Appendix L

Noise Modeling Calculations and Existing Noise Contour Maps for Plan Area Airports

Construction Equipment Average Noise Levels

Project Name: SANDAG

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{eq})
Thresholds		
Daytime Standard	71	75.0
Sensitive Receptors		

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]	Usage Factor[2]
Dozer	82	0.4

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level [4]	dBA L_{eq} at 50 feet[4]
Dozer	78.0

Combined Predicted Noise Level (dBA L_{eq} at 50 feet)
78.0

Sources:

[1] Where measured values are not available, noise levels based on the Construction Noise Control Specifiction 721.560 were used.

[2] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[3] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[4] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Construction Equipment Average Noise Levels

Project Name: SANDAG

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{eq})
Thresholds		
Daytime Standard	446	75.0
Sensitive Receptors		

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]	Usage Factor[2]
Impact Pile Driver	101	0.2

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level [4]	dBA L_{eq} at 50 feet[4]
Impact Pile Driver	94.0

Combined Predicted Noise Level (dBA L_{eq} at 50 feet)
94.0

Sources:

[1] Where measured values are not available, noise levels based on the Construction Noise Control Specifiction 721.560 were used.

[2] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[3] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[4] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Construction Equipment Maximum Noise Levels

Project Name: SANDAG

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{max})
Thresholds		
Caltrans Standard	32	86.0
Sensitive Receptors		

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]
Dozer	82

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level [3]	dBA L_{max} at 50 feet[3]
Dozer	82.0

Combined Predicted Noise Level (dBA L_{max} at 50 feet)
82.0

Sources:

[1] Where measured values are not available, noise levels based on the Construction Noise Control Specifiction 721.560 were used.

[2] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor, assumed to be 1 for the purposes of the calculation of maximum noise levels;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Construction Equipment Maximum Noise Levels

Project Name: SANDAG

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (dBA L_{max})
Thresholds		
Caltrans Standard	281	86.0
Sensitive Receptors		

Equipment[1]	Reference Emission Noise Levels (dBA L_{max}) at 50 feet[2]
Impact Pile Driver	101

Ground Type	Hard
Source Height	8
Receiver Height	5
Ground Factor[3]	0.00

Predicted Noise Level [3]	dBA L_{max} at 50 feet[3]
Impact Pile Driver	101.0

Combined Predicted Noise Level (dBA L_{max} at 50 feet)
101.0

Sources:

[1] Where measured values are not available, noise levels based on the Construction Noise Control Specifiction 721.560 were used.

[2] Based on Figure 4-26 from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 86).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2018 (pg 177).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor, assumed to be 1 for the purposes of the calculation of maximum noise levels;

G = Constant that accounts for topography and ground effects (FTA 2018: pg 86); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	80	0	74.0	67.0	100		
Blasting	100	94	94	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	83	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	85	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jack	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	90	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (hoe ram)	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle)	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	80	0	74.0	71.0	100		
Tractor	40	84	84	0	78.0	74.0	100		
Vacuum Excavator (Vac-truck)	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0

Distance Propagation Calculations for Stationary Sources of Ground Vibration

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

Table A. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Crack-and-seat - damage to fragile buildings	2.400	@	25	0.099	@	210
crack-and-seat - damage to older residential	2.400	@	25	0.300	@	100
Impact pile driver - damage to fragile buildings	0.650	@	25	0.098	@	88
Impact pile driver - damage to older residential	0.650	@	25	0.299	@	42
Ivibratory roller - damage to fragile buildings	0.210	@	25	0.096	@	42
vibratory roller- damage to older residential	0.210	@	25	0.293	@	20

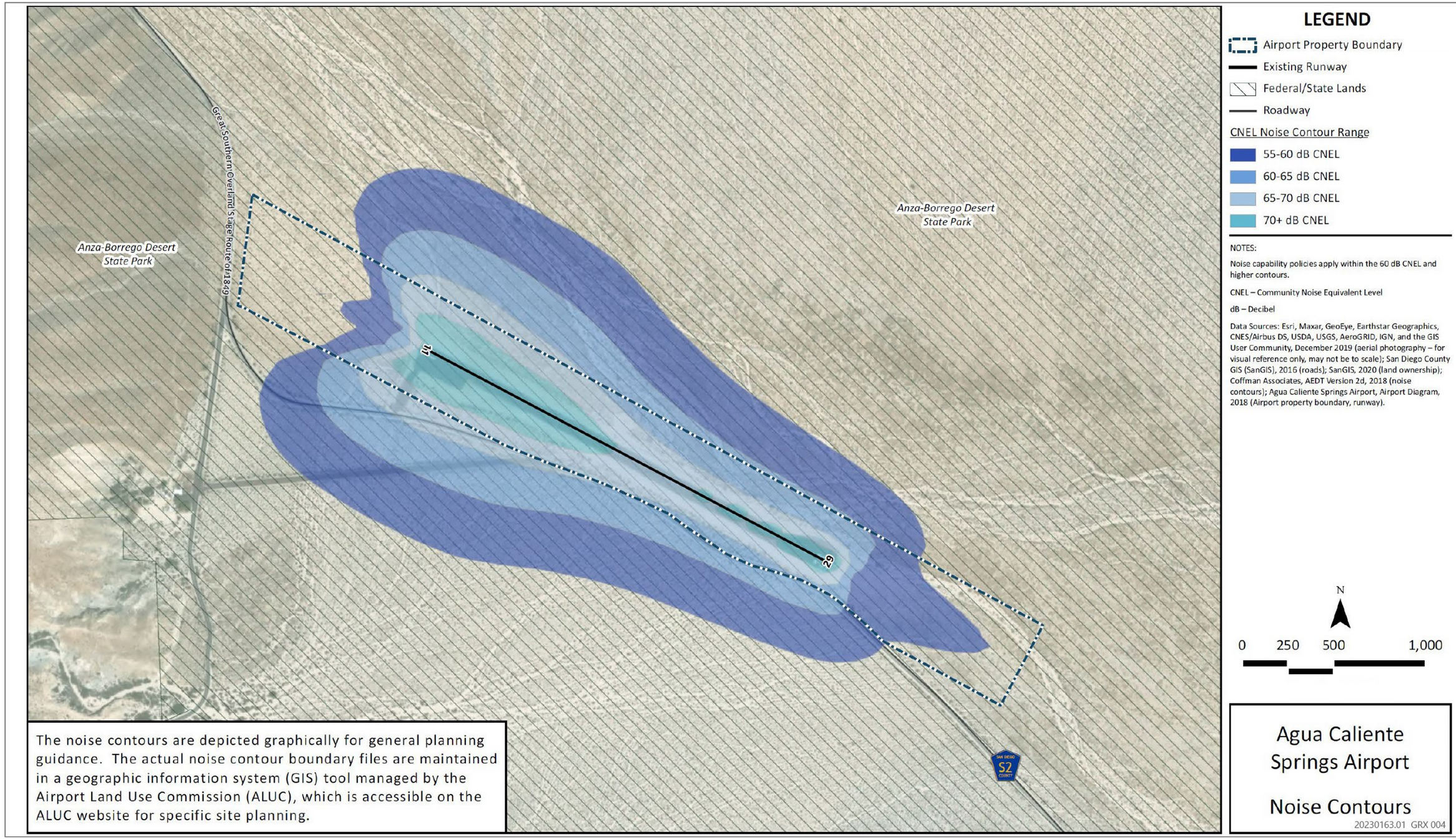
The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

