

Environmental Noise Assessment

CCL06126 AT&T Cellular Facility

City of Santa Clara, California

BAC Job #2023-021

Prepared For:

Complete Wireless Consulting

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Introduction

The CCL06126 AT&T Wireless Unmanned Telecommunications Facility (project) proposes the installation of cellular equipment within an existing (abandoned) telecommunications lease area located at 3111 Benton Street in Santa Clara, California (APN: 290-27-006). The outdoor equipment cabinets have been identified as the primary noise sources associated with the project. The project overall site plan is presented in Figure 1. The studied site drawings are dated February 3, 2023.

Bollard Acoustical Consultants, Inc. has been contracted by Complete Wireless Consulting, Inc. to complete an environmental noise assessment regarding the proposed project cellular equipment operations. Specifically, the following assessment addresses daily noise production and exposure associated with operation of the project outdoor equipment cabinets. Please refer to Appendix A for definitions of acoustical terminology used in this report. Appendix B illustrates common noise levels associated with various sources.

Criteria for Acceptable Noise Exposure

City of Santa Clara Municipal Code

The City of Santa Clara Municipal Code establishes noise level performance standards for non-transportation (stationary) noise sources, such as those that would occur on the project site. The nearest (adjacent) land uses have been identified as residential to the north. Section 9.10.040 of the Municipal Code limits noise levels at residential uses to 55 dB during daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dB during nighttime hours (10:00 p.m. to 7:00 a.m.).

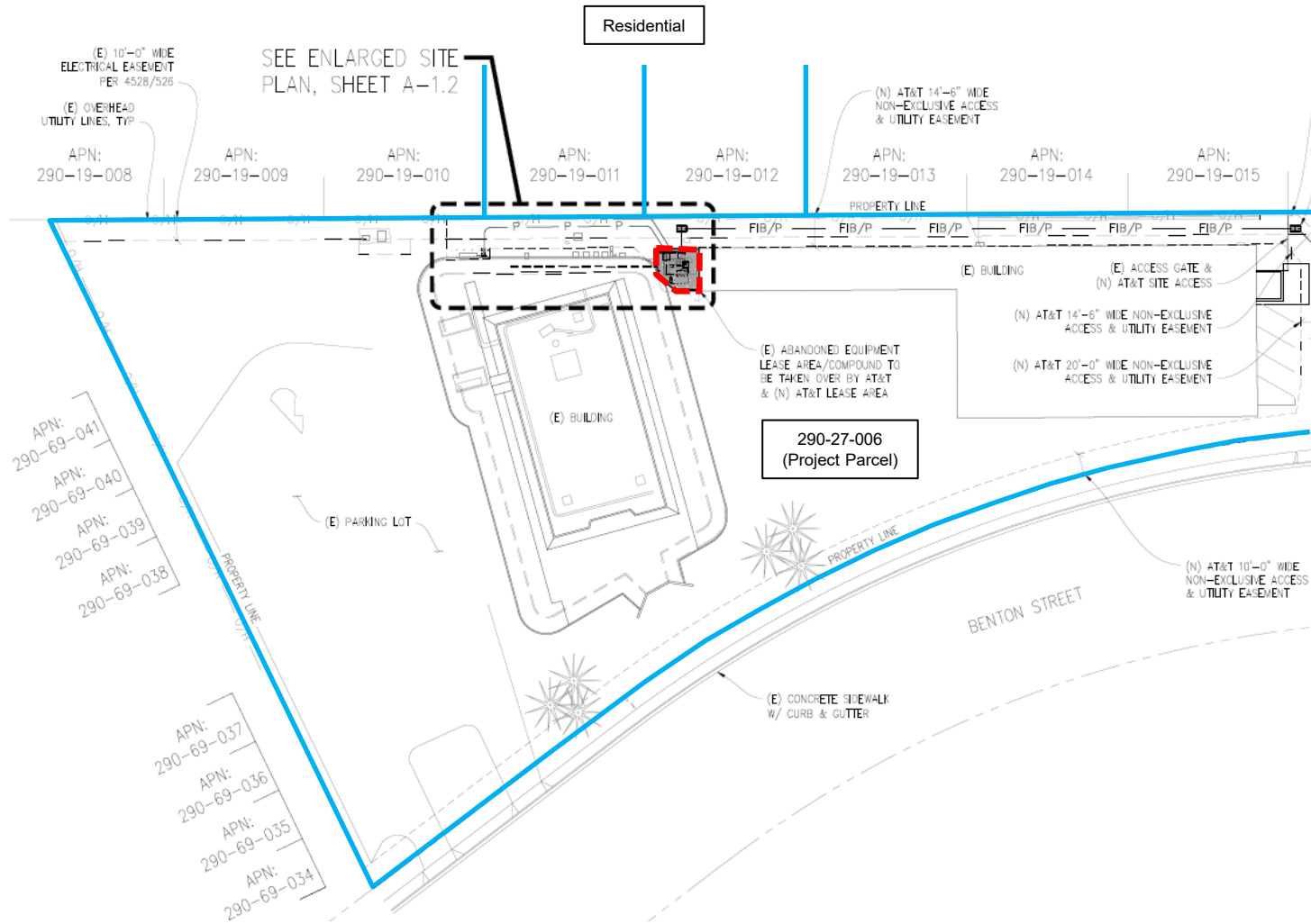
It should be noted that the Municipal Code does not define the acoustical time descriptor such as L_{eq} (average noise level) or L_{max} (maximum instantaneous noise level) that is associated with the established limits. For the purposes of this assessment, the City's noise level limits were reasonably interpreted to be an average noise level (L_{eq}).

