Environmental Noise Assessment

South Petaluma Verizon Cellular Facility

Petaluma, California

BAC Job # 2019-040

Prepared For:

Complete Wireless Consulting

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February 27, 2019

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Acoustical Consultants

Introduction

The South Petaluma Verizon Wireless Unmanned Telecommunications Facility Project (project) proposes the construction of antennas with associated equipment, and the installation of outdoor equipment cabinets on the rooftop of an existing building located at 611 Western Avenue in Petaluma, California. The outdoor equipment cabinets have been identified as primary noise sources associated with the project. Please see Figure 1 for the project overall site plan. The studied site design is dated January 8, 2019.

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 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 Petaluma Implementing Zoning Ordinance

Chapter 21 of the City of Petaluma Implementing Zoning Ordinance provides performance standards for stationary noise sources, such as those proposed by the project. Section 21.040 of the Implementing Zoning Ordinance has been reproduced and is summarized below in Table 1.

Table 1
Maximum Exterior Noise Exposure (L_{eq}, dBA)
City of Petaluma Implementing Zoning Ordinance

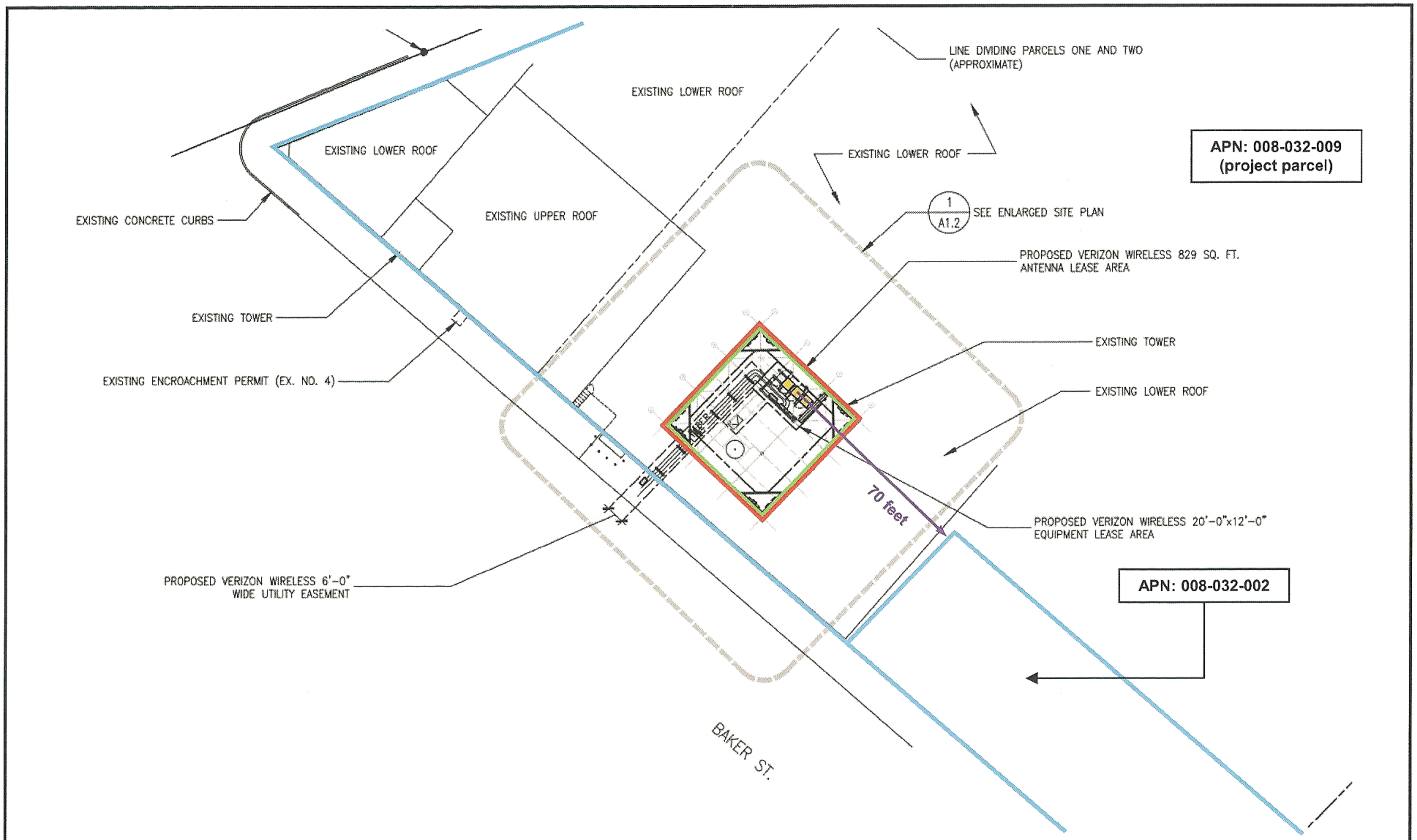
	Noise Level, L_{eq} (dBA)	
	Nighttime[1]	Daytime[2]
General Plan Ambient	60	60
Cumulative period of 15 min or more in an hour	65	70
Cumulative period of 5 min or more in an hour	70	75
Cumulative period of 1 min or more in an hour	75	80