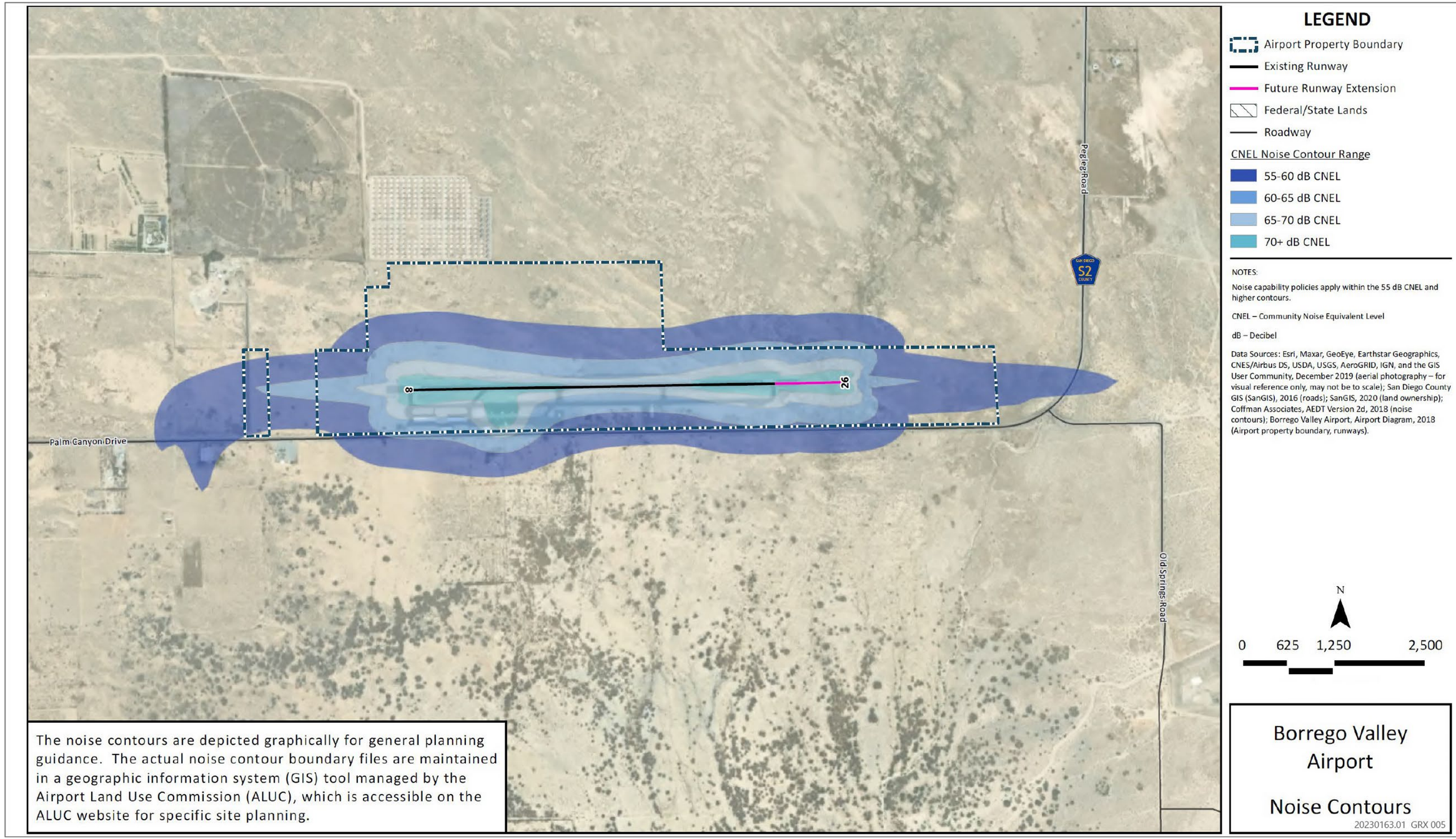
Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available:

https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf



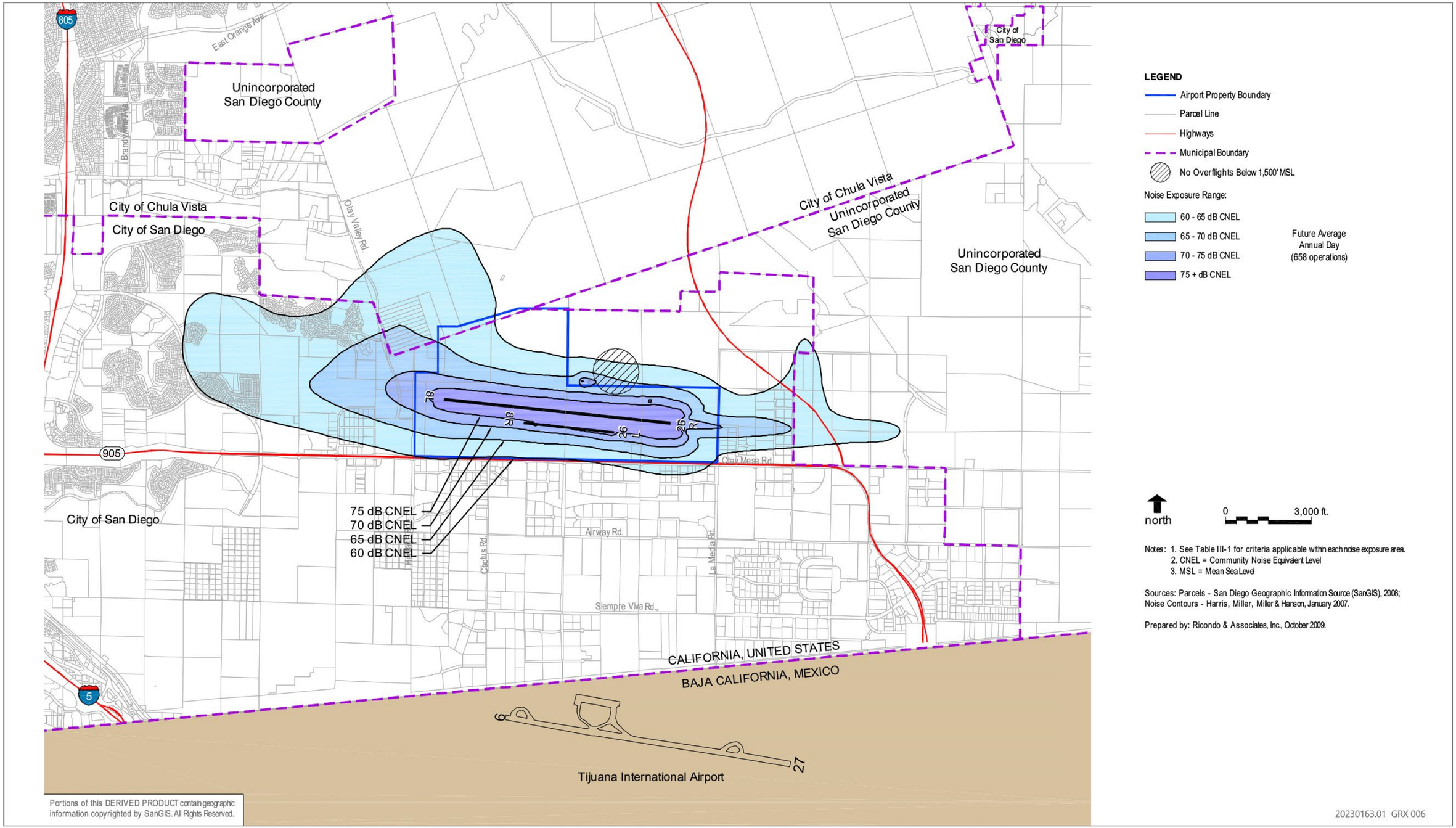
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Agua Caliente Airport Noise Contour



