3	4.5	34.7
Dining Room	16.2	31.8	15.6	34.2
Kitchen	24.6	27.7	3.1	41.4
Bedroom 2	29.5	39.0	9.5	27.0
Bedroom 3	27.1	37.9	10.8	28.1
Bedroom 4	29.3	38.8	9.5	27.2
1671 Pegasus				
Living Room	31.1	42.9	11.8	23.1
Dining Room	33.3	38.0	4.7	29.0
Family Room	30.2	37.5	7.3	29.5
Bedroom 1	30.9	40+	9.1	27.0
Bedroom 2	27.9	40.7	12.8	26.3
Bedroom 3	31.8	40.3	8.5	26.7
Bedroom 4	28.8	36.1	7.3	30.9
20132 Redlands				
Living Room	32.2	35.3	3.1	31.7
Dining Room	27.5	31.7	4.2	35.3
Kitchen	24.8	29.0	4.2	38.0
Family Room	27.5	32.0	4.5	35.0
Bedroom 1	33.9	40.1	6.2	26.9
Bedroom 2	33.5	39.0	5.5	28.0
Bedroom 3	26.5	35.9	9.4	31.1
Bedroom 4	27.0	32.8	5.8	34.2
20172 Redlands				
Living Room	29.6	35.6	6.0	30.4
Family Room	25.7	33.9	8.2	32.1
Kitchen	24.1	34.3	10.2	31.7
Dining Room	23.6	28.9	5.3	37.1
Bedroom 1	30.1	42.3	12.2	23.7
Bedroom 2	22.9	34.5	11.6	31.5
Bedroom 3	26.0	36.5	10.5	29.5
Bedroom 4	25.3	30.8	5.5	35.2

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
2905 Paper Lane				
Living Room	27.6	37.5	9.9	26.5
Family Room	24.3	35.3	11.0	28.7
Kitchen	22.5	33.5	11.0	30.5
Bedroom 1	26.8	42.5	15.7	21.5
Bedroom 2	35.1	44.9	9.8	19.1
Bedroom 3	34.5	40+	5.5	24.0
2927 Paper Lane				
Living Room	22.6	38.0	15.4	26.0
Kitchen	19.0	35.5	16.5	28.5
Bedroom 1	37.0	41.0	4.0	23.0
Bedroom 2	29.2	40+	10.8	24.0
Bedroom 3	24.7	40+	15.3	24.0
2911 Paper Lane				
Living Room	28.2	36.4	8.2	27.6
Family Room	30.5	36.9	6.4	27.1
Dining Room	31.4	38.9	7.5	25.1
Kitchen	30.4	39.0	8.6	25.0
Bedroom 1	29.3	38.0	8.7	26.0
Bedroom 2	31.6	44.6	13.0	19.4
Bedroom 3	34.4	44.8	10.4	19.2
1522 Pegasus				
Living Room	29.5	37.6	8.1	27.4
Bedroom 1	27.1	42.1	15.0	22.9
Bedroom 2	27.6	40.6	13.0	24.4
Bedroom 4	27.0	33.8	6.8	31.2
Bedroom 5	31.0	46.0	15.0	19.0
1531 Pegasus				
Living Room	24.2	33,4	9.2	31.6
Dining Room	23.2	29.9	6.7	35.1
Family Room	26.6	32.1	5.5	32.9
Den	25.8	32.6	6.8	32.4
Bedroom 1	29.9	39.4	9.5	25.6
Bedroom 2	24.3	32.2	7.9	32.8
Bedroom 3	28.5	32.8	4.3	32.2
Bedroom 4	23.2	36.6	13.4	28.4

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improve-ment	
20111 Redlands				
Living Room	34.5	37.6	3.1	29.4
Dining Room	33.6	36.4	2.8	30.6
Kitchen	37.7	36.2	-1.5	30.8
Bedroom 1	26.1	34.7	8.6	32.3
Bedroom 2	31.4	35.5	4.1	31.5
Bedroom 3	30.5	41.6	11.1	25.4
Bedroom 4	32.0	41.0	9.0	26.0
Bedroom 5	30.5	36.6	6.1	30.4
20121 Riverside				
Living Room	31.3	39.9	8.6	27.1
Dining Room	32.8	41.9	9.1	25.1
Kitchen	33.9	38.3	4.4	28.7
Family Room	38.5	No Mod.	--	28.5
Bedroom 1	26.4	36.6	10.2	30.4
Bedroom 2	26.2	36.6	10.4	30.4
Bedroom 3	20.3	35.5	15.2	31.5
Bedroom 4	30.1	38.9	8.8	28.1
Bedroom 5	33.4	38.7	5.3	28.3
20142 Riverside				
Living Room	29.5	34.9	5.4	33.1
Family Room	24.8	29.4	4.6	38.6
Dining Room	23.7	30.0	6.3	38.0
Kitchen	23.9	29.8	5.9	38.2
Bedroom 2	31.1	35.5	4.4	32.5
Bedroom 3	18.2	37.2	19.0	30.8
20151 Riverside				
Living Room	24.4	40.5	16.1	26.5
Dining Room	25.2	43.1	17.9	23.9
Family Room	30.8	41.6	10.8	25.4
Kitchen	27.7	42.1	14.4	24.9
Bedroom 1	29.7	39.6	9.9	27.4
Bedroom 2	30.2	39.0	8.8	28.0
Bedroom 3	36.0	41.6	5.6	25.4
Bedroom 4	34.9	40.8	5.9	26.2
Bedroom 5	32.9	40.5	7.6	26.5