Notes:

1 Nighttime hours considered to be 10 p.m. to 7 a.m. on M-F and 10 p.m. to 8 a.m. on S, S and Holidays.

2 Daytime hours considered to be 7 a.m. to 10 p.m. on M-F and 8 a.m. to 10 p.m. on S, S and Holidays.

Source: City of Petaluma Implementing Zoning Ordinance: Chapter 21, Performance Standards (Table 21.1)



Legend

- Parcel Boundaries
- Proposed Rooftop Cellular Equipment Lease Area
- Proposed 11-Foot Tall Solid Screen Wall
- Proposed Outdoor Equipment Cabinets

N

Scale (Feet)

0 25 50

South Petaluma Verizon Cellular Facility

Petaluma, California

Project Overall Site Plan

Figure 1

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Project Noise Generation

The project proposes the installation of three outdoor equipment cabinets within the proposed rooftop facility lease area illustrated on Figure 1. Based on the project equipment layout plan, the cabinets proposed for the project include two (2) Charles Industries 48V Power Plants and one (1) miscellaneous cabinet cooled by a McLean Model T-20 air conditioner. The cabinets and their respective reference noise levels are provided in Table 2. The manufacturer's noise level data specification sheets for the proposed equipment cabinets are provided as Appendix C.

Table 2
Reference Noise Level Data of Proposed Equipment Cabinets

Equipment	Number of Cabinets	Reference Noise Level, dB	Reference Distance, feet
Charles Industries 48V Power Plant	2	60	5
McLean T-20	1	66	5

Note: Manufacturer specification sheets provided as Appendix C.

Predicted Facility Noise Levels at Nearest Property Line

As indicated in Figure 1, the project equipment lease area maintains a separation of approximately 70 feet from the property line of the nearest parcel, APN: 008-032-002. Assuming standard spherical spreading loss (-6 dB per doubling of distance), project-equipment noise exposure at the nearest property line was calculated and the results of those calculations are presented in Table 3.

The predicted equipment noise levels presented in Table 3 take into consideration the shielding that would be provided by the proposed 11-foot tall screen wall along the perimeter of the rooftop equipment lease area. Figure 1 shows the location of the proposed screen wall. Based on the project site plans, the 11-foot tall screen wall would completely screen the equipment cabinets from view of the ground level property line. To account for this screening, predicted equipment cabinet noise levels have been conservatively adjusted by -10 dB. Additionally, the results presented in Table 3 also take into consideration the distance between the elevated equipment and the ground level property line of APN: 008-032-002, and have been conservatively adjusted by -5 dB.