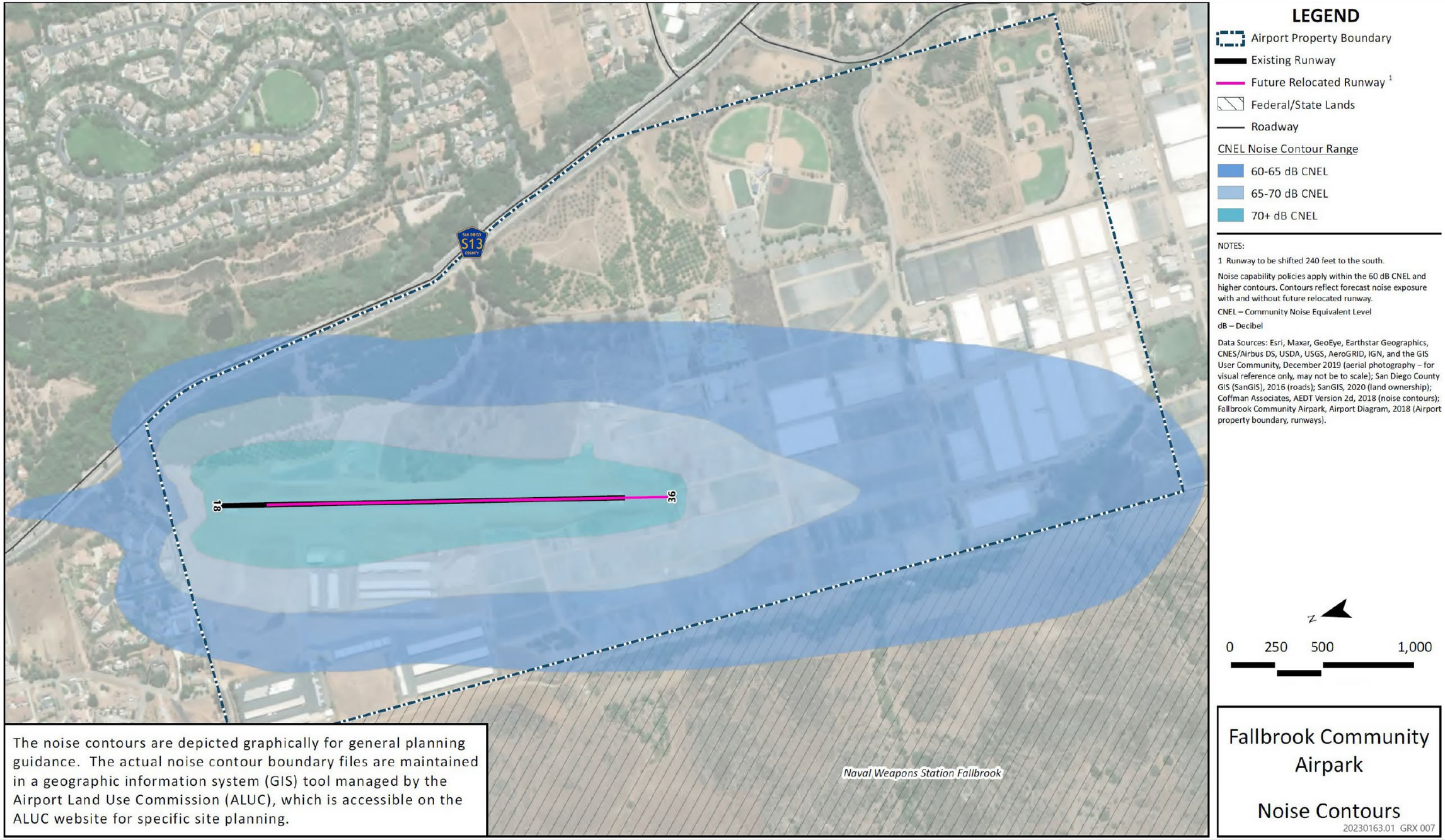
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Borrego Valley Airport Noise Contour



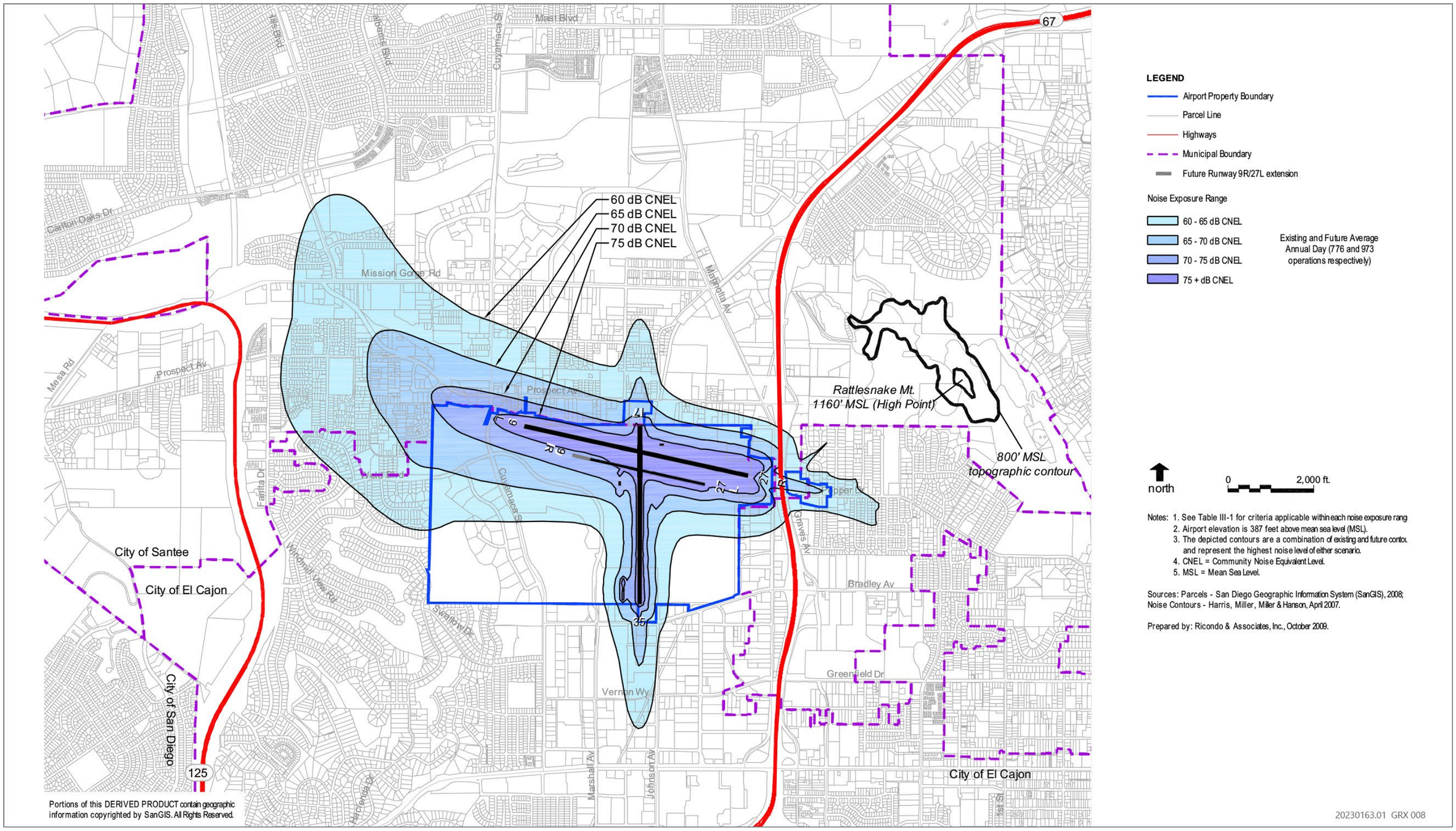
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Brown Field Airport Noise Contour



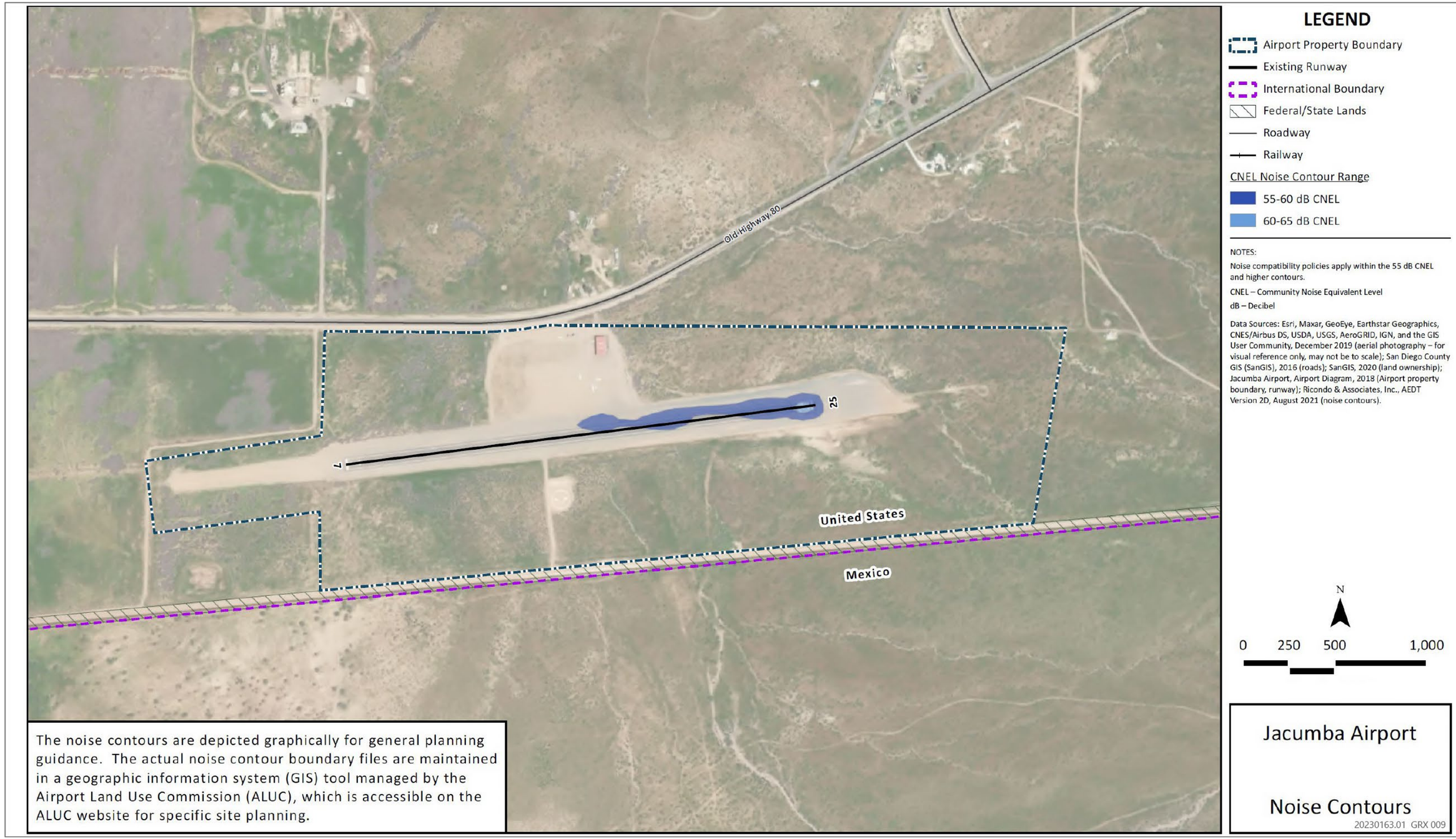
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Fallbrook Community Airport Noise Contour