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improvement	
2404 University				
Living Room	32.8	35.1	2.3	28.9
Kitchen	31.1	32.1	1.0	31.9
Bedroom 1	36.2	41.9	5.7	22.1
Bedroom 2	30.5	38.1	7.6	25.9
Bedroom 3	32.8	41.8	9.0	22.2
2406 University				
Living Room	32.0	35.1	3.1	28.9
Dining Room	31.5	37.1	5.6	26.9
Kitchen	26.0	36.6	10.6	27.4
Bedroom 1	24.6	36.8	14.2	27.2
2408 University				
Living Room	28.8	41.7	12.9	22.3
Kitchen	28.1	40.8	12.7	23.2
Bedroom 1	26.9	40.3	13.4	23.7
Dining Room	31.9	40+	8.1	24.0
Bedroom 2	24.4	40+	15.6	24.0
Bedroom 3	33.2	40+	6.8	24.0
2410 University				
Living Room	28.0	39.0	11.0	25.0
Dining Room	27.6	34.5	6.9	29.5
Bedroom 1	24.8	40.4	15.6	23.6
Bedroom 2	26.6	39.6	13.0	24.4
Bedroom 3	25.4	42.8	17.4	21.2
2412 University				
Living Room	26.8	37.5	10.2	27.5
Dining Room	26.6	35.3	9.2	29.7
Kitchen	26.8	33.5	11.3	31.5
Bedroom 1	35.2	42.5	9.8	22.5
Bedroom 2	27.2	44.9	9.9	20.1
Bedroom 3	30.0	40+	14.6	25.0
2414 University				
Living Room	29.6	35.4	5.8	29.6
Dining Room	26.7	35.5	8.8	29.5
Kitchen	26.1	33.5	7.4	31.5
Bedroom 1	23.8	38.7	14.9	26.3
Bedroom 2	25.6	40.6	15.0	24.4
Bedroom 3	26.4	40.8	14.4	24.2

Table 4 (Continued)

Location	Noise Reduction Value, dB			Interior CNEL dB Post Mod
	Pre-Mod	Post-Mod	Improve-ment	
2430 University				
Living Room	26.5	36.3	9.8	28.7
Dining Room	22.2	33.5	11.3	31.5
Kitchen	23.7	34.5	10.8	30.5
Bedroom 1	28.5	35.8	7.3	29.2
Bedroom 2	29.5	42.0	12.5	23.0
Bedroom 3	26.0	35.2	9.2	29.8
2508 University				
Living Room	26.4	39.5	13.1	24.5
Dining Room	29.3	34.2	4.9	29.8
Kitchen	29.1	34.9	15.8	29.1
Bedroom 1	31.1	42.8	11.7	21.2
Bedroom 2	27.1	41.3	14.2	22.7
2510 University				
Living Room	32.1	40.3	8.2	23.7
Dining Room	27.4	37.2	9.8	26.8
Kitchen	28.5	35.9	7.4	28.1
Bedroom 1	29.9	41.5	11.6	22.5
Bedroom 2	35.6	45.4	9.8	18.6
Bedroom 3	32.3	46.6	14.3	17.4
2514 University				
Living Room	29.5	39.1	9.6	24.9
Dining Room	26.1	35.6	9.5	28.4
Kitchen	26.1	24.5	8.4	39.5
Bedroom 1	30.0	39.4	9.4	24.5
Bedroom 2	26.8	38.4	11.6	25.6
2524 University				
Living Room	27.3	32.5	5.2	31.5
Dining Room	22.0	28.6	6.6	35.4
Kitchen	25.0	30.7	5.7	33.3
Bedroom 1	27.3	32.4	5.1	31.6
Bedroom 2	23.4	35.1	11.7	28.9
Bedroom 3	25.5	35.1	9.6	28.9
2528 University				
Living Room	28.3	35.1	6.8	28.9
Dining Room	25.5	32.7	7.2	31.3
Kitchen	28.0	35.6	7.6	28.4
Bedroom 1	24.5	40.1	15.6	23.9
Bedroom 2	24.3	42.5	18.2	21.5

