Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003
805 644 4455 OFFICE AND FAX
info@rinconconsultants.com
www.rinconconsultants.com

January 22, 2021
Project No: 19-08526

Attachment 11

Goleta Energy Storage, LLC
c/o: Peter Ledig, Principal
8614 Westwood Center Drive, Suite 1800
Vienna, Virginia 22182

Subject: Noise Memorandum Update for the Cortona Drive Battery Energy Storage Facility Project, 6864 and 6868 Cortona Drive, Goleta, California

Dear Mr. Ledig:

The Cortona Drive Energy Storage Facility Project (herein referred to as "proposed project" or "project") includes installation of a battery energy storage system (BESS) consisting of Megapacks (self-contained energy storage and management cabinets), medium-voltage transformers, inverters, and a high-voltage generator step-up transformer to connect with the underground utility conduit on the west side of Storke Road. The project site consists of an approximately 2.66-acre site at 6864 and 6868 Cortona Drive in Goleta, located adjacent to Storke Road and the Union Pacific Railroad tracks and approximately 300 feet south of U.S. Highway 101 (U.S. 101) (see Figure 1 for the regional project location and Figure 2 for the project site location).

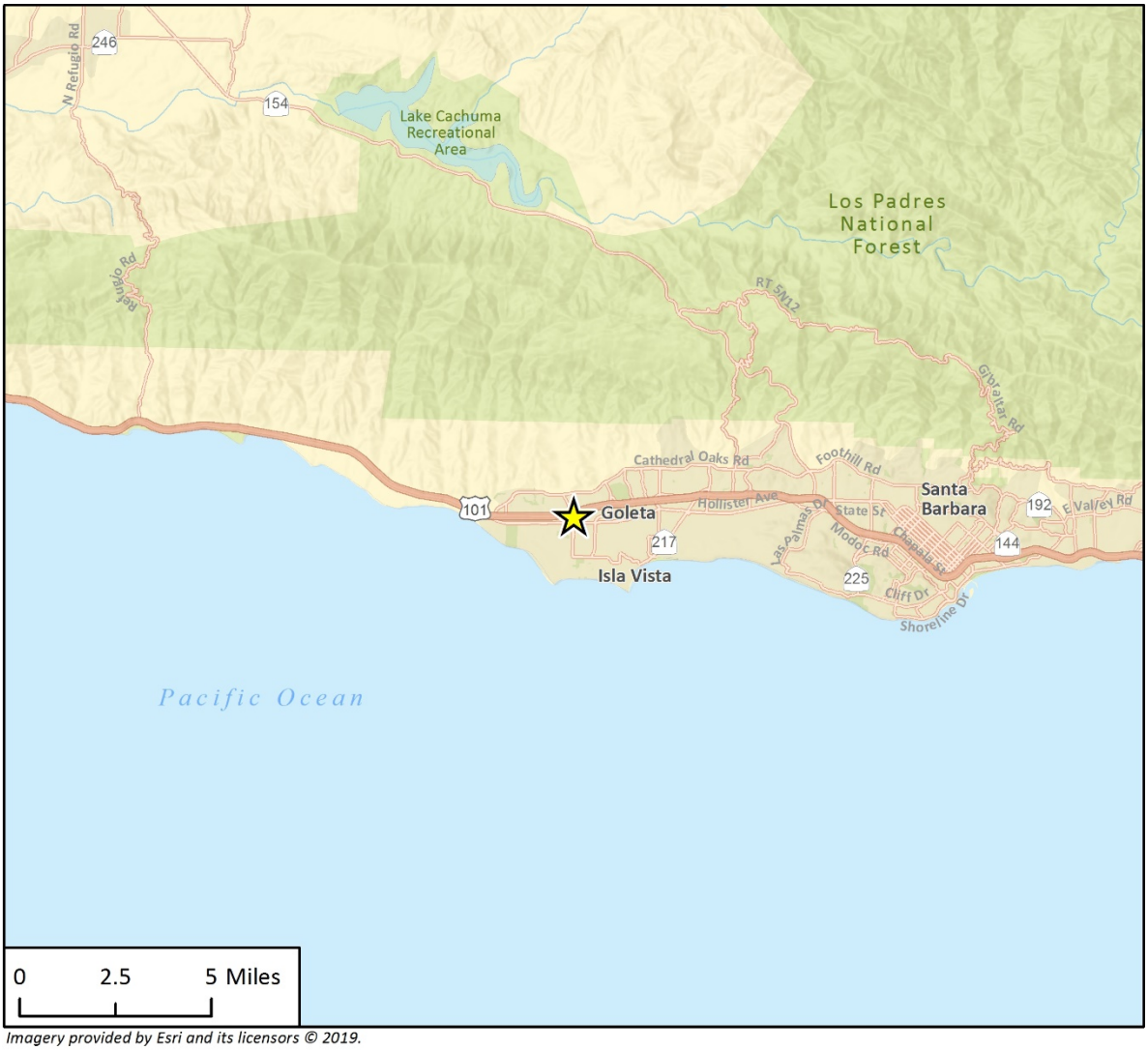
In September 2020, Rincon prepared a Noise Memorandum (herein referred to as "Original Noise Memorandum") to analyze potential noise impacts for the project. As discussed in the Original Noise Memorandum, the project would comply with the City of Goleta's (City) noise performance standards as defined in Section 17.39.070 of the Goleta Municipal Code (GMC) and would not result in a substantial increase in noise levels at any surrounding properties. Nonetheless, to address a concern that noise generated by the fan sets associated with the Tesla Megapack cooling would be distinctive in tone and therefore be noticeable to future residents of the Cortona Apartments, a contingency plan which established a procedure for evaluation of noise complaints and noise abatement through erection of a sound barrier was developed.

Rincon Consultants has prepared this Noise Memorandum Update to review the revised site plans dated January 14, 2021 (Attachment 1), update estimated receiver noise levels and noise contour figures, and to evaluate the potential for site plan changes to impact the conclusions of the Original Noise Memorandum. It is our understanding that the following site plan revisions have occurred:

- Amount of battery storage has been reduced from 84 Megapacks to 62 Megapacks
- Megapacks have been moved slightly farther away from the eastern and northeastern property lines
- Minor rearrangement of the equipment layout has occurred

As detailed below, the revised project design would not change the conclusions of the Original Noise Memorandum, and the project would continue to be consistent with the City's noise and land use compatibility criteria and Noise Ordinance.

Figure 1 Regional Project Location



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Project Location

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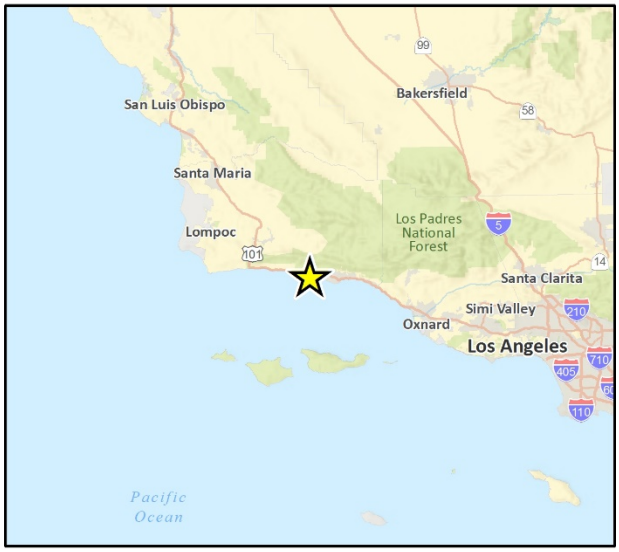

Fig 1 Regional Location

Figure 2 Project Site Location

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Fig 2 Project Location

Noise Overview

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs (e.g., the human ear). Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment.[1]

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz (Hz) and less sensitive to frequencies around and below 100 Hz.[2] Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB; similarly, dividing the energy in half would result in a decrease of 3 dB.[3]

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level." Although these terms can be easily confused, they represent two distinct characteristics of sound. Both are measured in dB. However, the sound power level, expressed as L_w, is the energy converted into sound by the sound source and is defined as the average rate at which sound energy is radiated from a sound source, measured in watts. As sound energy travels through the air, it creates a sound wave in the air that exerts pressure on receivers such as an eardrum or microphone; the amount of pressure is the sound pressure level (SPL). The L_w can be thought of as similar to the rating of a light bulb, while the SPL is similar to the amount of light produced at a given distance from the bulb. Sound measurement instruments only measure SPL, and limits used in standards are generally expressed as SPL. Noise modeling uses the L_w of equipment to calculate the SPL at a distance.