Table 3
Project-Related Noise Exposure at Nearest Property Line
South Petaluma Verizon Wireless Telecommunications Facility Project

APN[1]	Distance from Cellular Equipment, feet[2]	Predicted Equipment Cabinet Noise Level, L_{eq} (dBA)[3,4,5]
008-032-002	70	30

Notes:

1 Property boundary is shown on Figure 1.

2 Distance was scaled from the project equipment to the property line of APN: 008-032-002 using the provided site plans.

3 Predicted equipment noise levels take into consideration the shielding provided by solid 11-foot tall screen wall around the perimeter of the rooftop equipment lease area, and have been conservatively adjusted by -10 dB.

4 Predicted equipment noise levels take into consideration the distance between the elevated equipment and ground level property line of APN: 008-032-002, and have been conservatively adjusted by -5 dB.

5 Project equipment was assumed to be in operation for the duration of an hour during nighttime hours.

The three equipment cabinets were conservatively assumed to be in operation concurrently for the duration of an hour during nighttime hours. According to the City of Petaluma Implementing Zoning Ordinance, the corresponding noise level standard would be 65 dB L_{eq} during nighttime hours (Table 1). As shown in Table 3, the predicted equipment cabinet noise level of 30 dB L_{eq} at the nearest property line would satisfy the applicable City of Petaluma 65 dB L_{eq} nighttime noise level standard by a wide margin. As a result, no additional noise mitigation measures would be warranted for the project.

Conclusions

Based on the equipment noise level data and analyses presented above, project-related equipment noise exposure is expected to satisfy the applicable City of Petaluma noise exposure limits at the nearest property line. As a result, no additional noise mitigation measures would be warranted for this project.

This concludes our environmental noise assessment for the proposed South Petaluma Verizon Cellular Facility in Petaluma, California. Please contact BAC at (916) 663-0500 or dariog@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.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax 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.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

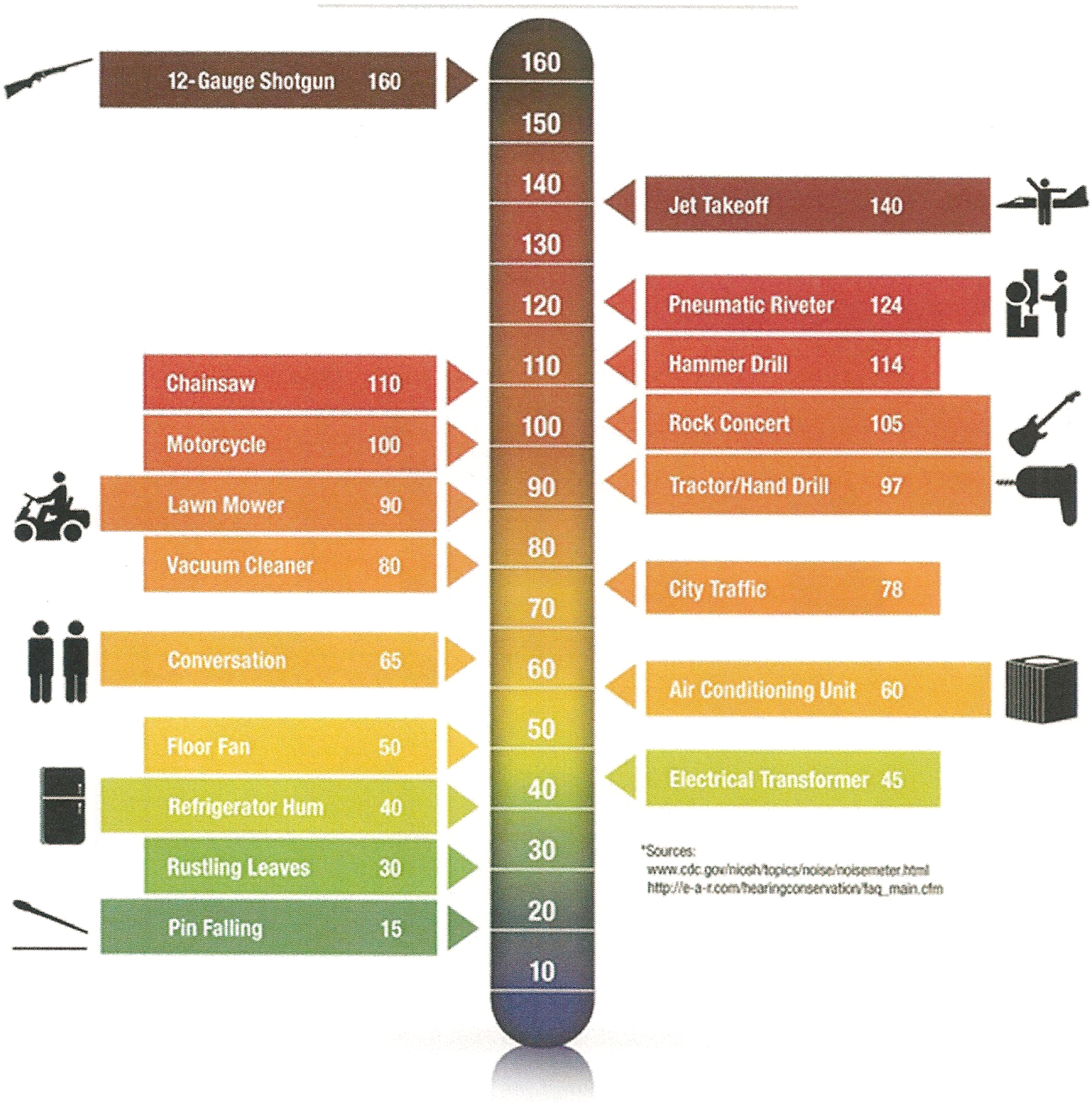
SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