Noise Standards Applied to the Project

Noise would be generated by this project by the ongoing operation of the cellular equipment cabinets' cooling systems. These systems utilize fans to circulate cooling air through the electric circuitry. During warmer periods, the cooling requirements will be greater, and the fans will run continuously. During cooler periods, however, the heat transfer requirements are diminished, and the fans will run intermittently as needed. Because the fan operation is a normal aspect of the project, and because the fans could run continuously during warm nighttime hours (i.e., more than 30 minutes per hour), the noise standards applied to the equipment cabinets are as follows:

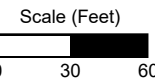
- 55 dB L_{eq} at residential uses during daytime hours (7:00 a.m. to 10:00 p.m.)
- 50 dB L_{eq} at residential uses during nighttime hours (10:00 p.m. to 7:00 a.m.)

Satisfaction with the City's 50 dB L_{eq} nighttime noise level standard at the nearest residential property lines would ensure compliance with the City's less restrictive 55 dB L_{eq} daytime noise level standard.



Legend

- Proposed AT&T Cellular Equipment Lease Area
- Parcel Boundaries



CCL06126 AT&T Cellular Facility
Santa Clara, California

Project Overall Site Plan

Figure 1



Project Noise Generation

The project proposes the installation of four (4) equipment cabinets within the lease area shown in Figure 1. Based on the project site drawings, the cabinets assumed for installation within the lease area are as follows: two (2) stacked Purcell Systems FLX12WS (GR-487 rated) cabinets, and two (2) AT&T Power/Battery cabinets. The cabinets and their respective reference noise levels are provided in Table 1. The manufacturer's noise level data specification sheets for the proposed cabinets are provided as Appendix C.

Table 1
Reference Noise Level Data of Proposed Equipment Cabinets¹

Equipment	Number of Cabinets	Reference Noise Level (dB)	Reference Distance (ft)
Purcell Systems FLX12WS	2	65	5
AT&T Power/Battery	2	65	5

¹ Manufacturer specification sheets provided as Appendix C.

Predicted Facility Equipment Noise at the Nearest Residential Property Lines

Assuming standard spherical spreading loss (-6 dB per doubling of distance from a stationary noise source), project-equipment noise exposure at the nearest residential property lines to the north was calculated and the results of those calculations are presented in Table 2. Satisfaction of the City's noise level criteria at the closest residential property lines would ensure compliance of the City's noise limits at residential property lines located farther away.

The results presented in Table 2 include consideration the orientation of the proposed outdoor equipment cabinet cooling fans relative to the adjacent residential property lines. Based on the provided site plans, the cooling fans of the equipment cabinets are proposed to face south, or away from the residential property lines to the north. Reference noise level measurements conducted by BAC staff at a similarly configured facility in Livermore, California (5179 Preston Avenue) indicate that the proposed equipment cabinet cooling fans are approximately 8 dB quieter when measured from the opposite side (rear) of the cooling fans. As a result, predicted equipment cabinet noise levels were adjusted by -8 dB at the residential property lines to the north.

Finally, it should be noted that an existing 6' CMU wall is constructed along a portion of the project equipment lease area. However, because the existing 6' solid wall does not enclose the entire perimeter of the equipment lease area (i.e., there is a wood fence portion on the west side), the effectiveness of the CMU wall performing as a noise barrier would be significantly reduced. As a result, barrier offsets for the existing non-continuous CMU wall were not applied to predicted equipment noise levels.

Table 2
Predicted Equipment Noise Levels at the Nearest Residential Property Lines

APN ¹	Land Use	Distance from Equipment Cabinets (ft) ²	Predicted Noise Level, L _{eq} (dB) ³
290-19-012	Residential	25	49
290-19-011	Residential	30	47
¹ Parcel boundaries are shown in Figure 1. ² Distance scaled using the provided site plans dated 2/3/23. ³ Predicted cabinet noise levels include consideration the orientation of the cooling fans, which resulted in an -8 dB noise level reduction at the residential property lines.			