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dBA or in terms of acoustical energy. Two equivalent noise sources combined do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease; that a change of 5 dBA is readily perceptible; and that an increase (decrease) of 10 dBA sounds twice (half) as loud.[4]

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this analysis are the one-hour equivalent noise level ($L_{eq[1H]}$) and the community noise equivalent level (CNEL).

- The L_{eq} is the level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. For example, $L_{eq(1h)}$ is the equivalent noise level over a 1-hour period and is a common metric for limiting nuisance noise.

[1] Crocker, Malcolm J. (Editor). 2007. Handbook of Noise and Vibration Control Book, ISBN: 978-0-471-39599-7, Wiley-VCH, October.
[2] Kinsler, Lawrence E., Austin R. Frey, Alan B. Coppens, and James V. Sanders. 1999. Fundamentals of Acoustics, 4th Edition. ISBN 0-471-84789-5. Wiley-VCH, December 1999.
[3] Crocker, Malcolm J. (Editor). 2007. Handbook of Noise and Vibration Control Book, ISBN: 978-0-471-39599-7, Wiley-VCH, October.
[4] California Department of Transportation (Caltrans). 2013a. Technical Noise Supplement to the Traffic Noise Analysis Protocol. (CT-HWANP-RT-13-069.25.2) September. http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf (accessed August 2019).

- The CNEL is a 24-hour equivalent sound level. The CNEL calculation applies an additional 5 dBA penalty to noise occurring during evening hours (i.e., 7:00 p.m. to 10:00 p.m.) and an additional 10 dBA penalty is added to noise occurring during nighttime hours (i.e., 10:00 p.m. to 7:00 a.m.). These increases for certain times are intended to account for the added sensitivity of humans to noise during the evening and nighttime periods.

Sound from a small, localized source (approximating a "point" source) decreases or drops off at a rate of 6 dBA for each doubling of the distance from the source.

Existing Noise Setting

The BESS, transformers, inverters, and generator step-up transformer would be installed at the property located at 6864 and 6868 Cortona Drive in Goleta. To characterize ambient sound levels, two short-term measurements and a 24-hour sound level measurement were conducted at the project site. An Extech, Model 407780A, ANSI Type 2 integrating sound level meter was used to conduct the measurements. For all measurements, the meter was set on A-weighting with slow response and was placed five feet above ground level. The short-term measurements used a one-second sampling rate, and the 24-hour measurement used a three-second sampling rate. Table 1 summarizes the results of the short-term noise measurements and Table 2 summarizes the results of the long-term noise measurements. Figure 3 and Figure 4 provide more detail regarding changes in noise level during the measurement period, and summarizes the results of the long-term noise measurement. Detailed sound level measurement data are available upon request. See Figure 5 for noise measurement locations.

Table 1 Short-Term Sound Level Monitoring Results

Measurement Location		Sample Times	Approximate Distance to Primary Noise Source	dBA L_{eq}[1]
ST-1[2]	Northern boundary of the project site	10:25 – 10:40 a.m.	210 feet to centerline of Storke Road 370 feet to centerline of U.S. 101	57
ST-2[2]	Eastern boundary of the project in existing parking lot	10:49 – 11:04 a.m.	320 feet to centerline of Storke Road	57

L_{eq} = average noise level equivalent; dBA = A-weighted decibel

[1] See Figure 3 and Figure 4 for detailed noise monitoring summaries. Detailed noise monitoring data available upon request.

[2] See Figure 5 for noise measurement locations.

Table 2 Project Site Noise Monitoring Results – Long Term

Measurement Location	Sample Date	Sample Time	$L_{eq\ [1h]}$ (dBA)[1]
LT-1 Northern boundary of project site			
	September 30, 2019	11:00 a.m.	59
	September 30, 2019	12:00 p.m.	60
	September 30, 2019	1:00 p.m.	59
	September 30, 2019	2:00 p.m.	57
	September 30, 2019	3:00 p.m.	60
	September 30, 2019	4:00 p.m.	60
	September 30, 2019	5:00 p.m.	61
	September 30, 2019	6:00 p.m.	60
	September 30, 2019	7:00 p.m.	60
	September 30, 2019	8:00 p.m.	57
	September 30, 2019	9:00 p.m.	56
	September 30, 2019	10:00 p.m.	54
	September 30, 2019	11:00 p.m.	56
	October 1, 2019	12:00 a.m.	58
	October 1, 2019	1:00 a.m.	52
	October 1, 2019	2:00 a.m.	53
	October 1, 2019	3:00 a.m.	55
	October 1, 2019	4:00 a.m.	56
	October 1, 2019	5:00 a.m.	60
	October 1, 2019	6:00 a.m.	64
	October 1, 2019	7:00 a.m.	62
	October 1, 2019	8:00 a.m.	58
	October 1, 2019	9:00 a.m.	56
	October 1, 2019	10:00 a.m.	56
24-hour L_{eq}			**59**
CNEL			**65**

[1] Ambient noise levels during certain early morning and daytime hours may have been elevated by intermittent activity by pick-up trucks and a backhoe operating on the project site. However, regardless of this activity, noise generated by vehicular traffic on U.S. 101 and Storke Road was the dominant noise source.

L_{eq} = average noise level equivalent; dBA = A-weighted decibel

Detailed noise monitoring data is available upon request. See Figure 5 for noise measurement locations.

Source: Rincon Consultants, field measurements on September 30 – October 1, 2019, using ANSI Type II integrating sound level meter.