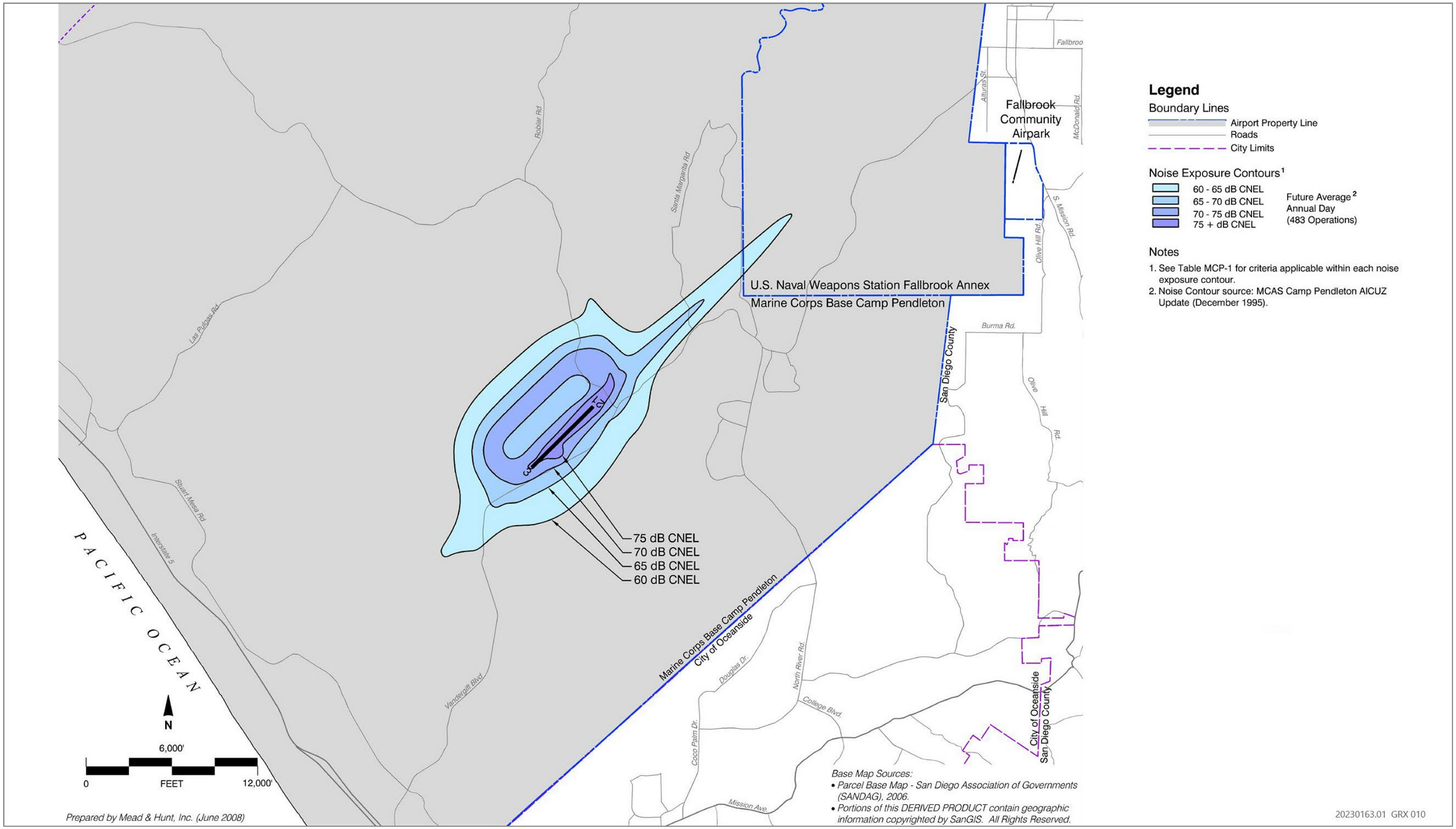
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Gillespie Field Airport Noise Contour



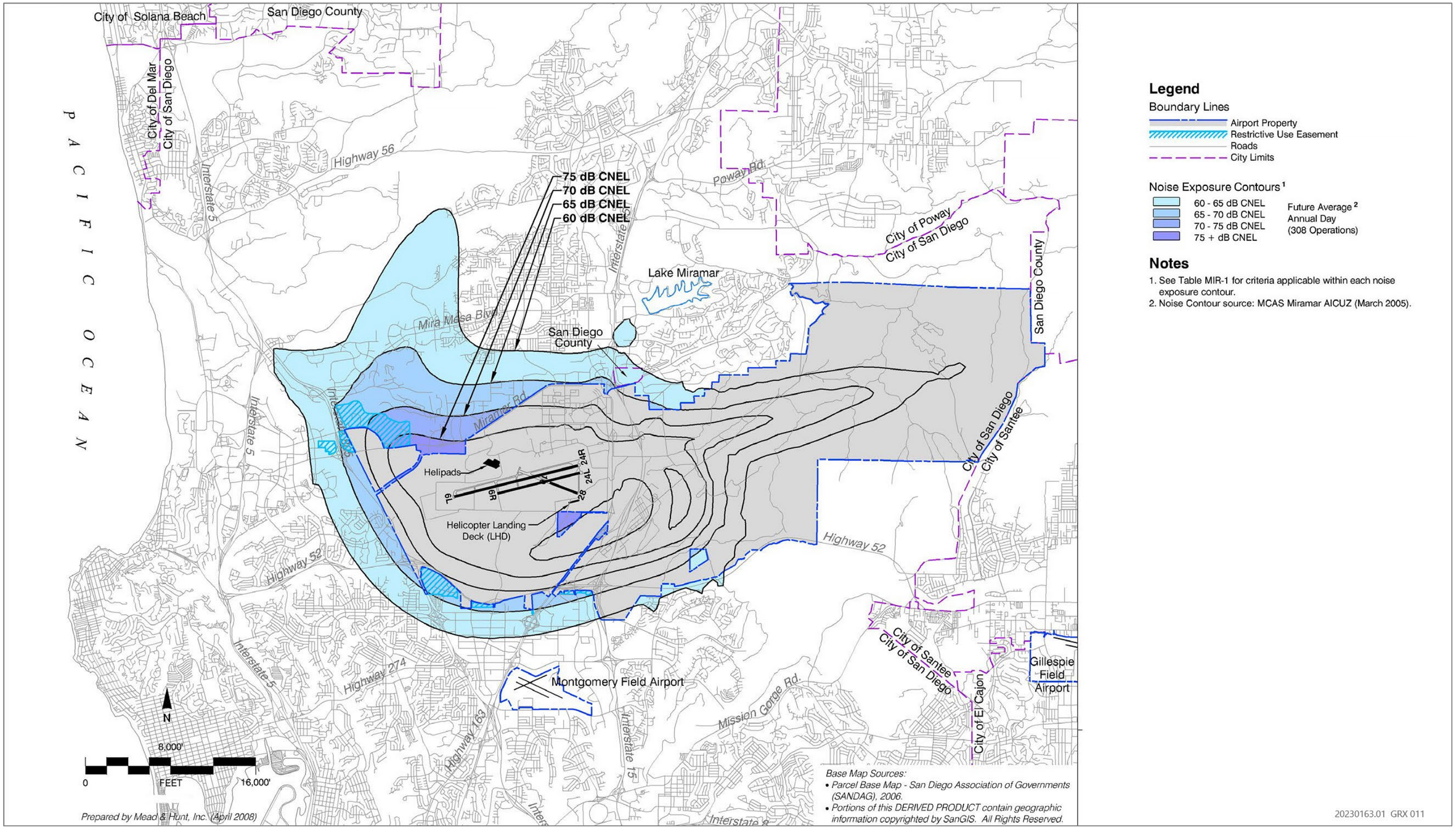
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Jacumba Airport Noise Contour