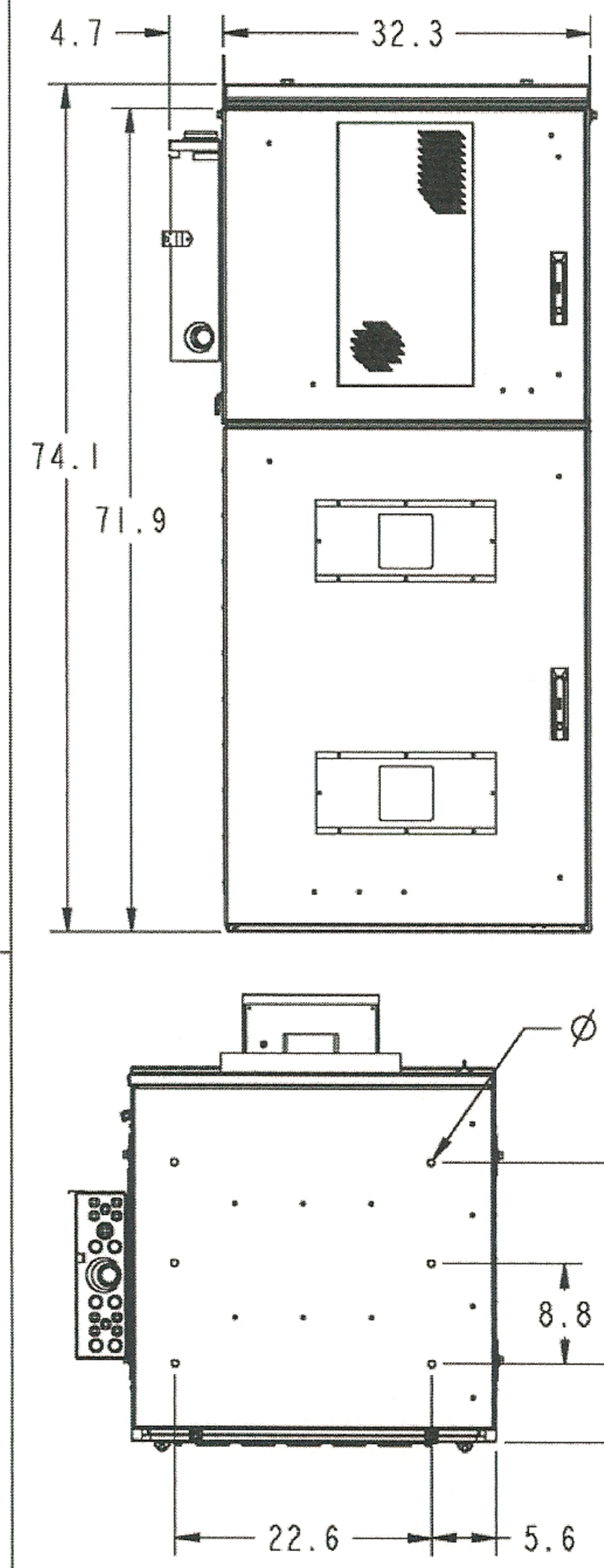
Appendix B

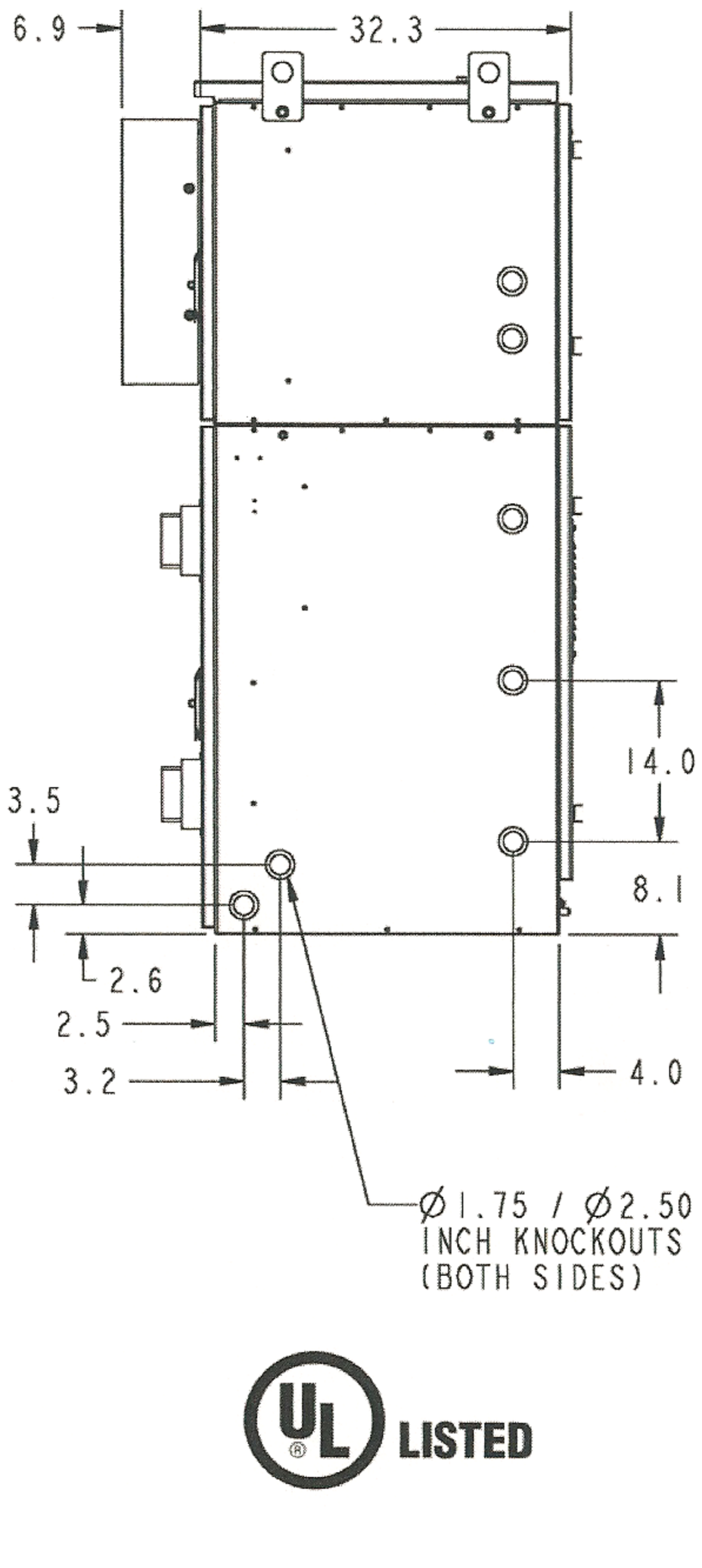
Typical A-Weighted Sound Levels of Common Noise Sources