Figure 3 Noise Measurement 1

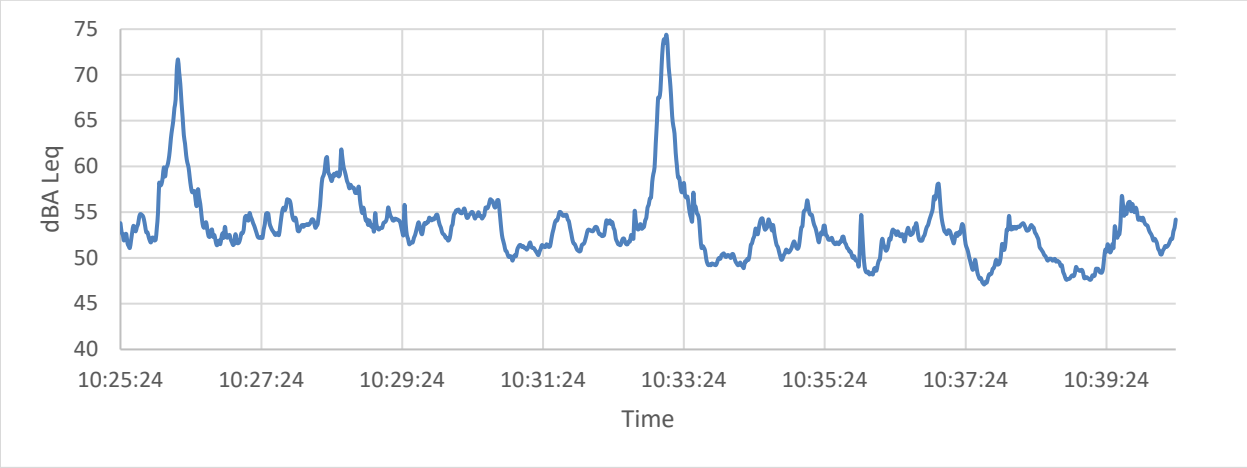

Figure 4 Noise Measurement 2

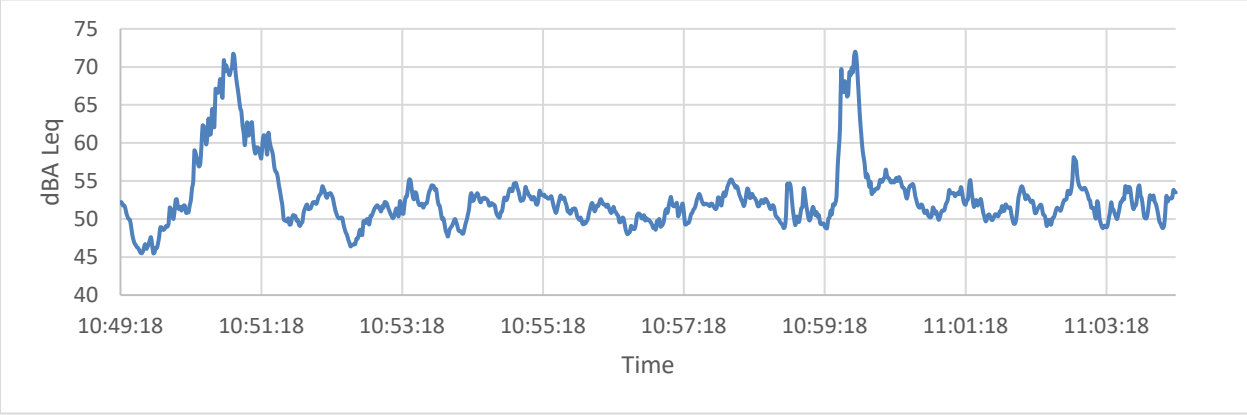

Figure 5 Noise Measurement Locations

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Surrounding Land Uses

The City of Goleta General Plan Noise Element defines noise-sensitive land uses as residential neighborhoods, schools, libraries, hospitals and rest homes, auditoriums, certain open space areas, and public assembly places. The nearest noise-sensitive land use to the project site is a planned three-story apartment building in the Cortona Apartment complex that is being constructed on the property adjacent to the project site's northern boundary. While additional noise-sensitive receivers are located in the residential neighborhood located approximately 175 feet west of the project site across Storke Road, the intervening topography (i.e., a berm) would block the line-of-sight between this neighborhood and the project site, thereby substantially reducing project-related noise levels at these residences. All other surrounding properties are commercial in nature.

City of Goleta General Plan Noise Element

The following standards of the City of Goleta General Plan Noise Element would be applicable to the proposed project[5]:

NE 1.1 **Land Use Compatibility Standards.** The City shall use the standards and criteria of Table 9-2 (reproduced herein as Table 3) to establish compatibility of land use and noise exposure. The City shall require appropriate mitigation, if feasible, or prohibit development that would subject proposed or existing land uses to noise levels that exceed acceptable levels as indicated in this table. Proposals for new development that would cause standards to be exceeded shall only be approved if the project would provide a substantial benefit to the City (including but not limited to provision of affordable housing units or as part of a redevelopment project), and if adequate mitigation measures are employed to reduce interior noise levels to acceptable levels.

NE 1.3 **Noise Buffers.** When feasible, the City should require an open space or other noise buffer between new projects that are a source of noise and nearby sensitive receptors. The nature and extent of the noise buffer shall be determined based upon site-specific conditions.

NE 1.4 **Acoustical Studies.** An acoustical study that includes field measurement of noise levels may be required for any proposed project that would: a) locate a potentially intrusive noise source near an existing sensitive receptor, or b) locate a noise-sensitive land use near an existing known or potentially intrusive noise source such as a freeway, arterial roadway, railroad, industrial facility, or airport traffic pattern. Acoustical studies should identify noise sources, magnitudes, and potential noise mitigation measures and describe existing and future noise exposure. The acoustical study shall be funded by the applicant and conducted by a qualified person or firm that is experienced in the fields of environmental noise assessment and architectural acoustics. The determination of applicability of this requirement shall be made by the Planning and Environmental Services Department by applying the standards and criteria of Table 9-2 (reproduced herein as Table 3).

[5] Goleta, City of. 2006. Goleta General Plan/Coastal Land Use Plan Noise Element. Last amended September 2006. https://www.cityofgoleta.org/home/showdocument?id=577 (accessed October 2019).

Table 3 Noise and Land Use Compatibility Criteria

Land Use	Community Noise Exposure (Ldn or CNEL, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential – Low Density	50 – 60	60 – 65	65 – 75	75 – 85+
Residential – Multiple Family	50 – 60	60 – 65	65 – 75	75 – 85+
Transient Lodging – Motels and Hotels	50 – 65	65 – 70	70 – 80	80 – 85+
Schools, Libraries, Churches, Hospitals, and Nursing Homes	50 – 60	60 – 65	65 – 80	80 – 85+
Auditoriums, Concert Halls, and Amphitheaters	n/a	50 – 65	n/a	65 – 85+
Sports Arenas and Outdoor Spectator Sports	n/a	50 – 70	n/a	70 – 85+
Playgrounds and Neighborhood Parks	50 – 70	n/a	70 – 75	75 – 85+
Golf Courses, Riding Stables, Water Recreation, and Cemeteries	50 – 70	n/a	70 – 80	80 – 85+
Office Buildings, Business, Commercial, and Professional	50 – 67.5	67.5 – 75	75 – 85+	n/a
Industrial, Manufacturing, Utilities, and Agriculture	50 – 70	70 – 75	75 – 85+	n/a

n/a = not applicable

[1] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

[2] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

[3] Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements shall be made and needed noise insulation features shall be included in the design.

[4] Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Goleta, City of. 2006. Goleta General Plan/Coastal Land Use Plan Noise Element. Last amended September 2006.

NE 5.1 **New, Expanded, or Upgraded Stationary Noise Sources.** The City shall require proposals for new stationary sources or expansions or alterations of use for an existing stationary source to include appropriate noise mitigation measures. Retrofits and facility upgrades under the permitting jurisdiction of the City should ensure that noise levels are reduced, particularly for sources that impact adjacent sensitive receivers.

NE 5.2 **Equipment Maintenance.** The City shall require that new and existing heating, ventilation, and air conditioning equipment and other commercial/industrial equipment be adequately maintained in proper working order so that noise levels emitted by such equipment remain minimal. The City shall also require noise shielding or insulation for such equipment if operation of the equipment results in objectionable noise levels at adjacent properties.

NE 5.4 **Noise Barriers for Industrial/Commercial Sources.** Absorptive types of noise barriers or walls should be used to reduce noise levels generated by industrial and certain heavy commercial uses. To be considered effective, the noise barrier should provide at least a 5-dBA CNEL noise reduction.

NE 7.1 **Control of Noise.** The City shall require that primary emphasis on the control of noise be accomplished at the source by reducing the intensity of the noise generated or through appropriate placement of noisy components of a project or use. Secondary emphasis should be through site design of receiver sites and noise attenuation and insulation measures.

NE 7.2 **Site Design Techniques.** The City encourages the inclusion of site-design techniques for new construction that will minimize noise exposure impacts. These techniques shall include building placement, landscaped setbacks, and siting of more noise-tolerant components (parking, utility areas, and maintenance facilities) between noise sources and sensitive receptor areas.