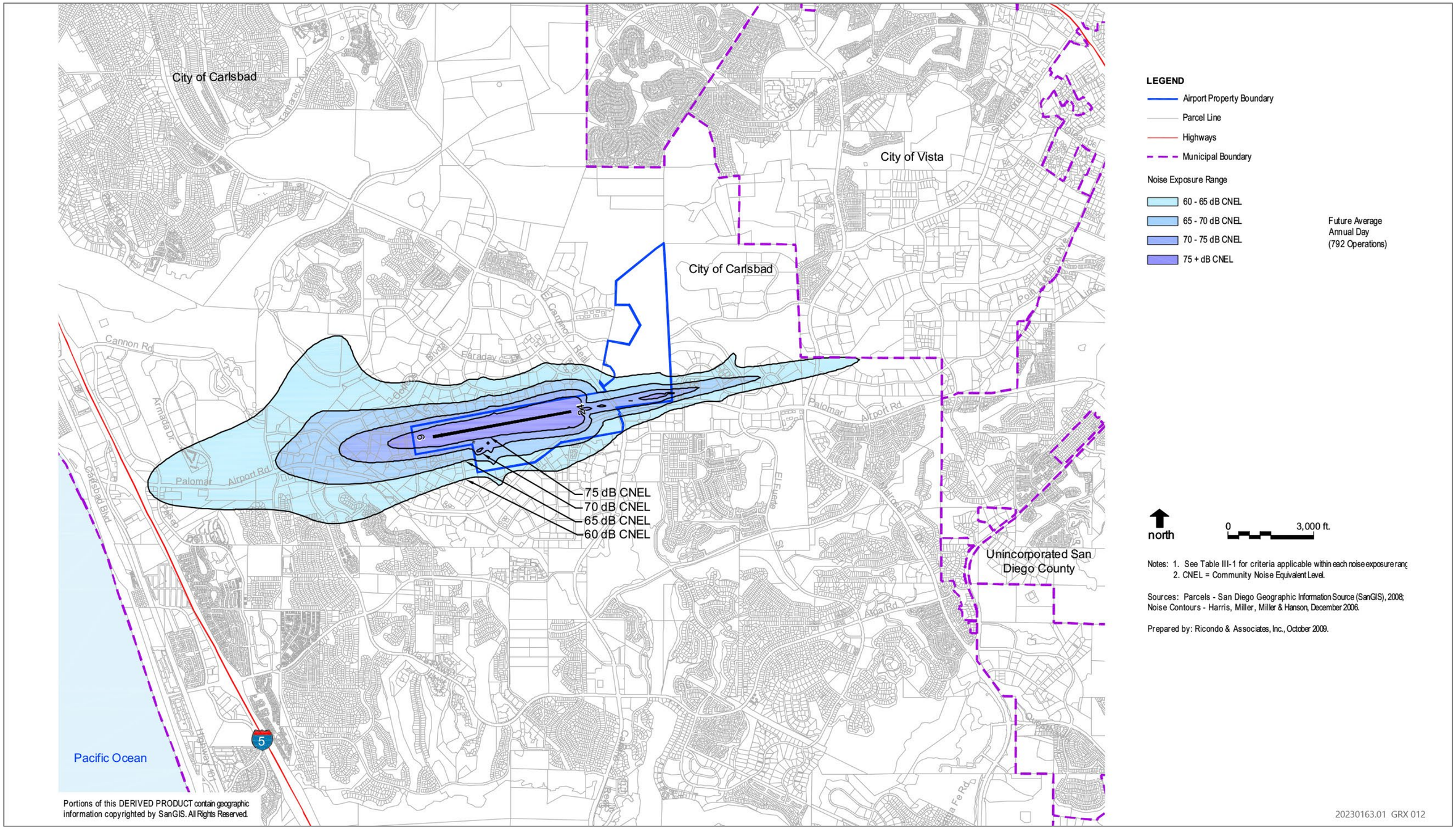
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

MCAS Camp Pendelton Airport Noise Contour



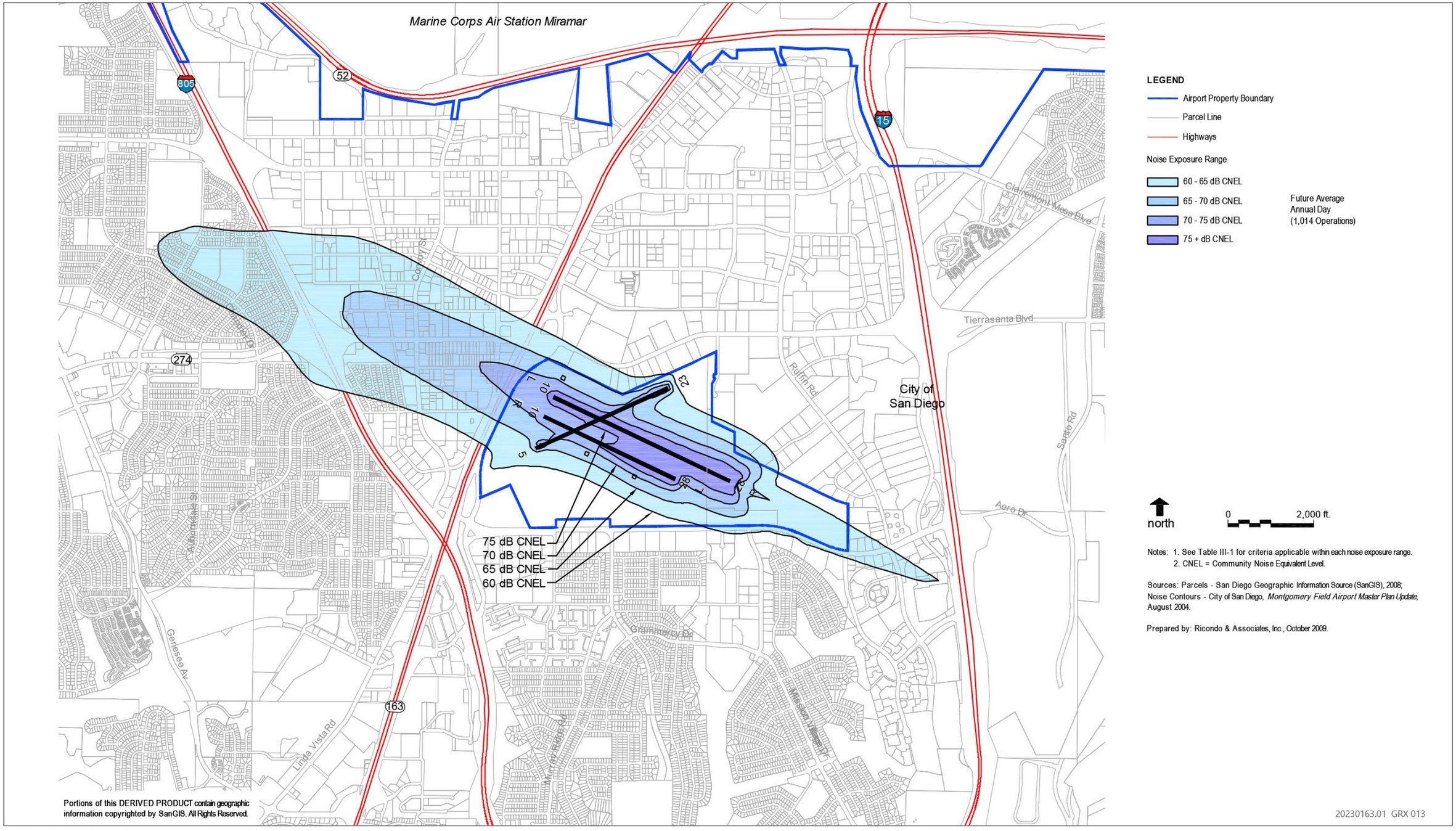
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