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

Appendix C-1





UL LISTED

WEIGHT WITH BATTERIES:
2296 LBS.

NorthStar NSB-170FT batteries at 128 lbs each, Qty 12

WEIGHT WITHOUT BATTERIES:
760 LBS.

MAX NOISE LEVEL:
55-60dB

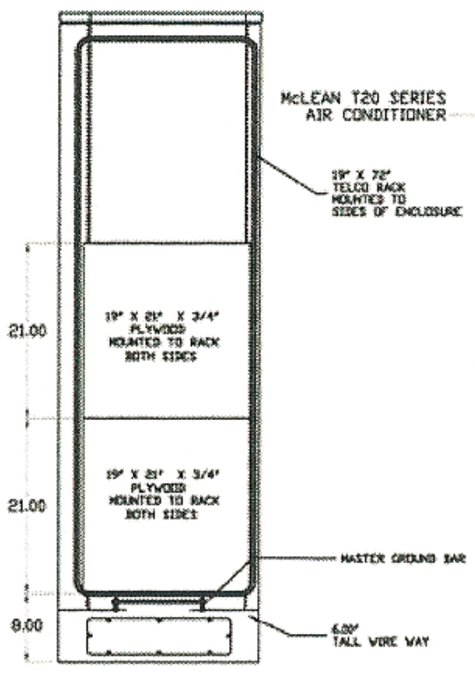
CHARLES PART #
CUBE-SS4C215XC1

Charles Industries Ltd.
Telecommunications Group
Charles Center, 5600 Apollo Drive
Rolling Meadows, IL 60008
Telephone: 847-806-6300

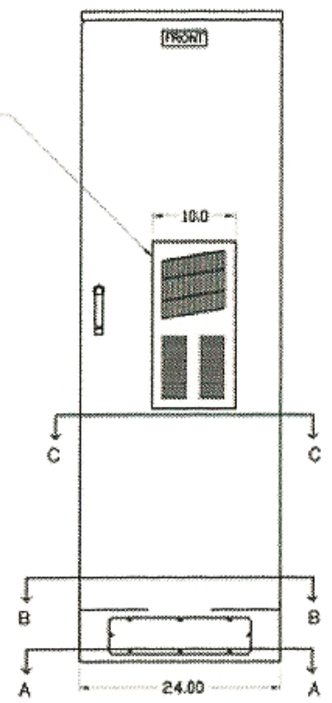
Verizon Wireless
Large Site Support Enclosure

Appendix C-2

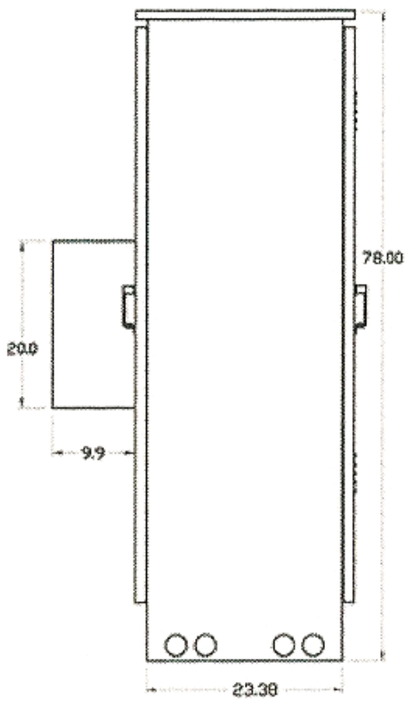
REV.	DESCRIPTION	DATE	APPROVED
000	INITIAL RELEASE	06/09/2011	J.S.
	A.C. DETAILS ADDED TO NOTES	05/01/2014	J.S.