City of Goleta Municipal Code

Title 9 Public Peace and Welfare

The City's Noise Ordinance is codified as Section 9.09 of the GMC. GMC Section 9.09.020 states:

A. It shall be unlawful to make, assist in making, permit, continue, create, or cause to be made, any loud and unreasonable noise, music, percussion or other sound which is broadcast outside of any residence or building by means of any amplified musical instrument, drum, or similar device, or by means of any radio, loudspeaker, sound amplifier or phonograph, or by means of or employing any similar device which amplifies and produces, reproduces or broadcasts sound, during any of the following periods of time:

   1. The night and following morning of any Sunday, Monday, Tuesday, Wednesday, or Thursday between the hours of 10:00 p.m. of such day and 7:00 a.m. the following morning; or
   2. The morning hours after midnight of any Friday or Saturday, between 12:00 midnight, following such day, and 7:00 a.m. the following morning.

B. Within such time periods, and for the purposes of this chapter, a loud and unreasonable sound shall include any sound created by means prohibited above which is clearly discernable at a distance of 100 feet from the property line of the property upon which it is broadcast or which is at any level of sound in excess of 60 decibels at the edge of the property line of the property upon which the sound is broadcast, as such sound would be measured on a sound measuring instrument meeting American National Standard Institute's Standard SI.4-1971 (or more recent revision thereof) for Type 1 or Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which provide equivalent data, or inside of a neighboring residence.

Section 9.0.020 does not appear to apply directly to the project as it does not include a public address system, or "any amplified musical instrument, drum, or similar device, or… any radio, loudspeaker, sound amplifier or phonograph, or… any similar device which amplifies and produces, reproduces or broadcasts sound" as the only noise sources associated with the project are mechanical equipment,

including transformers, inverters, and associated cooling fans. Therefore, Section 9.09.020 is not further considered in the assessment of the proposed project noise impacts.

Title 17 Zoning

The City's Noise Performance Standards are codified as Section 17.39 of the GMC. Section 17.39.070 of the GMC sets noise performance standards, i.e., noise level limits, for various land uses throughout the city. Section 17.39.070(A) specifies noise and land use compatibility criteria (see Table 4) which apply to all new development and conditions of approval may be imposed to minimize or eliminate incompatibilities. Section 17.39.070(A)1, states that "proposals for new development that would cause standards to exceed the Normally Acceptable noise exposure for any use may only be approved if the project would provide a substantial benefit to the City." Section 17.39.070(A)2, states that "these compatibility criteria also may justify denial of an application if a proposed use or adjacent use would be exposed to Clearly Unacceptable noise exposure," as defined in the Table 4.

Table 4 Noise and Land Use Compatibility Criteria

Land Use	Community Noise Exposure (Ldn or CNEL, dBA)			
	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Residential – Low Density	50 – 60	60 – 65	65 – 75	75 +
Residential – Multiple Family	50 – 60	60 – 65	65 – 75	75 +
Transient Lodging – Motels and Hotels	50 – 65	65 – 70	70 – 80	80 +
Schools, Libraries, Churches, Hospitals, and Nursing Homes	50 – 60	60 – 65	65 – 80	80 +
Auditoriums, Concert Halls, and Amphitheaters	n/a	50 – 65	n/a	65 +
Sports Arenas and Outdoor Spectator Sports	n/a	50 – 70	n/a	70 +
Playgrounds and Neighborhood Parks	50 – 70	n/a	70 – 75	75 +
Golf Courses, Riding Stables, Water Recreation, and Cemeteries	50 – 70	n/a	70 – 80	80 +
Office Buildings, Business, Commercial, and Professional	50 – 67.5	67.5 – 75	75 – 85+	n/a
Industrial, Manufacturing, Utilities, and Agriculture	50 – 70	70 – 75	75 – 85+	n/a

n/a = not applicable

[1] Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

[2] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.

[3] Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements shall be made and needed noise insulation features shall be included in the design.

[4] Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Goleta, City of. 2020. Goleta Municipal Code, Section 17.39.070, Noise. Last amended June 2020.

Section 17.39.070(B) states that "the maximum Normally Unacceptable or Clearly Unacceptable noise levels of [Table 4], may be adjusted according to the following provisions. No more than one increase in the maximum permissible noise level will be applied to the noise generated on each property.

1. **Nuisance Noise.** If a noise contains a steady audible tone (i.e., hum or buzz), rises or falls in pitch or volume (i.e., whine or screech), or is a repetitive noise (i.e., hammering or riveting) or contains music or speech conveying informational content, the maximum noise levels will be reduced by five dBA."

Section 17.39.070(C) through Section 17.39.070(G) deal with short term noise sources, requirements of acoustical reports, noise attenuation measures, exemptions, and construction noise, which are not the subject of this report. A copy of Section 17.39.070 is included as Attachment 2.

City of Goleta Environmental Thresholds and Guidelines Manual

The City has adopted local Guidelines for the implementation of the California Environmental Quality Act (CEQA) which interpret the General Plan policies and Municipal Code for assessments required under CEQA. According to the City's 2002 *Environmental Thresholds and Guidelines Manual,* impacts would be significant under CEQA if the proposed project would:

- Generate noise levels in excess of 65 dBA CNEL and could affect sensitive receptors.
- Expose outdoor living areas to noise levels in excess of 65 dBA CNEL and/or exposure to interior noise levels in excess of 45 dBA CNEL.
- Substantially increase in ambient noise levels for noise-sensitive receptors in adjoining areas. This is generally presumed to be an increase to 65 dBA CNEL or more; or a substantial increase in ambient noise levels for noise-sensitive receptors that is less than 65 dBA CNEL, as determined on a case-by-case basis.
- Noise from grading and construction activity proposed within 1,600 feet of sensitive receptors, including schools, residential development, commercial lodging facilities, hospitals, or care facilities that exceeds 65 dBA CNEL.

Impact Analysis

Methodology

Noise levels from the proposed project were modeled using SoundPlan, version 8.2, a three-dimensional noise modeling software program. Propagation of modeled stationary noise sources is based on International Organization for Standardization (ISO) Standard 9613-2, "Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation." The ISO Standard 9613-2 assumes all receivers would be downwind of stationary sources. This is a worst-case assumption for total noise impacts because in reality, only some receivers will be downwind at any one time. This analysis does not account for topographical features that would provide noise attenuation (i.e., the berm immediately adjacent to the project site's western boundary) and therefore provides a conservative estimate of noise impacts.

Receivers

Based on the requirements of the City noise performance standards and noise ordinance, receivers were modeled at the project property lines and at the future location of the first, second, and third floor balconies of buildings within the Cortona Apartments to determine if the project would result in exposure of these receivers to noise levels in excess of City standards.

Receivers 1 through 6 represent the project property lines and are modeled at a height of 5 feet above ground level. Receivers associated with the Cortona Apartments, Receivers 7 through 11, were modeled at heights of 5, 16, and 27 feet above ground level, for the first, second, and third floors, respectively. Based on a review of the Environmental Impact Report (EIR) for the Cortona Apartments Project and EIR Addendum, the closest buildings in the Cortona Apartments the project site will be Building 6 (Receivers 9, 10, and 11) and Building 7 (Receivers 7 and 8).

Based on the 24-hour measurement, Table 2 ground level receivers at the project property lines are exposed to an ambient noise level of 65 CNEL. According to the review of the EIR, Building 6 is exposed to 69 CNEL at the upper floors due to noise generated by U.S. 101 and the United Pacific Railroad (UPRR) line. As described in its CEQA documentation, the Cortona Apartments Project included an 8-foot-high wall along the Cortona Apartments property line with the UPRR that would reduce ground-level noise levels to 66 CNEL at Building 6. Additional mitigation measures were included in the EIR that required the project to design and construct balcony barriers to shield the second and third floor outdoor areas and reduce future noise level to 65 CNEL. However, the noise level at the façade would remain 69 CNEL above the first floor and the project was also required to include windows and doors with higher sound transmission class rating than required by the building code at the upper floors. As Building 7 was not addressed, ambient noise levels are assumed to be similar to the project site ambient noise level of 65 CNEL at all floors for Building 7.