Noise Measurement Data
For Project -02

Address	*Room*	*Pre-Mod NR (dB)*	*CNEL Zone*	*Post-Mod NR (dB)*	*NR Change (dB)*	*Post-Mod Interior CNEL*
2501 Anniversary	Living Room	29.5	65	32.4	2.9	32.6
	Kitchen	26.3		34.4	8.1	30.6
	Bed 1	25.9		30.8	4.9	34.2
	Bed 2	25.1		34.8	9.7	30.2
	Bed 3	31.0		38.5	7.5	26.5
	Bed 4	32.2		46.0	13.8	19.0
20401 Cypress	Living Room	25.7	65	32.8	7.1	32.2
	Family Room	26.7		35.9	9.2	29.1
	Kitchen	22.9		31.8	8.9	33.2
	Bed 1	26.2		30.9	4.7	34.1
	Bed 2	29.4		31.6	2.2	33.4
20472 Cypress	Living Room	31.0	65	34.4	3.4	30.6
	Den	25.8		37.0	11.2	28.0
	Kitchen	24.7		40.2	15.5	24.8
	Bed 1	24.1		44.9	20.8	20.1
	Bed 2	26.8		35.1	8.3	29.9
	Office	35.2		46.8	11.6	18.2
2908 Irvine	Living Room	29.6	65	38.1	8.5	26.9
	Kitchen	20.7		35.1	14.4	29.9
	Den	25.9		35.1	9.2	29.9
	Bed 1	29.5		40.9	11.4	24.1
	Bed 2	29.5		41.0	11.5	24.0
20161 Kline	Living Room	29.5	68	35.0	5.5	33.0
	Family Room	29.7		35.4	5.7	32.6
	Bed 1	32.9		37.4	4.5	30.6
	Bed 2	29.0		36.7	7.7	31.3
	Bed 3	29.2		37.7	8.5	30.3
	Bed 4	34.2		43.8	9.6	24.2
	Bed 5	35.0		45.9	10.9	22.1
20111 Kline	Living Room	28.2	69	37.9	9.7	31.1
	Family Room	29.8		37.9	8.1	31.1
	Bed 1	28.8		39.4	10.6	29.6
	Bed 2	29.9		36.4	6.5	32.6
	Bed 3	29.8		33.6	3.8	35.4
	Bed 5	33.9		38.6	4.7	30.4

Noise Measurement Data
For Project -02

Address	*Room*	*Pre-Mod NR (dB)*	*CNEL Zone*	*Post-Mod NR (dB)*	*NR Change (dB)*		*Post-Mod Interior CNEL*
1651 Pegasus	Living Room	31.0	67	35.3	4.3		31.7
	Bed 1	35.8		41.0	5.2		26.0
	Bed 2	34.5		38.3	3.8		28.7
	Bed 3	30.5		39.0	8.5		28.0
	Bed 4	31.7		38.9	7.2		28.1
	Bed 5	32.2		35.9	3.7		31.1
1642 Pegasus	Living Room	30.9	66	39.8	8.9		26.2
	Dining Room	36.3		40.1	3.8		25.9
	Family Room	29.7		33.7	4.0		32.3
	Bed 1	25.7		39.3	13.6		26.7
	Bed 2	33.6		40.1	6.5		25.9
	Bed 4	33.0		43.2	10.2		22.8
	Bed 5	34.4		42.1	7.7		23.9
1631 Pegasus	Living Room	28.4	67	35.7	7.3		31.3
	Family Room	24.9		32.8	7.9		34.2
	Dining Room	26.6		33.5	6.9		33.5
	Bed 1	33.3		33.0	-0.3	*	34.0
	Bed 3	26.4		38.1	11.7		28.9
	Bed 4	26.1		38.9	12.8		28.1
	Bed 5	30.2		37.2	7.0		29.8
2530 University	Living Room	30.3	65	26.5	-3.8	*	38.5
	Bed 1	28.5		37.0	8.5		28.0
	Bed 2	27.9		28.0	0.1		37.0
	Bed 3	27.7		29.2	1.5		35.8

*The minus value indicates that there was some occupant interference during the noise measurements.

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NOISE MEASUREMENT DATA
FOR 20122 SANTA ANA AVE.

One-Story Unit	***Noise Reduction, dB***			***Interior CNEL***
	Pre-Mod Unit 2B	***Post-Mod Unit 2A***	***Improvement***	
Living	20.9	30.2	9.3	35.8
Bed 1	28.7	40.1	11.4	25.9
Bed 2	*	35.3		30.7

Two-Story Unit	***Noise Reduction, dB***			***Interior CNEL***
	Pre-Mod Unit 5A	***Post-Mod Unit 5D***	***Improvement***	
Living	24.7	31.8	7.1	34.2
Bed 1				
Bed 2	25.5	33.5	8.0	32.5
Bed 3	28.1	34.7	6.6	31.3

* Data not available

THIS DATA IS A SAMPLING OF THE TYPICAL UNITS
AT THIS SITE AND CAN BE ASSUMED TO APPLY
TO ALL OF THE 32 UNITS.

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Noise Measurement Data
For Project 04
pg. 1 of 2