Source: BAC 2024

As indicated in Table 2, project equipment cabinet noise levels are predicted to be 49 dB L_{eq} or less at the nearest residential property lines, which would satisfy the Municipal Code 50 dB L_{eq} nighttime noise level limit. As a result, consideration of project equipment cabinet noise mitigation measures would not be warranted for the project.

Conclusions

Project equipment noise level exposure is expected to comply with applicable City of Santa Clara Municipal Code daytime and nighttime noise level criteria at the nearest residential uses to the north. As a result, no further consideration of project equipment noise mitigation measures would be warranted for this project.

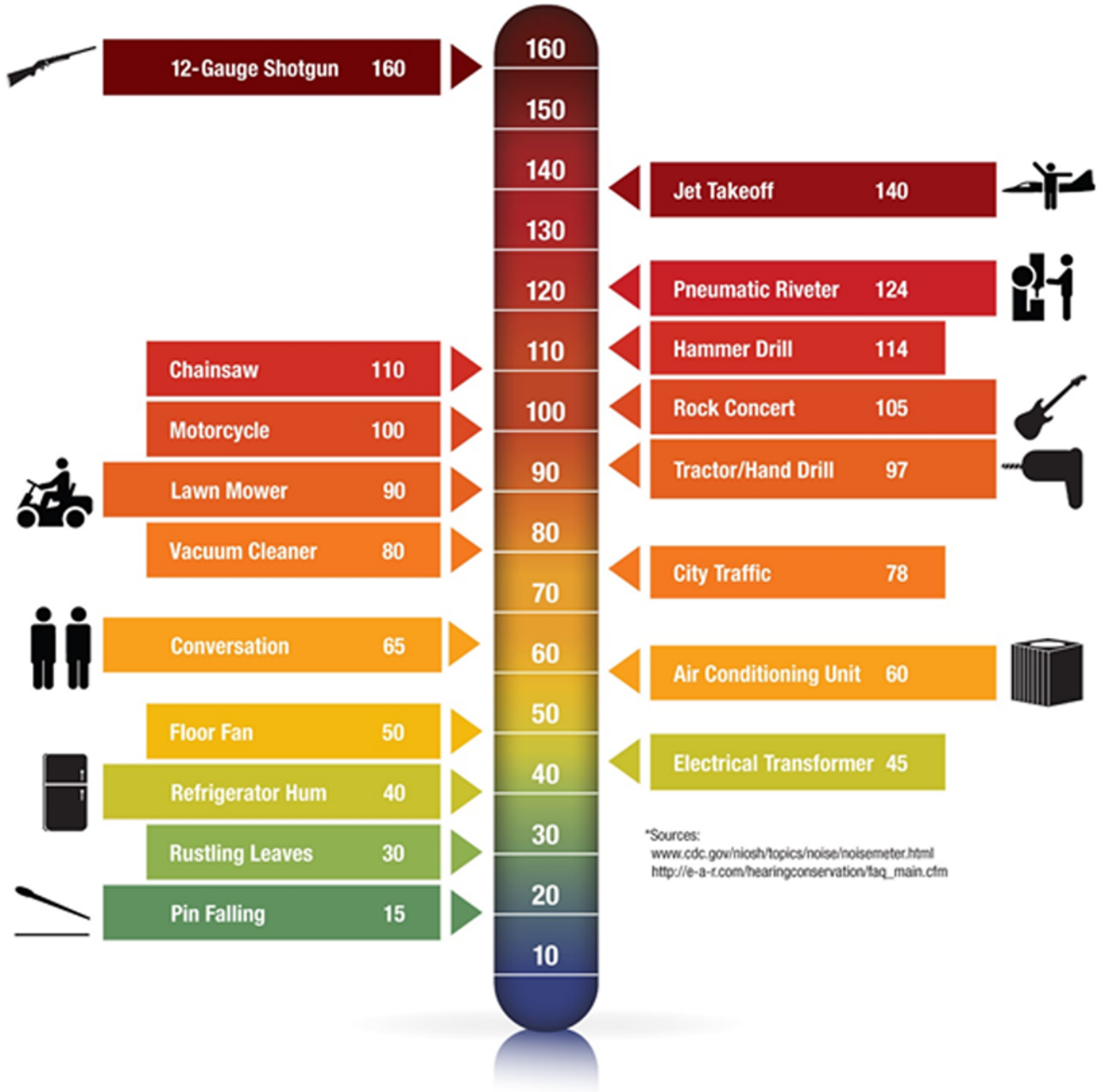
This concludes our environmental noise assessment for the proposed CCL06126 AT&T Cellular Facility in Santa Clara, California. Please contact BAC at (530) 537-2327 or darioq@bacnoise.com with any questions or requests for additional information.