Noise Sources

Noise generated by the proposed Megapacks is based on the cooling fans located on top of the units. Tesla provided sound power levels for various duty cycles from two fans operating at the same time and noise data for one fan operating at 95 percent power, in accordance with the methods described in Attachment 3. The Megapacks were modeled at a height of 8.25 feet (2.52 meters) and the cooling fans were modeled sitting on top of the Megapacks at a height of 8.3 feet (2.53 meters). Based on Tesla fan operations data, the fans would only operate at 40 percent power even when operating for 60 minutes. While Tesla provided noise levels data for two cooling fans operating at the same time at 90, 80, 70, 60 and 40 percent power, respectively, the phasing of the fans is not known and it appears there is some potential reduction on sound power levels from the two fans canceling each other. Therefore, the modeling is based on the single fan reduced by 4 dBA to account for the lower power setting (78.7 dB - 4 dB =74.7 dB). Additionally, based on the Tesla data the sound power level of two fans operating at 40 percent power have an audible tonal component at 200 hertz, while this is not a pure tone, due to its dominance, the cooling fans are potentially considered to have a “hum or buzz” as defined by GMC Section 17.39.070.

In addition to the sound power levels for the cooling fans, Tesla developed several histograms of the cooling fan operations for the hottest day and the hottest 10 days of the year. Based on data developed by Tesla based on the hottest 10-days of operation, the fans would operate at a maximum of 40 percent power and often may operate at lower power settings depending on the ambient temperature. Additionally, Tesla has stated that not all fans would operate at the same time as they serve different

purposes. Of the six fans associated with each Megapack, four of the fans are used for cooling the batteries and would only operate during discharge and recharge periods, which would occur during between 12 p.m. and 12 a.m. During the initial three hours, 12 p.m. to 3 p.m., the fans would operate approximately six minutes out of the hour, between 3 p.m. and 9 p.m. the battery fans would operate for the full 60 minutes, and for the final three hours, 9 p.m. to 12 a.m., the fans would operate 47 minutes out of each hour. The other two fans are for cooling the power equipment (PE) within the Megapack and would operate at various times depending on the ambient temperature between 18 and 30 minutes. The majority of the PE fans operation occur during the daytime hours between 6 a.m. and 6 p.m. with limited operation at night between 9 p.m. and 12 a.m. Time histograms of the fan operations are provided in Attachment 4.

Noise from the proposed transformers was modeled using a noise reference level of 58.5 dBA L_{eq} at 3 feet (sound power level [Lw] of 66.5 dBA) at a height of 3 feet (0.91 meters), consistent with manufacturer specifications for WEG Three Phase Pad-Mount 3360 kVA transformers operating at a 100 percent duty cycle.[6] Noise from the proposed substation step-up transformer was modeled using the noise reference level of 80 dBA L_{eq} at 2 meters (Lw of 94.0 dBA), consistent with manufacturer specifications for the ABB step-up transformer under the "all cooling fans on" scenario (i.e., a conservative estimate) for a 100 percent duty cycle operation. The substation transformer was modeled at a height of 8 feet (2.44 meters).[7] Manufacturer specification sheets are included in Attachment 5.

Applied Standards

Based on Section 17.39.070(A)2 of the GMC, the project can be denied if it exposes adjacent land uses to Clearly Unacceptable noise levels, i.e., 75 CNEL or greater for residential land uses. There are no Clearly Unacceptable levels for commercial office and industrial land uses. Additionally, the noise level limits should be reduced by 5 dBA in the maximum Normally Unacceptable and Clearly Unacceptable level if it includes a "steady audible tone (i.e., hum or buzz), rises or falls in pitch or volume (i.e., whine or screech), or is a repetitive noise (i.e., hammering or riveting) or contains music or speech conveying informational content." Therefore, for compliance with Section 17.39.070 of the GMC, the project shall not exceed 70 CNEL at the adjacent Cortona Apartments.

For purposes of CEQA, the project cannot result in a substantial permanent increase in the ambient noise levels. To estimate changes in ambient noise levels under existing plus project conditions, project-generated noise levels were added to the existing ambient noise level measured by Noise Measurement LT-1 (Table 2)and the exterior, i.e., façade, noise levels stated in the recently certified EIR for the Cortona Apartments. For purposes of this analysis a substantial increase would be considered a 4 dBA increase as a 3 dBA increase would be barely perceivable, but a 5 dBA increase is a readily noticeable increase. Additionally, according to the City's *Environmental Thresholds and Guidelines Manual*, a substantial increase in noise levels may also be considered an impact if a project would generate noise levels in excess of 65 dBA CNEL, which could affect sensitive receptors.

[6] Reale, Nick. 2019. Senior Project Development Manager – Energy Storage, Tesla. Personal communication regarding noise specifications for WEG transformers with Garrett Lehman, Director of Development, Strata Solar. August 19, 2019.

[7] Sound pressure levels in L_{eq} were converted to Lw values assuming a directivity factor of 2 using an online calculator tool available at: http://www.sengpielaudio.com/calculator-soundpower.htm.

Project Impacts

Following the methodology and reference noise levels discussed under *Methodology*, CNEL noise levels from the proposed project operations were modeled at receiver points and are presented in Table 5. Noise levels contours at 5 feet, 16 feet, and 27 feet above ground level are provided in Figure 6, Figure 7, and Figure 8, respectively. Existing, project-generated, and existing-plus-project 24-hour noise levels at the project's property lines (Receivers R1 through R11) are summarized in Table 5.

As discussed under *Methodology*, at ground level the existing ambient noise level on the project site and at the Cortona Apartments is 65 to 66 CNEL and reaches up to 69 CNEL at the upper floors of the Cortona Apartments. These noise levels range from the City's "Conditionally Acceptable to Normally Unacceptable" range for multi-family residential land uses. Therefore, the Cortona Apartments are exposed to noise levels in excess of the normally acceptable levels as an existing condition and the project does not cause the exceedance.

As shown in Table 5, project-generated noise levels would not exceed 57 CNEL at the multi-family residential land uses to the north at any patio or balcony. The project-plus-ambient noise levels would not result in noise levels that exceed the adjusted maximum "Normally Unacceptable" or "Clearly Unacceptable" noise level of 70 CNEL at the Cortona Apartments. Additionally, the project would not result in a perceivable change, i.e., +3 dBA, in ambient noise levels at the Cortona Apartments or at existing commercial/industrial uses to the east and south.

The project would result in an approximately 7 CNEL increase at the western property line. However, the City's noise criteria are not applicable to this property line because it is the public right-of-way for Storke Road.

In addition, as shown in Figure 6, Figure 7, and Figure 8, residences west of Storke Road would be outside the project's 50 CNEL noise level contour. Therefore, similar to land uses immediately adjacent to the project site, project-related noise would not result in a measurable change in ambient noise levels at residences west of Storke Road.

In summary, although ambient noise levels at the Cortona Apartments to the north are in excess of the City's "Normally Acceptable" and "Conditionally Acceptable" noise level range of 50-65 CNEL, the project-plus-ambient noise levels would not result in noise levels that exceed the adjusted maximum "Normally Unacceptable" or "Clearly Unacceptable" noise level of 70 CNEL at the Cortona Apartments as required by Section 17.39.070 of the GMC. The project would not result in a perceivable increase in ambient noise levels at any sensitive receptor. In addition, per the City's *Environmental Thresholds and Guidelines Manual* would not generate noise levels in excess of 65 dBA CNEL at the Cortona Apartments.