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20411 Cypress 65	Bedroom 1	32.6	39.7	7.1	25.3
	Bedroom 2	28.3	31.2	9.6	33.8
	Bedroom 3	31.1	34.1	3.0	30.9
2268 University 63	Living	28.2	37.6	9.4	25.4
	Bedroom 1	27.2	39.5	12.3	23.5
	Bedroom 2	31.4	37.7	6.3	25.3
	Bedroom 3	25.6	36.8	11.2	26.2
1661 Orchad 67	Living	30.7	43.5	12.8	23.5
	Bedroom 1	28.2	37.0	8.8	30.0
	Bedroom 3	*	34.3		32.7
1721 Orchard 68	Living	27.9	31.5	3.6	36.5
	Bedroom 1	29.3	37.6	8.3	30.4
	Family	32.4	34.4	2.0	33.6
	Bedroom 3	30.4	34.0	3.6	34.0
	Bedroom 4	25.1	30.6	5.5	37.4
2919 Paper Lane 64	Living	22.0	36.1	14.1	27.9
	Bedroom 1	21.6	30.6	9.0	33.4
	Bedroom 2	21.3	46.7	25.4	17.3
1502 Pegasus 66	Living	30.1	34.1	4.0	31.9
	Family	26.8	29.3	2.5	36.7
	Bedroom 3	28.2	38.9	10.7	27.1
1672 Pegasus 67	Living	31.2	37.3	6.1	29.7
	Bedroom 2	24.4	36.8	12.4	30.2
	Bedroom 3	27.8	39.5	11.7	27.5
	Bedroom 4	31.1	32.1	1.0	34.9
1692 Pegasus 67	Living	28.5	36.7	8.2	28.3
	Bedroom 1	31.1	36.5	5.4	30.5
	Bedroom 2	31.2	35.6	4.4	31.4
	Bedroom 3	28.6	37.3	8.7	29.7
	Bedroom 5	28.9	39.1	10.2	27.9
20141 Riverside 67	Living	27.4	35.9	8.5	31.1
	Dinning	32.9	33.8	0.9	33.2
	Bedroom 1	25.9	33.1	7.2	33.9
	Bedroom 2	26.4	39.8	13.4	27.2
	Bedroom 3	34.7	41.2	6.5	25.8
	Bedroom 4	32.4	34.0	1.6	33.0
20321 Riverside 65	Living	27.8	32.3	4.5	32.7
	Bedroom 1	28.7	33.6	4.9	31.4
	Bedroom 2	33.4	38.2	6.0	26.8
	Bedroom 3	28.3	34.3	6.0	30.7

*Data Not Available

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Noise Measurement Data
For Project -04
pg. 2 of 2

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
2900 Silver Lane 65	Living	23.9	29.3	5.4	35.7
	Bedroom 1	31.7	32.3	0.6	32.7
	Bedroom 3	32.1	40.3	8.2	24.7
2426 University 65	Living	*	26.2		38.8
	Dining	*	23.2		41.8
	Bedroom 2	*	37.9		27.1
	Bedroom 3	*	38.6		26.4
2402 Anniversary 64	Dining	28.1	38.1	10.0	25.9
	Bedroom 1	30.7	42.8	12.1	21.2
	Bedroom 2	26.3	36.1	9.8	27.9
	Bedroom 3	28.1	40.7	12.6	23.3
2500 Anniversary 63	Living	25.5	41.7	16.2	21.3
	Bedroom 1	29.7	41.0	11.3	22.0
	Bedroom 2	24.2	38.0	13.8	25.0

*Data Not Available

Noise Measurement Data
For Project 05

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20062 Cypress 65	Living	27.7	37.4	9.7	27.6
	Bedroom 1	25.1	39.2	14.1	25.8
	Bedroom 2	25.0	33.6	8.6	31.4
20162 Cypress 65	Living	24.0	31.3	7.3	33.7
	Dinning	22.4	30.6	8.2	34.4
	Bedroom 1	29.0	34.7	5.7	30.3
	Bedroom 2	21.0	32.1	11.1	32.9
20402 Cypress 65	Living	*	34.3	*	30.7
	Dinning	*	32.1	*	32.9
	Bedroom 1	*	33.1	*	31.9
2221 Mesa 64	Living	31.5	33.3	1.8	30.7
	Dinning	24.3	32.8	8.5	31.2
	Bedroom 1	27.7	38.0	9.1	26.0
	Bedroom 2	27.5	36.6	9.1	27.4
2141 Mesa 66	Living	19.5	29.3	9.8	36.7
	Rec.Rm	17.8	25.1	7.3	40.9
	Bedroom 1	21.8	34.9	13.1	31.1
	Music Rm	21.7	29.1	7.4	36.9
1561 Orchard 65	Living	25.4	32.3	6.9	32.7
	Bedroom1	32.5	37.8	5.3	27.2
	Bedroom 2	24.8	38.5	13.7	26.5
	Bedroom 3	27.7	37.6	9.9	27.4
	Bedroom 4	32.8	38.7	5.9	26.3
2901 Paper 64	Living	30.8	34.7	3.9	29.3
	Bedroom 2	26.3	34.4	8.1	29.6
	Bedroom 3	32.2	37.8	5.6	26.2
1532 Pegasus 65	Living	29.3	37.2	7.9	27.8
	Dining	33.7	34.4	0.7	30.6
	Family	32.5	33.2	0.7	31.8
	Bedroom 2	32.1	39.3	7.2	25.7
	Bedroom 3	29.1	35.6	6.5	29.4
	Bedroom 4	31.0	39.8	8.8	25.2
2428 University 64	Living	22.3	34.4	12.1	29.6
	Dining	22.3	39.9	17.6	24.1
	Bedroom 1	25.5	37.0	12.0	27.0
	Bedroom 2	22.9	34.9	12.0	29.1
2502 University 64	Bedroom 1	34.1	39.0	4.9	25.0
	Bedroom 2	35.6	39.7	4.1	24.3
2520 University 64	Living	24.6	32.4	7.8	31.6
	Dining	25.1	29.6	4.5	34.4
	Bedroom 2	32.1	41.4	9.3	22.6
2522 University 63	Living	24.6	30.1	5.5	32.9
	Dining	21.6	28.9	7.3	34.1
	Bedroom 2	32.3	38.6	6.3	24.4