MCAS Miramar Airport Noise Contour



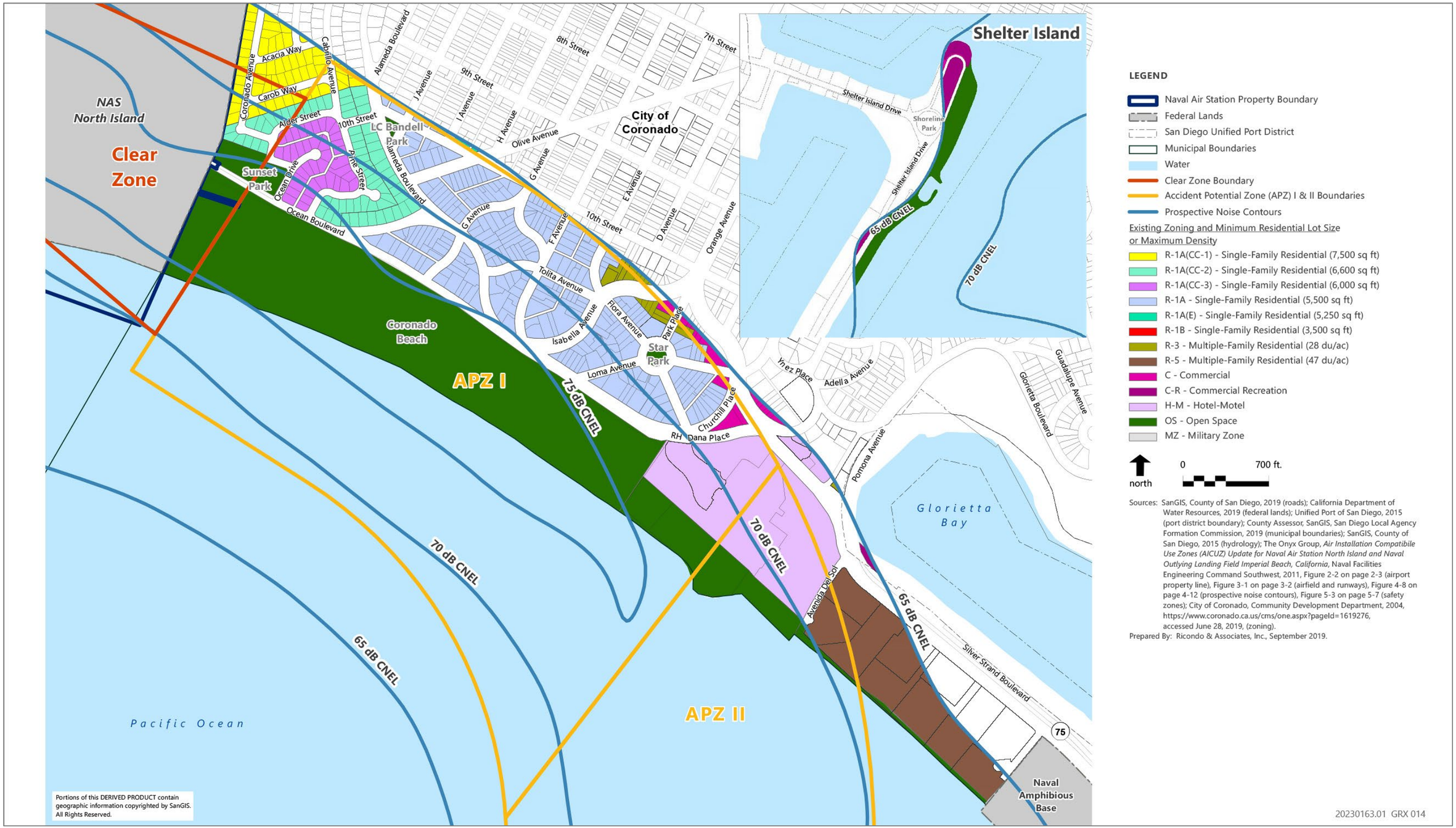
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

McClellan-Palomar Airport Noise Contour



Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

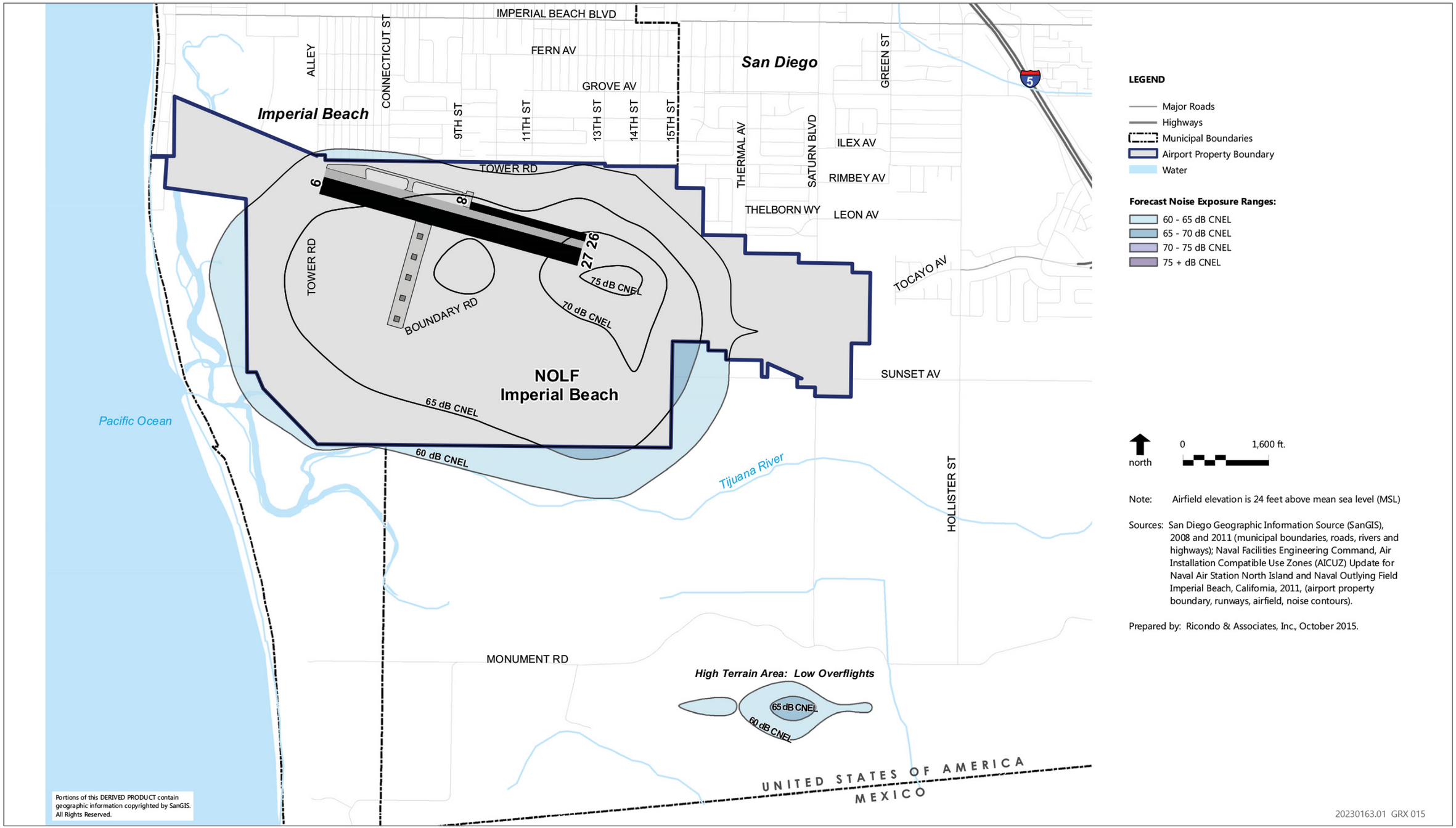
Montgomery-Gibbs Airport Noise Contour



Sources: SanGIS, County of San Diego, 2019 (roads); California Department of Water Resources, 2019 (federal lands); Unified Port of San Diego, 2015 (port district boundary); County Assessor, SanGIS, San Diego Local Agency Formation Commission, 2019 (municipal boundaries); SanGIS, County of San Diego, 2015 (hydrology); The Onyx Group, *Air Installation Compatibile Use Zones (AICUZ) Update for Naval Air Station North Island and Naval Outlying Landing Field Imperial Beach, California*, Naval Facilities Engineering Command Southwest, 2011, Figure 2-2 on page 2-3 (airport property line), Figure 3-1 on page 3-2 (airfield and runways), Figure 4-8 on page 4-12 (prospective noise contours), Figure 5-3 on page 5-7 (safety zones); City of Coronado, Community Development Department, 2004, https://www.coronado.ca.us/cms/one.aspx?pageId=1619276, accessed June 28, 2019, (zoning).
Prepared By: Ricondo & Associates, Inc., September 2019.