Contingency Measure for Complaints

While the noise level increase would generally not be considered perceivable, and the noise levels would not exceed the appliable noise level limits, there is a potential concern that the noise generated by the fan sets associated with the Tesla Megapack cooling would be distinctive and may be noticeable to future residents of the Cortona Apartments. Therefore, this contingency measure has been developed to assist the City in identifying and addressing noise complaints at the proposed facility. If a verified complaint is filed with the City, the City shall require the project operator to initiate a noise survey, prepare a report of the primary noise sources identified during the survey, evaluate the broadband noise level and octave band data, and determine if there is an exceedance of the performance noise level limits of Section 17.39.070 or an audible tone, or set of tones. If an exceedance or audible tones are identified,

Figure 6 Project Noise Level Contours at 5 Feet

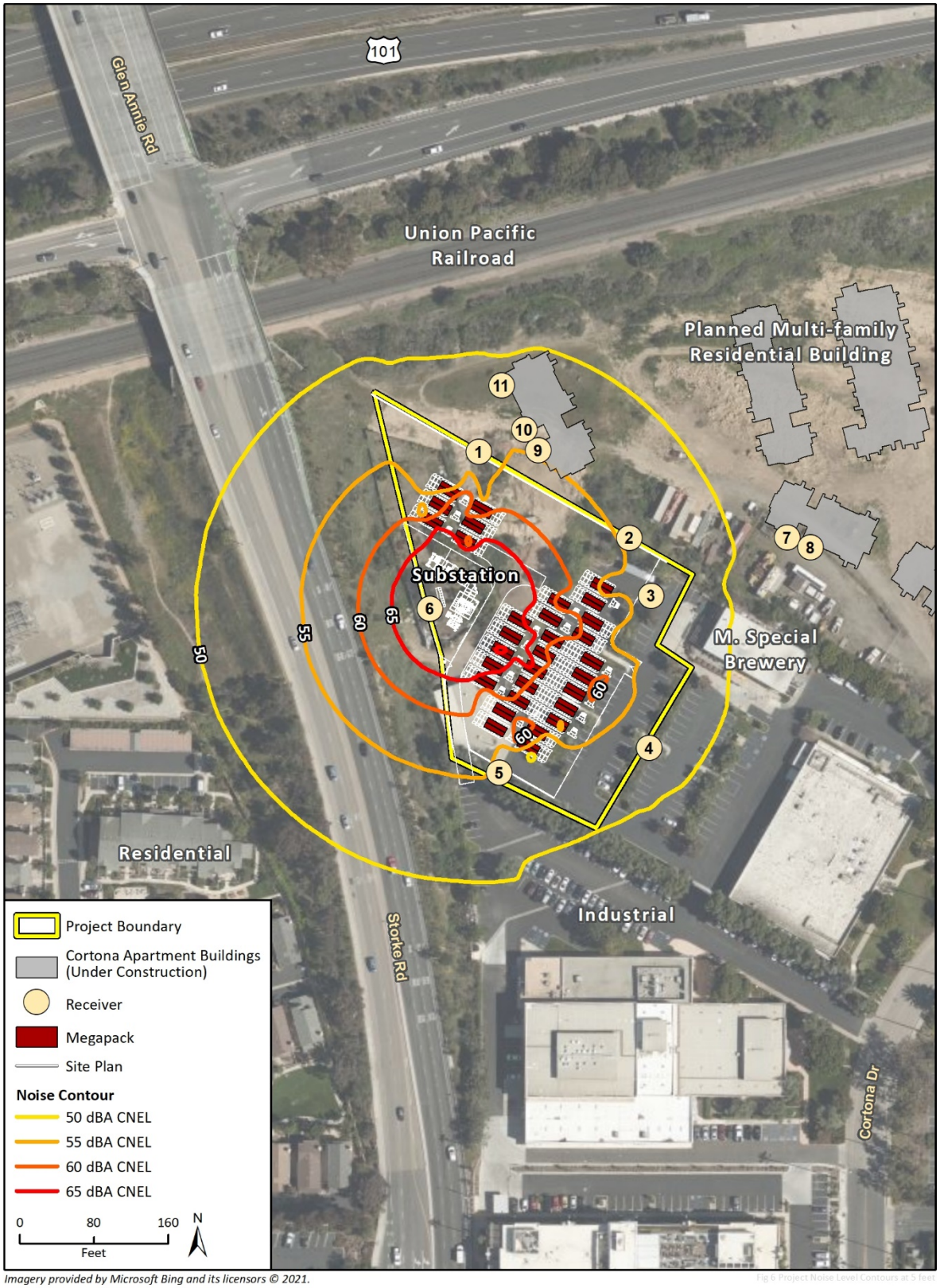

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Fig 6 Project Noise Level Contours at 5 feet

Figure 7 Project Noise Level Contours at 16 Feet

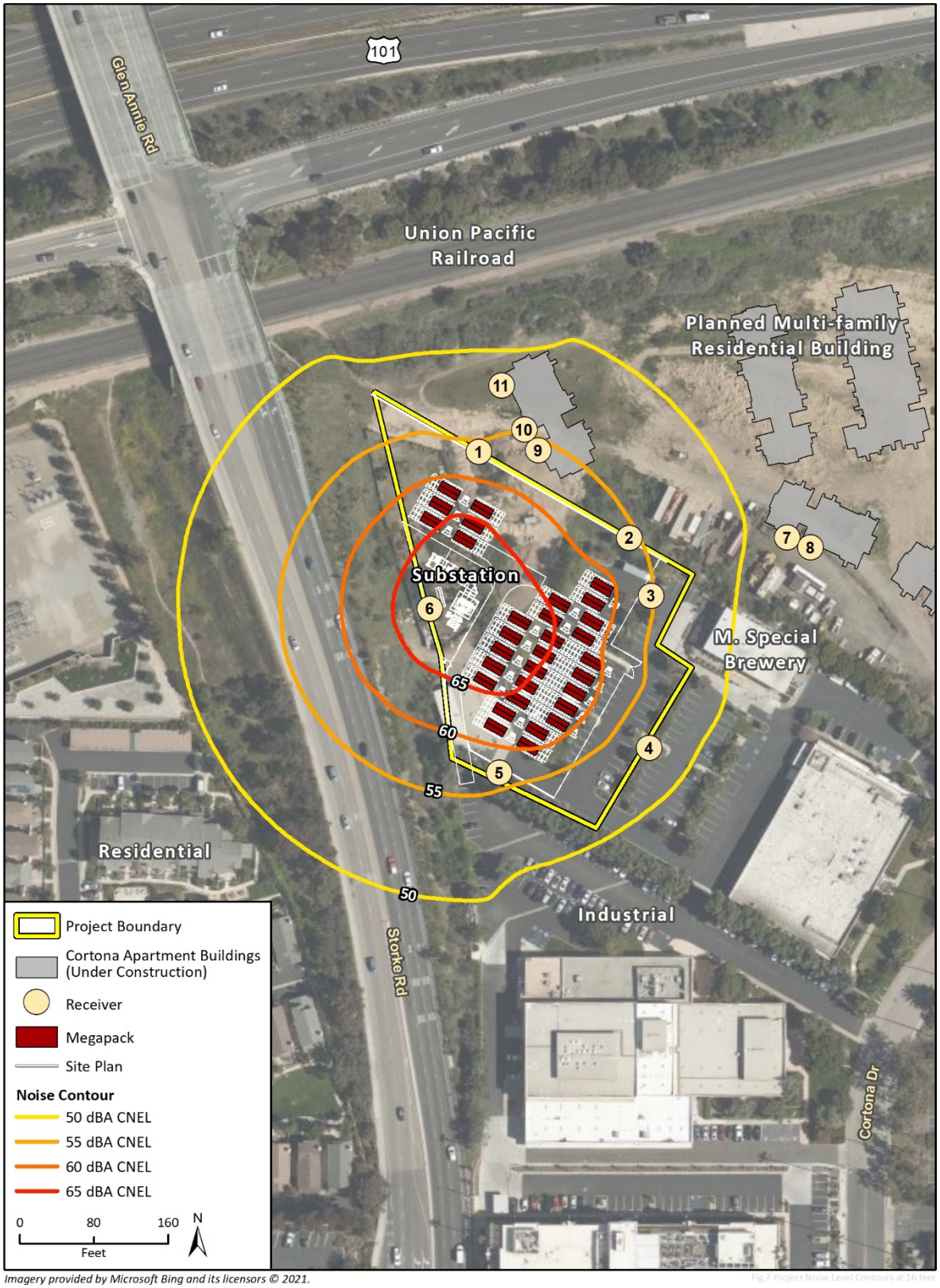

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Fig 7 Project Noise Level Contours at 16 feet