*Data Not Available

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Noise Measurement Data
For Project 06

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20271 Kline 65	Living	25.8	*	*	41.2, maximum
	Kitchen	24.3	*	*	42.7, maximum
	Bedroom 1	27.9	*	*	39.1, maximum
	Bedroom 2	32.8	*	*	34.2, maximum
	Bedroom 3	22.6	*	*	44.4, maximum
1551 Orchad 65	Living	25.0	37.4	12.4	27.6
	Kitchen	22.8	33.1	10.3	31.9
	Bedroom 1		43.0	*	22.0
	Bedroom 2	24.6	37.2	12.6	27.8
	Bedroom 3	26.5	28.5	2.0	36.5
	Bedroom 5	25.1	36.4	11.3	28.6
	Family	30.6	32.1	1.5	32.9
1662 Orchad 66	Living	32.3	38.0	5.7	28.0
	Entry Rm	27.1	*	*	38.9
	Kitchen	27.2	34.9	7.7	31.1
	Bedroom 1	31.6	46.4	14.8	19.6
	Bedroom 2	36.3	39.2	2.9	26.8
	Bedroom 3	29.9	41.5	11.6	24.5
1694 Orchard 67	Living	33.9	35.7	1.8	31.3
	Dinning	27.9	35.5	7.6	31.5
	Kitchen	29.2	35.8	6.6	31.2
	Bedroom 1	31.1	35.3	4.2	31.7
	Bedroom 2	36.2	40.2	4.0	26.8
1701 Orchard 67	Living	28.8	36.0	7.2	31.0
	Kitchen	24.4	33.1	8.7	33.9
	Bedroom 1	31.3	35.9	4.6	31.1
	Bedroom 2	28.2	38.9	10.7	28.1
	Bedroom 3	28.7	37.9	9.2	29.1
	Bedroom 4	22.2	38.9	16.7	28.1
	Bedroom 5	32.3	43.1	10.8	23.9
	Family	26.9	34.8	7.9	32.2
1521Pegasus 65	Living	33.0	*	*	32.0, maximum
	Dinning	25.6	*	*	39.4, maximum
	Family	29.6	*	*	35.4, maximum
	Bedroom 1	33.8	*	*	31.2, maximum
	Bedroom 2	34.3	*	*	30.7, maximum
	Bedroom 3	30.9	*	*	34.1, maximum
	Bedroom 4	28.1	*	*	36.9, maximum
	Bedroom 5	32.6	*	*	32.4, maximum

*Data Not Available

Noise Measurement Data
For Project 06

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
1551Pegasus 65	Living	30.0	37.4	7.4	27.6
	Dinning	30.7	*	*	34.3
	Kitchen	22.6	33.1	10.5	31.9
	Family	*	32.1	*	32.9
	Bedroom 1	31.0	43.0	12.0	22.0
	Bedroom 2	35.9	37.2	1.3	27.8
	Bedroom 3	28.5	37.0	8.5	28.0
	Bedroom 4	32.3	34.5	2.2	30.5
	Bedroom 5	34.1	36.4	2.3	28.6
20151 SW. Cypress 66	Living	27.0	32.8	5.8	33.2
	Dinning	22.6	24.8	2.2	41.2
	Bedroom 1	28.0	30.3	2.3	35.7
	Bedroom 2	24.2	33.2	9.0	32.8
20271 SW. Cypress 65	Living	27.5	29.0	1.5	36.0
	Dinning	21.9	26.5	4.6	38.5
	Kitchen	20.9	25.4	4.5	39.6
	Bedroom 1	27.8	33.8	6.0	31.2
	Bedroom 2	31.6	38.1	6.5	26.9
	Bedroom 3	31.6	38.1	6.5	26.9
	Loft		30.2	*	34.8
20311 SW. Cypress 65	Living	28.1	31.5	3.4	33.5
	Dinning	24.4	29.9	5.5	35.1
	Kitchen	23.9	30.7	6.8	34.3
	Bedroom 2	31.1	*	*	33.9
2253 Golden Circle 66	Living	32.0	36.9	4.9	29.1
	Kitchen	31.1	35.5	4.4	30.5
	Family	31.1	33.4	2.3	32.6
	Bedroom 1	35.3	40.8	5.5	25.2
	Bedroom 2	31.4	38.0	6.6	28.0
	Bedroom 3	27.7	39.8	12.1	26.2
2291 Golden Circle	Living	30.5	*	*	35.5, maximum
	Dinning	31.1	*	*	34.9, maximum
	Kitchen	28.4	*	*	37.6, maximum
	Family	29.3	*	*	36.7, maximum
	Bedroom 1	39.2	*	*	26.8, maximum
	Bedroom 2	31.2	*	*	34.8, maximum
	Bedroom 3	40.8	*	*	25.2, maximum