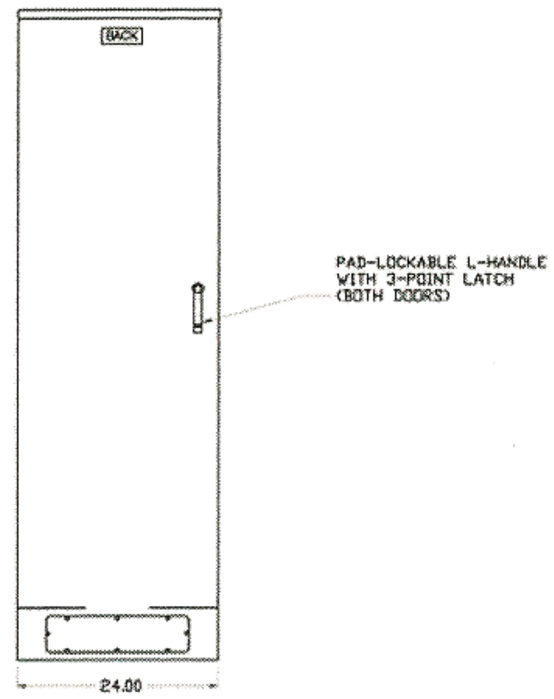
AXT2106-D ENCLOSURE
DOOR REMOVED



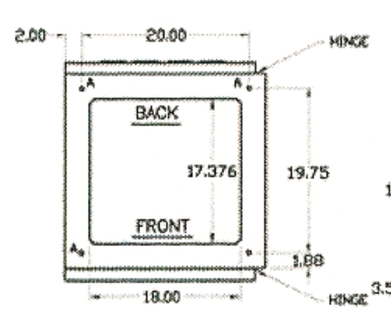
FRONT VIEW



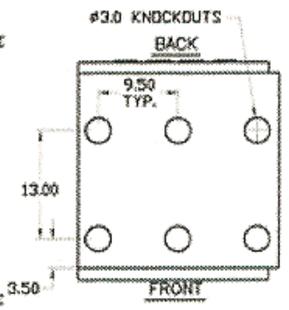
LEFT SIDE VIEW



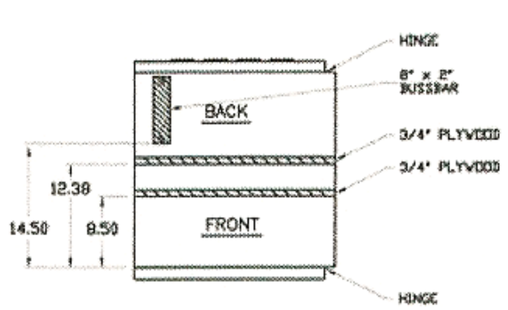
BACK VIEW



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:
1. PRODUCT SPECIFICATIONS SUBJECT TO CHANGE
2. ENCLOSURE IS TYPE 3R, RAINPROOF
3. ENCLOSURE IS ALUMINUM, WELDED CONSTRUCTION WITH POWDER COATED FINISH
4. WEIGHT ≈ 300-lb
5. AIR CONDITIONER MODEL: McCLEAN #T200216G150 , NOISE LEVEL AT A DISTANCE OF 1.5M = 66 dB (A)

APPLICATION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ±0.5° BEND ± 2°
.XXX ± 0.007
.XX ± 0.03
.X ± 0.1
THIRD ANGLE PROJECTION
MATERIAL
FINISH

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	J.GESSELE	
CHECKED		
ENG APPR.	J.GESSELE	
MFG APPR.		
Q.A.		

COMMENTS:

pantrol
800-261-3505 www.pantrol.com

TITLE: AXT WITH T20

SIZE	DWG. NO.	REV
B	T1134689AD2P000	000

SCALE: - SHEET 1 OF 1