Figure 8 Project Noise Level Contours at 27 Feet

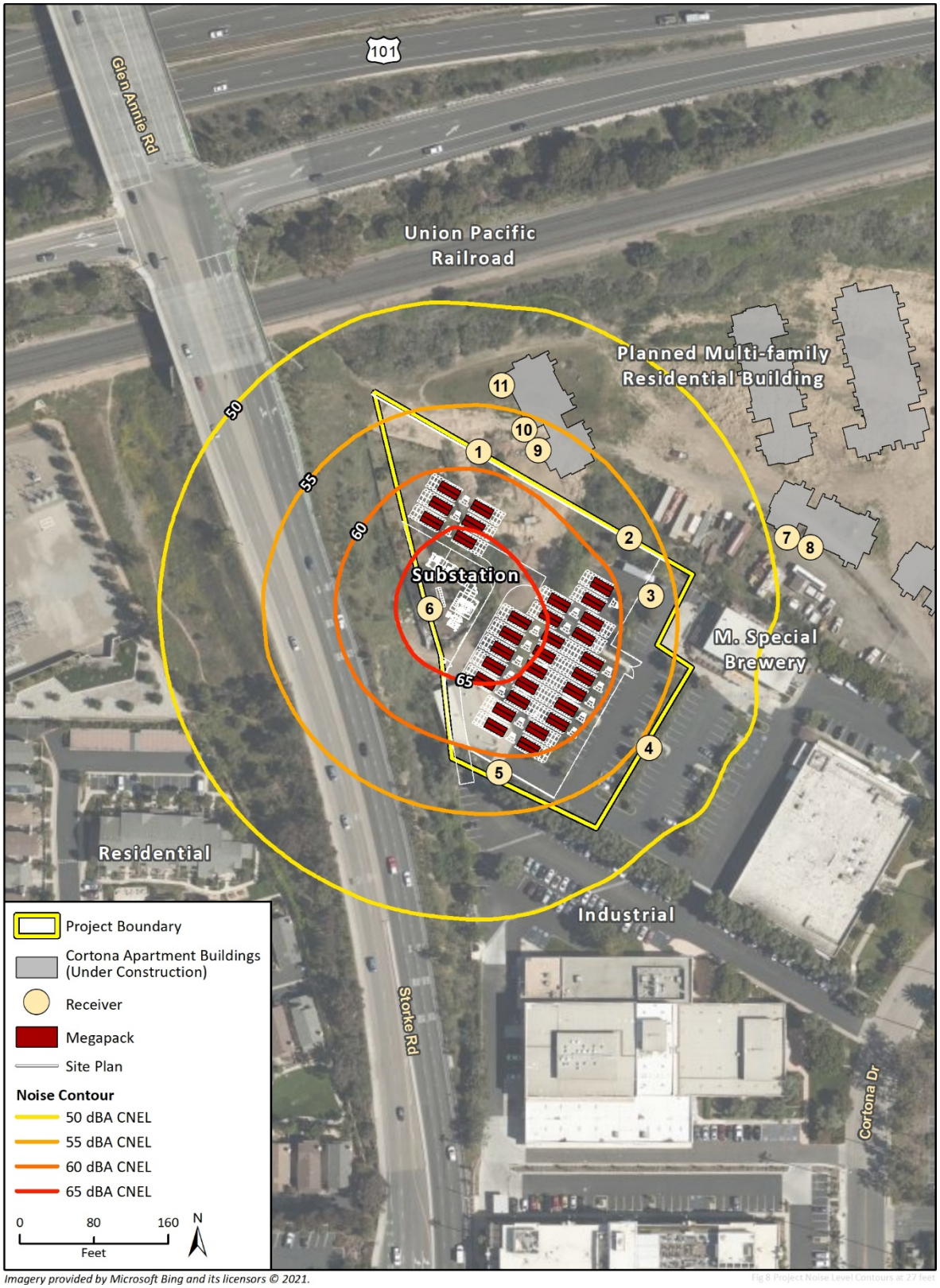

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Fig 8 Project Noise Level Contours at 27 feet

additional noise measurements will be conducted to identify the noise source of concern and develop measures to reduce noise levels. This can include, among many possible solutions, alternate fan settings, fans speeds, fan blade angle, or even passive barriers. Passive barriers can provide 5 to 15 dBA reduction depending on the height of the wall as compared to the source and the receiver. Barriers can be located at ground level and surround the site, or be located along a property line. If specific equipment is the primary source, then these barriers can be located adjacent to the equipment, or placed on the equipment, such as on top of the Tesla Megapack. The primary need is to block the line of sight from the source to the receiver and the material of the barrier must have a weight of two pounds per square foot or greater, this can include, but is not limited to 18-gauge steel sheet, 5/32 glass panels, and 5/8-inch-thick plywood. In addition, the barrier must be solid with no holes, gaps, or perforations and well-sealed to the surface to which it is attached.

Table 5 Existing Plus Project Noise Levels

	Location	Existing or Proposed Land Use	Existing Ambient Noise Level (CNEL)	Project-Generated Noise Level (CNEL)	Existing plus Project Noise Level (CNEL)	Change in Noise Levels (dBA)
R1	Northern property line	MFR	65	54	65	<1
R2	Northern property line	MFR	65	54	65	<1
R3	Eastern property line	Commercial	65	53	65	<1
R4	Eastern property line	Commercial	65	51	65	<1
R5	Southern property line	Industrial	65	53	65	<1
R6	Western property line	Storke Road	65	72	72	7
R7	1st Floor Building 7	MFR	65	48	65	<1
	2nd Floor Building 7	MFR	65	48	65	<1
	3rd Floor Building 7	MFR	65	49	65	<1
R8	1st Floor Building 7	MFR	65	48	65	<1
	2nd Floor Building 7	MFR	65	48	65	<1
	3rd Floor Building 7	MFR	65	49	65	<1
R9	1st Floor Building 6	MFR	66	55	66	<1
	2nd Floor Building 6	MFR	69	56	69	<1
	3rd Floor Building 6	MFR	69	57	69	<1
R10	1st Floor Building 6	MFR	66	54	66	<1
	2nd Floor Building 6	MFR	69	55	69	<1
	3rd Floor Building 6	MFR	69	56	69	<1
R11	1st Floor Building 6	MFR	66	51	66	<1
	2nd Floor Building 6	MFR	69	51	69	<1
	3rd Floor Building 6	MFR	69	53	69	<1

See Figure 6, Figure 7, and Figure 8 for receiver locations.

CNEL = Community Noise Level Equivalent; dBA = A-weighted decibels; MFR = Multi-family Residential

Conclusion

Noise levels generated by the project would comply with the City's noise performance standards as defined in Section 17.39.070 of the GMC and would not result in a substantial increase in noise levels at any surrounding properties per CEQA and the City's *Environmental Thresholds and Guidelines Manual*.

However, due to a concern that noise generated by the fan sets associated with the Tesla Megapack cooling would potentially be distinctive in tone and may be noticeable to future residents of the Cortona Apartments, a contingency plan has been provided. The Plan requires an evaluation to confirm the project is the cause of the complaint; if the project is the source of the complaint, the plan provides that the project component or components that are generating the distinctive noise be identified. Once the source(s) of the complaint has been identified, the plan requires the evaluation of noise abatement measures that can range from modification to the equipment to erecting a barrier along the project site's shared boundary with the Cortona Apartments.