*Data Not Available

Noise Measurement Data
For Project 06

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20082 Kline Dr.	Living	27.0	*	*	43.0, maximum
	Family	23.3	*	*	46.7, maximum
	Breaskfast Rm	28.3	*	*	41.7, maximum
	Bedroom 3	35.9	*	*	34.1, maximum
	Bedroom 4	24.0	*	*	46.0, maximum
	Bedroom 5	25.9	*	*	44.1, maximum
	Bedroom 6	22.0	*	*	48.0, maximum
	Bedroom 7	34.8	*	*	35.2, maximum
20182 Kline 69	Living	35.3	38.6	3.3	30.4
	Den	22.8	*	*	39.3
	Kitchen	27.9	31.9	4.0	37.1
	Bedroom 1	33.3	44.9	11.6	24.1
	Bedroom 4	26.9	31.1	4.2	37.9
	Bedroom 5	36.5	39.2	2.7	29.8

*Data Not Available

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TABLE 1
NOISE MEASUREMENT DATA FOR
1691 MESA

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	INTERIOR CNEL dB POST-MOD
B4	Living	24.2	32.4	8.2	37.6
	Dining	25.5	32.4	6.9	37.6
	Bedroom 1	19.5	34.0	14.5	36.0
B7	Living	31.3	38.4	7.1	31.6
	Dining	30.1	37.9	7.8	32.1
	Bedroom 1	24.3	44.1	19.8	25.9
	Bedroom 2	24.4	39.4	15.0	30.6
B1	Living	29.7	39.7	10.0	30.3
	Dining	29.4	35.6	6.2	34.4
	Bedroom 1	23.0	40.4	17.4	29.6
B10	Living	28.8	33.7	4.9	36.3
	Bedroom 1	16.4	37.1	20.7	32.9
	Bedroom 2	20.0	35.7	15.7	34.3
K2	Living	26.8	35.1	8.3	34.9
	Dining	23.3	34.9	11.6	35.1
	Bedroom 1	27.8	36.4	8.6	33.6

Based on the results in this random sampling of 5 units it can be assumed that all of the other 177 units have similar results, for a total of 182 units in this project.

TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -08
Page 1 of 4

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
1732 Orchard 68	Living	24.3	32.9	8.6	35.1
	Kitchen	25.1	31.6	6.5	36.4
	Bedroom 2	33.8	39.9	6.1	28.1
	Bedroom 2	27.0	32.9	5.9	35.1
20462 Birch 66	Living	23.6	27.4	3.8	38.6
	Dining	23.0	25.7	2.7	40.3
	Bedroom 1	25.1	25.5	0.4	40.5
	Bedroom 2	26.7	28.1	1.4	37.9
	Bedroom 3	*	33.0	*	33.0
	Bedroom 4	*	33.3	*	32.7
	Bedroom 5	*	36.3	*	29.7
	Den	27.3	29.6	2.3	36.4
	Rec. Rm.	24.5	24.8	0.3	41.2
2223 Anniversary Ln 66	Living	29.3	35.0	5.7	31.0
	Dining	31.4	35.2	3.8	30.8
	Bedroom 1	28.7	37.7	9.0	28.3
	Bedroom 2	34.6	38.8	4.2	27.2
20271 Riverside 65	Living	30.5	30.6	0.1	34.4
	Dining	23.3	31.0	7.7	34.0
	Bedroom 1	30.5	32.0	1.5	33.0
	Bedroom 2	35.1	39.3	4.2	25.7
	Bedroom 3	*	38.7	*	26.3
	Office	*	32.1	*	32.9
1651 Indus 68	Living	29.4	37.7	8.3	30.3
	Family	22.3	23.5	1.2	44.5
	Rec. Rm.	*	28.0	*	40.0
	Bedroom 1	32.9	40.3	7.4	27.7
	Bedroom 3	28.1	43.8	15.7	24.2
	Bedroom 4	29.4	32.2	2.8	35.8
20281 Riverside 65	Living	27.4	32.5	5.1	32.5
	kit/Dining	26.1	36.5	10.4	28.5
	Bedroom 1	27.5	37.9	10.4	27.1
	Bedroom 2	25.7	35.0	9.3	30.0
	Bedroom 3	32.4	36.6	4.2	28.4