Appendix A Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
IIC	Impact Insulation Class (IIC): A single-number representation of a floor/ceiling partition's impact generated noise insulation performance. The field-measured version of this number is the FIIC.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Masking	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT₆₀	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
STC	Sound Transmission Class (STC): A single-number representation of a partition's noise insulation performance. This number is based on laboratory-measured, 16-band (1/3-octave) transmission loss (TL) data of the subject partition. The field-measured version of this number is the FSTC.

Appendix B

Typical A-Weighted Sound Levels of Common Noise Sources Decibel Scale (dBA)*



*Sources:
www.cdc.gov/niosh/topics/noise/noisemeter.html
http://e-a-r.com/hearingconservation/faq_main.cfm

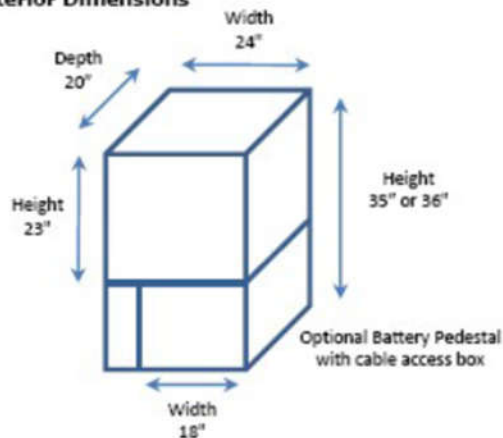
Appendix C-1

FlexSure®

FLX12WS

GR-487 Certified for Wireless Data Broadband Backhaul Applications

Exterior Dimensions



Interior Dimensions

- 22"H x 23"W x 18"D

Construction Materials

- Material: Aluminum (lightweight, corrosion-resistant)
- Paint: GR-487 tested & certified power coat

Door/Side Panel Construction

- Doors: Front door with door alarm and optional air conditioner, heat exchanger, or thermoelectric cooler
- Latches: Two-point latched, pad lockable
- Rear hatch or door option available

Equipment Mounting

- 12RU 19" rails, front to back adjustable

Environmental Options

- Heat Exchanger: Up to 39W/ °C heat exchanger, +24VDC or -48VDC
- Air Conditioner: Up to 2,000 BTU/hr air conditioner with heater
- Thermoelectric Cooler: 400W @ 0°dT, +24VDC, -48VDC, or 120VAC

Battery Pedestal

- 12"H pedestal accommodates up to 60Ahr batteries
 - 13"H pedestal accommodates up to 92Ahr batteries
- * 65 dBA at five (5) feet (according to the Purcell Systems)

Cable Entry

- (3) ½"; (3) 1"; (1) 2"; (2) 3 ½" or 2" knockouts

AC Power Options

- 30A-main power with optional Surge Suppression Device; 15A generator connection cable
- 6-position 19" rack-mounted (1RU) or 12-position (2U) AC load centers available in various configurations- can be equipped with surge protection devices (120V or 240V configurations). Optional DIN-mounted SPD
- 15A GFCI dual outlet receptacle convenience outlet

Mounting Options

- 4" plinth
- 14" plinth
- Pole mount kits
- Wall mount kits
- Vertical cabinet-on-cabinet stacking (up to 3 cabinets high; 150lbs per cabinet with installed equipment)

Warranty

- 5 years enclosure/1 year thermal system



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FLX12WS-2012-03-02

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Appendix C-2



OSP00743N
AT&T 48V Fusion Power and Battery Cabinet
Acoustical Noise Emission Test
TR00002174A - Design Verification / Validation Test Plan Details

Test Requirements:

Per GR-487-CORE Issue 3 of April 2009 - Generic Requirements for Electronic Equipment Cabinets, Paragraph R3-222 – Acoustical Noise Emission Test:

R3-222 [157] Cabinets equipped with telecommunications equipment and associated cooling fans shall suppress acoustical noise to a level of less than 65 dBA at every measurement point at a distance of 1.5 m (5 ft) from the cabinet with the doors closed during times of maximum noise generation within the cabinet. Measurements are made via sound pressure.

Table 9.1: Test Result for Sample P1.1 – PASSED

**AT&T 48V Fusion Power and Battery Cabinet
OSP743N Sample P1.1
Final Data**

	Measurement 1 (LASmax)	Measurement 2 (LASmax)
Amb	23.9	23.7
0°	64.6	64.7
45°	63.8	64.0
90°	58.4	58.6
135°	55.6	55.6
180°	56.9	56.8
225°	59.5	59.2
270°	58.7	58.7
315°	64.5	64.5

- Internal Fans - 3250 rpm
- External Fans - 4250 rpm
- Battery Fan - Full Speed
- Rectifiers and Converters - Full Speed



Figure 9.1a: Acoustic Test at 0°