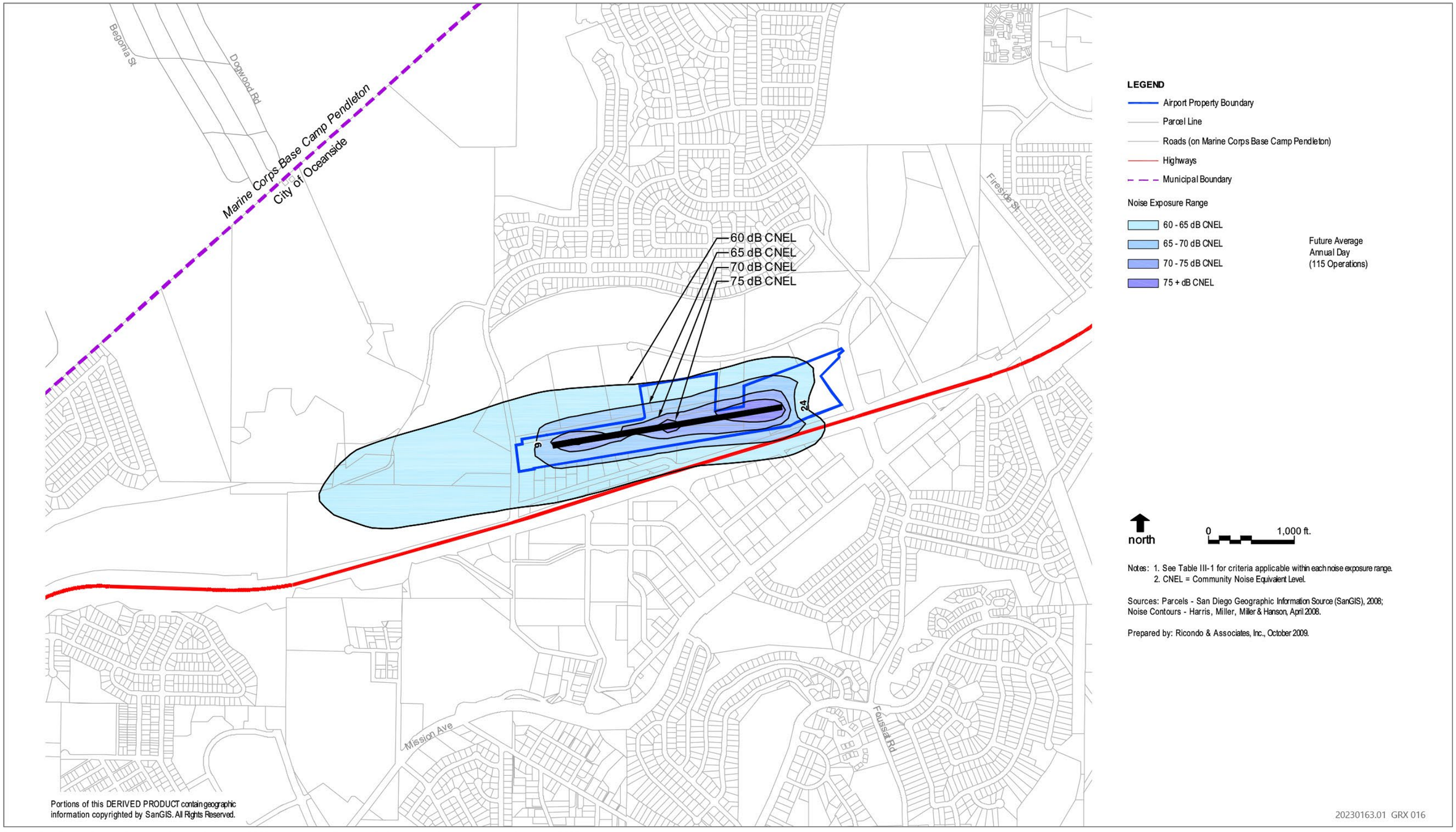
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Naval Air Station North Island Airport Noise Contour



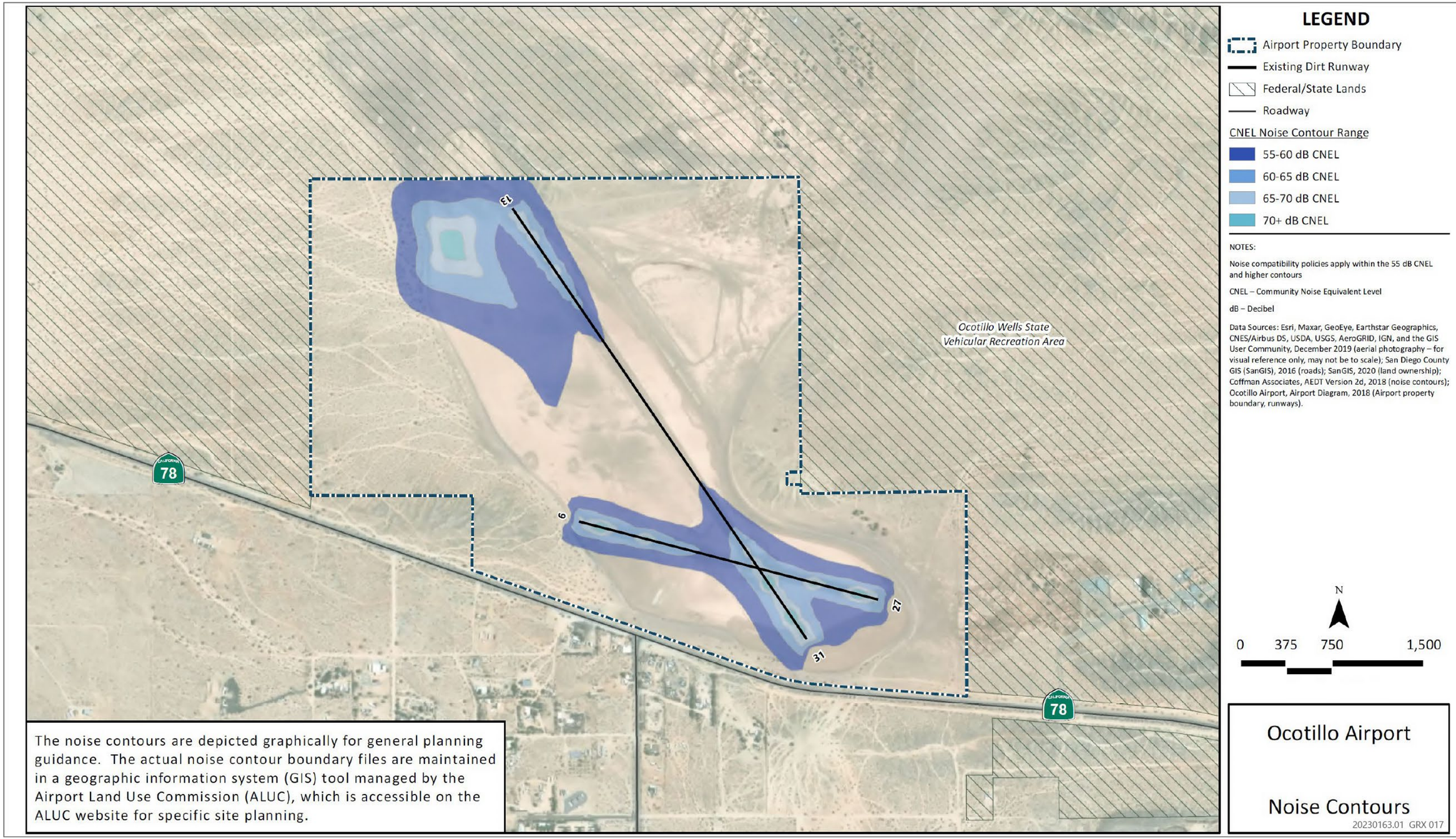
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Naval Outlying Field Airport Noise Contour