*Data Not Available

TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -08

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
1722 Pegasus 68	Living	27.5	34.2	6.7	33.8
	Bedroom 1	33.6	40.7	7.1	27.3
	Bedroom 2	29.0	37.9	8.9	30.1
	Bedroom 3	26.1	35.6	9.5	32.4
	Bedroom 4	27.8	37.3	9.5	30.7
	Family	24.7	31.3	6.6	36.7
20122 Kline 70	Living	37.2	44.6	7.4	25.4
	Bedroom 1	40.1	41.7	1.6	28.3
	Bedroom 2	30.4	41.7	11.3	28.3
	Bedroom 3	23.8	35.1	11.3	34.9
	Bedroom 4	25.8	37.7	11.9	32.3
	Bedroom 5	*	37.3	*	32.7
20171 Cypress 66	Living	26.5	30.0	3.5	36.0
	Bedroom 1	30.3	32.4	2.1	33.6
	Bedroom 2	29.2	31.2	2.0	34.8
	Bedroom 3	23.3	24.6	1.3	41.4
20351 SW Cypress 65	Living	30.9	35.2	4.3	29.8
	Kitchen	22.2	26.8	5.1	38.2
	Bedroom 1	27.8	32.9	7.3	32.1
	Bedroom 2	25.1	32.4	7.3	32.6
	Bedroom 3	30.5	35.0	4.5	30.0
20361 Cypress 65	Living	27.4	35.1	7.7	29.9
	Dining	23.1	32.6	9.5	32.4
	Kitchen	20.4	28.8	8.4	36.2
	Bedroom 1	27.8	34.0	6.2	31.0
	Bedroom 2	24.2	36.9	12.7	28.1
20261 SW Cypress 65	Living	31.0	39.6	8.6	25.4
	Kitchen	26.0	30.4	4.4	34.6
	Bedroom 1	31.6	37.7	6.1	27.3
	Bedroom 2	26.6	35.2	8.6	29.8
20262 SW Cypress 64	Living	25.8	37.0	11.2	27.0
	Kitchen	26.5	35.8	9.3	28.2
	Bedroom 1	32.5	45.7	13.2	18.3
	Bedroom 2	*	37.7	*	26.3
	Bedroom 3	32.5	40.9	8.4	23.1

* Data not available

TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -08

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20260 SW. Cypress 64	Living	27.1	31.9	4.8	32.1
	Dining	27.1	29.6	2.5	34.4
	Breakfast Rm	24.9	35.1	10.2	28.9
	Bedroom 1	26.4	35.2	8.8	28.8
	Bedroom 2	27	36.4	9.4	27.6
	Bedroom 3	37.1	44.6	7.5	19.4
20122 Cypress 65	Living	25.9	31.7	5.8	33.3
	Dining	22.6	40.3	17.7	24.7
	Bedroom 1	22.8	43.7	20.9	21.3
	Bedroom 2	34.9	39.4	4.5	25.6
	Bedroom 3	32	38.6	6.6	26.4
2917 Silver Ln 65	Living	24.5	36.4	11.9	28.6
	Kitchen	16.9	31.1	14.2	33.9
	Bedroom 1	27.5	36.6	9.1	28.4
	Bedroom 2	35.9	40.1	4.2	24.9
	Bedroom 3	*	45.8		19.2
2240 Golden Circle 66	Living	23.8	32.6	8.8	33.4
	Dining	26.1	31.1	5.0	34.9
	Bedroom 1	30.5	36.9	6.4	29.1
	Bedroom 2	30.9	37.6	6.7	28.4
	Bedroom 3	32.6	39.1	6.5	26.9
2281 Golden Circle 65	Living	29.4	35.7	6.3	29.3
	Dining	34.8	39.4	4.6	25.6
	Bedroom 1	24.8	36.3	11.5	28.7
	Bedroom 2	36.8	40.1	3.3	24.9
	Bedroom 3	38.3	44.6	6.3	20.4
	Bedroom 4	34.5	36.1	1.6	28.9
20091 Kline 69	Living	30.0	36.0	6.0	33.0
	Bedroom 1	37.7	39.1	1.4	29.9
	Bedroom 2	32.0	33.9	1.9	35.1
	Family	31.5	32.3	0.8	36.7
20072 Cypress 65	Living	24.3	28.2	3.9	36.8
	Bedroom 1	26.1	31.3	5.2	33.7

*Data Not Available

TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -08

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
20070 Cypress 65	Living	25.9	30.1	4.2	34.9
	Bedroom 1	27.5	30.8	3.3	34.2
	Bedroom 2	27.6	32.0	4.4	33.0
	Bedroom 3	31.0	33.7	2.7	31.3
20304 Cypress 64	Living	*	40.0	*	24.0
	Kitchen	*	30.1	*	33.9
	Bedroom 1	*	35.6	*	28.4
	Bedroom 2	*	40.7	*	23.3
	Bedroom 3	*	39.4	*	24.6
2500 Anniversary 64	Living	24.9	30.2	5.3	33.8
	Kitchen	30.6	36.0	5.4	28.0
	Bedroom 1	29.6	35.8	6.2	28.2
	Bedroom 2	27.1	32.5	5.4	31.5
	Bedroom 3	32.3	39.0	6.7	25.0

* Data not available

TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -09
Page 1 of 1

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
2842 Irvine 64	Living	21.1	31.9	10.8	32.1
	Dining	21.5	26.8	5.3	37.2
	Bedroom 1	24.7	33.8	9.1	30.2
	Bedroom 2	25.0	38.7	13.7	25.3
	Bedroom 3	33.1	38.1	5.0	25.9
20082 Kline 64	Living	27.0	38.7	11.7	25.3
	Bedroom 1	*	44.4	*	19.6
	Bedroom 4	24.0	39.0	15.0	25.0
	Bedroom 5	25.9	34.3	8.4	29.7
	Bedroom 6	22.0	40.2	18.2	23.8
20192 Kline 64	Living	34.0	37.2	3.2	26.8
	Dining	30.1	34.8	4.7	29.2
	Bedroom 1	*	38.5	*	25.5
	Bedroom 2	33.0	41.9	8.9	22.1
	Bedroom 3	32.5	34.1	1.6	29.9
	Bedroom 4	32.5	36.5	4.0	27.5
	Family Room	28.8	37.8	9.0	26.2
2291 Mesa 64	Living	25.1	35.7	10.6	28.3
	Bedroom 1	24.9	32.1	7.2	31.9
	Bedroom 2	13.9	29.5	15.6	34.5
	Den	23.6	37.0	13.4	27.0
1601 Orchard 64	Living	25.7	34.7	9.0	29.3
	Dining	22.1	35.5	13.4	28.5
	Bedroom 1	33.5	45.4	11.9	18.6
	Bedroom 3	30.5	42.6	12.1	21.4
	Bedroom 4	22.7	38.9	16.2	25.1
	Bedroom 5	29.9	35.3	5.4	28.7
	Bedroom 6	28.2	35.3	7.1	28.7
	Bedroom 7		36.7	36.7	27.3
2292/2296 Orchard 64	Living	20.2	36.6	16.4	27.4
	Bedroom 1	27.3	40.3	13.0	23.7
	Bedroom 2	25.9	37.6	11.7	26.4
1561 Pegasus 64	Living	30.6	34.2	3.6	29.8
	Dining	24.7	27.3	2.6	36.7
	Bedroom 1	33.6	40.7	7.1	23.3
	Bedroom 2	27.1	37.9	10.8	26.1
2424 University 64	Living	33.1	36.9	3.8	27.1
	Dining	*	31.5	*	32.5
	Bedroom 1	31.0	42.0	11.0	22.0
	Bedroom 2	36.1	40.6	4.5	23.4

*Data Not Available

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TABLE 1
NOISE MEASUREMENT DATA FOR
PROJECT -10

ADDRESS	ROOM	PRE-MOD	POST-MOD	CHANGE	Interior CNEL, dB Post Mod
2161 Mesa 65	Living	26.2	33.7	7.5	31.3
	Bedroom 1	27.2	36.5	9.3	28.5
	Bedroom 2	24.7	36.9	12.2	28.1
	Bedroom 3	25.2	35.1	9.9	29.9
2526 University 63	Living	18.1	32.5	14.4	30.5
	Dining	15.1	28.8	13.7	34.2
	Bedroom 1	36.5	43.1	6.6	19.9
	Bedroom 3	27.5	42.7	15.2	20.3
	Bedroom 4	25.6	36.8	11.2	26.2
2301 Anniversary 66	Living	24.7	33.2	8.5	32.8
	Dining	27.3	34.1	6.8	31.9
	Bedroom 1	23.9	33.6	9.7	32.4
	Bedroom 2	30.4	35.1	4.7	30.9
	Bedroom 3	32.1	36.5	4.4	29.5
2275 Golden Circle 65	Living	25.2	32.5	7.3	32.5
	Bedroom 1	22.6	35.7	13.1	29.3
	Bedroom 2	26.1	35.6	9.5	29.4
	Bedroom 3	32.6	38.6	6.0	26.4
2201 Anniversary 67	Living	29.1	39.2	10.1	27.8
	Dining	27.0	31.3	4.3	35.7
	Bedroom 1	25.5	34.9	9.4	32.1
	Bedroom 2	31.9	34.1	2.2	32.9
	Bedroom 3	33.2	35.2	2.0	28.8
2115 Anniversary 66	Dining	27.7	36.5	8.8	29.5
	Bedroom 1	32.2	40.3	8.1	25.7
	Bedroom 2	34.5	39.6	5.1	26.4
	Bedroom 3	31.1	34.8	3.7	31.2
	Family	31.1	34.8	3.7	31.2
1562 Anniversary 66	Living	30.2	32.8	2.6	33.2
	Dining	26.6	33.4	6.8	32.6
	Bedroom 1	32.1	40.1	8.0	25.9
	Bedroom 2	24.5	36.7	12.2	29.3
	Bedroom 4	33.2	43.2	10.0	22.8
20111 Cypress 65	Living	24.0	30.0	6.0	35.0
	Dining	27.1	36.0	8.9	29.0
	Family	29.5	37.0	7.5	28.0
	Bedroom 1	38.1	42.5	4.4	22.5
	Bedroom 2	26.9	34.0	7.1	31.0
	Bedroom 3	23.9	33.9	10.0	31.1
	Bedroom 4	26.2	38.6	12.4	26.4
	Bedroom 5	35.4	39.9	4.5	25.1
	Bedroom 6	35.4	37.2	1.8	27.8
	Bedroom 7	26.4	30.6	4.2	34.4
20312 Cypress 65	Living	26.2	32.1	5.9	32.9
	Bedroom 1	18.9	35.2	16.3	29.8
	Bedroom 3	30.7	43.6	12.9	21.4
20341 Cypress 65	Living	31.6	35.4	3.8	29.6
	Bedroom 3	30.6	33.6	3.0	31.4
	Bedroom 4	27.2	35.9	8.7	29.1