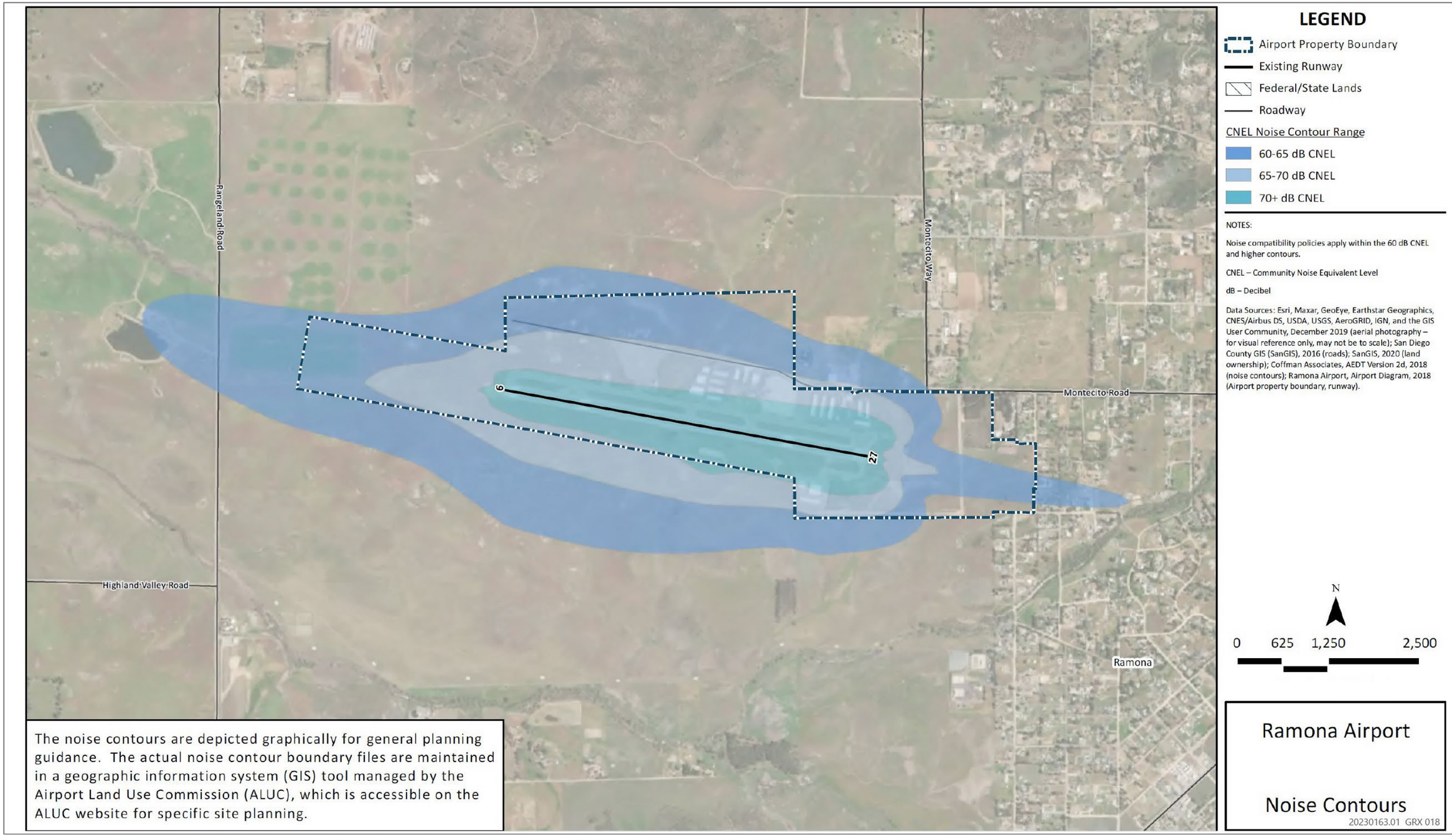
Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Oceanside Municipal Airport Noise Contour



Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Ocotillo Airport Noise Contour



Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

Ramona Airport Noise Contour

LEGEND

- Airport Property
- Runway
- 2050 Forecast Noise Exposure Contours
- Municipal Boundaries
- San Diego Unified Port District Boundary
- Highway
- Water

NOTES:

CNEL - Community Noise Equivalent Level

dB - Decibel

This data is depicted graphically for general planning guidance. The actual ALUCP mapping files are maintained in a geographic information system (GIS) tool managed by the Airport Land Use Commission (ALUC), which is accessible on the ALUC website for specific site planning.

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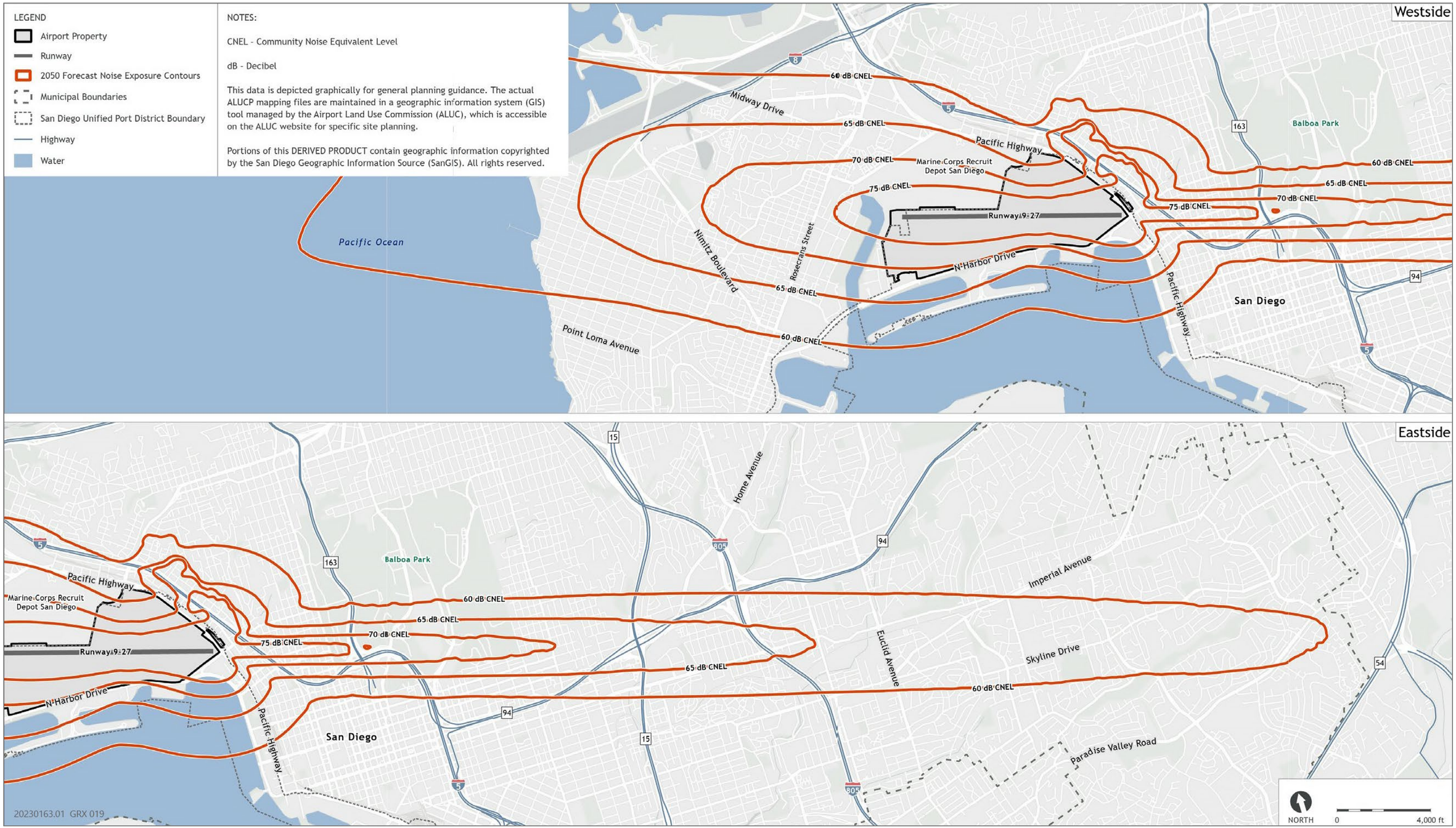

Source: San Diego County Regional Airport Authority 2022; prepared by Ricondo & Associates, Inc.; adapted by Ascent in 2025.

San Diego International Airport Noise Contour