Thank you for the opportunity to assist with this assignment. Please do not hesitate to contact us if you have questions about this report.

Sincerely,
Rincon Consultants, Inc.

Jack Emerson
Environmental Planner

Jennifer Haddow, PhD
Principal Environmental Scientist

Attachments

Attachment 1 Project Site Plan

Attachment 2 Section 17.39.070 of the Goleta Municipal Code

Attachment 3 Tesla Megapack Data Sound Level Measurement Data

Attachment 4 Tesla Megapack Hottest Day and Hottest 10-day Fan Operation Data

Attachment 5 Transformer Manufacturer Specifications

Attachment 6 Sound Plan Results

Attachment 1

Project Site Plan


FW
FW
SD

Attachment 2

Section 17.39.070 of the Goleta Municipal Code

17.39.070 Noise

A. **Noise Limits.** Noise and land use compatibility criteria specified in Table 17.39.070(A) below apply to all new development and conditions of approval may be imposed to minimize or eliminate incompatibilities.

1. Proposals for new development that would cause standards to exceed the Normally Acceptable noise exposure for any use may only be approved if the project would provide a substantial benefit to the City.

2. These compatibility criteria also may justify denial of an application if a proposed use or adjacent use would be exposed to Clearly Unacceptable noise exposure, as defined in the table.

TABLE 17.39.070(A): NOISE AND LAND USE COMPATIBILITY CRITERIA

Land Use Category	*Community Exposure (Ldn or CNEL, dBA)*			
	Normally Acceptable[1]	*Conditionally Acceptable*[2]	*Normally Unacceptable*[3]	*Clearly Unacceptable*[4]
Residential—Single Unit	50-60	60-65	65-75	75+
Residential—Multiple Unit	50-60	60-65	65-75	75+
Other Residential Uses	50-60	60-65	65-80	80+
Auditoriums, Concert Halls, and Amphitheaters	N/A	50-65	N/A	65+
Park and Recreation Facilities	50-70	N/A	70-75	75+
Other Public/Quasi-Public Uses	50-60	60-65	65-80	80+
Sports Arenas and Outdoor Spectator Sports	N/A	50-70	N/A	70+
Golf Courses, Riding Stables, Water Recreation, and Cemeteries	50-70	N/A	70-80	80+
Lodging	50-65	65-70	70-80	80+
Other Commercial Uses	50-67.5	67.5-75	75+	N/A
Industrial, Transportation, Communication, and Utility, and Agricultural Uses	50-70	70-75	75+	N/A

Notes:

1 Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without special noise-insulation requirements.
2 Conditionally Acceptable: New construction or development may be undertaken only after detailed analysis of the noise reduction requirements is made and needed noise-insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
3 Normally Unacceptable: New construction or development is discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features must be included in the design. See Section 17.39.070(D), Acoustical Study.
4 Clearly Unacceptable: New construction or development must generally not be undertaken.
5 N/A: Not applicable.

B. **Adjustments to Noise Exposure Limits.** The maximum “Normally Unacceptable” or “Clearly Unacceptable” noise levels of Table 17.39.070(A), may be adjusted according to the following provisions. No more than one increase in the maximum permissible noise level will be applied to the noise generated on each property.

1. ***Nuisance Noise.*** If a noise contains a steady audible tone (i.e., hum or buzz), rises or falls in pitch or volume (i.e., whine or screech), or is a repetitive noise (i.e., hammering or riveting) or contains music or speech conveying informational content, the maximum noise levels will be reduced by five dBA.

C. **Short Duration Noise.** In addition to the durational noise standards above, the following standards apply to episodic noise affecting Residential Uses:

1. Noise that is produced for no more than a cumulative period of five minutes in any hour must not exceed 80 dBA; and

2. Noise that is produced for no more than a cumulative period of one minute in any hour must not exceed 85 dBA.

D. **Acoustical Study.** The Review Authority may require an acoustical study that includes field measurement of noise levels for any proposed project that would impact or be impacted by noise levels at the Conditionally Acceptable level.

1. Acoustical studies must identify noise sources, magnitudes, and potential noise attenuation measures, and describe existing and future noise exposure.

2. All costs of the acoustical study and any peer review are borne by the applicant.

E. **Noise Attenuation Measures.** Any project subject to the acoustic study requirements of subsection D, above, must incorporate noise attenuation features deemed necessary to ensure that noise standards are not exceeded.

1. Where any portion of a site proposed for a new residential use exceeds 60 dBA CNEL, noise-attenuation features to achieve and maintain an interior noise level of 45 dBA CNEL must be included.

F. **Exemptions.** The following are exempt from the provisions of this section:

1. ***Emergencies.*** The emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work;

2. ***Warning Devices.*** Warning devices necessary for the protection of the public safety, such as police, fire, and ambulance sirens;

3. ***Special Events.*** Occasional outdoor gatherings, public dances, shows, and sporting and entertainment events, provided that such events are conducted pursuant to a permit or license issued by the City;

4. ***Municipal Solid Waste Collection.*** Collection of solid waste, vegetative waste, and recyclable materials by the City or under contract with the City; and

5. ***Public Works Construction Projects, Maintenance, and Repair.*** Street, utility, and similar construction projects undertaken by or under contract to or direction of the City, or the State of California or a public utility regulated by the California Public Utilities Commission, as well as maintenance and repair operations conducted by such parties.

G. **Construction Hours.** Construction-related noise-generating activities are subject to the following:

1. ***Limitation on Hours.***

a. Noise-generating construction activities within 1,600 feet of sensitive receptors are limited to Monday through Friday, 8:00 a.m. to 5:00 p.m.

b. Noise-generating construction activities not within 1,600 feet of sensitive receptors are limited to Monday through Friday, 7:00 a.m. to 4:00 p.m.

c. Exceptions to these restrictions for on-site work may be made for good cause at the sole discretion of the Director. Exceptions to these restrictions may be made for good cause at the sole discretion of the Public Works Director or designee, for work in the City right-of-way.

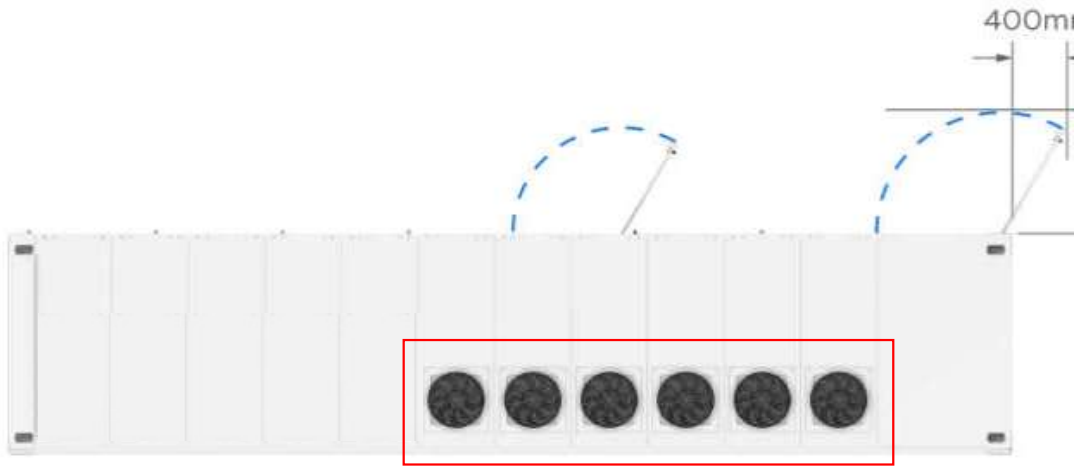
2. ***Holidays.*** No noise-generating construction activities may occur on State holidays.

3. ***Construction Hours.*** Construction hours of operation must be posted on site near the entrance of the development site. (Ord. 20-03 § 6)

Attachment 3

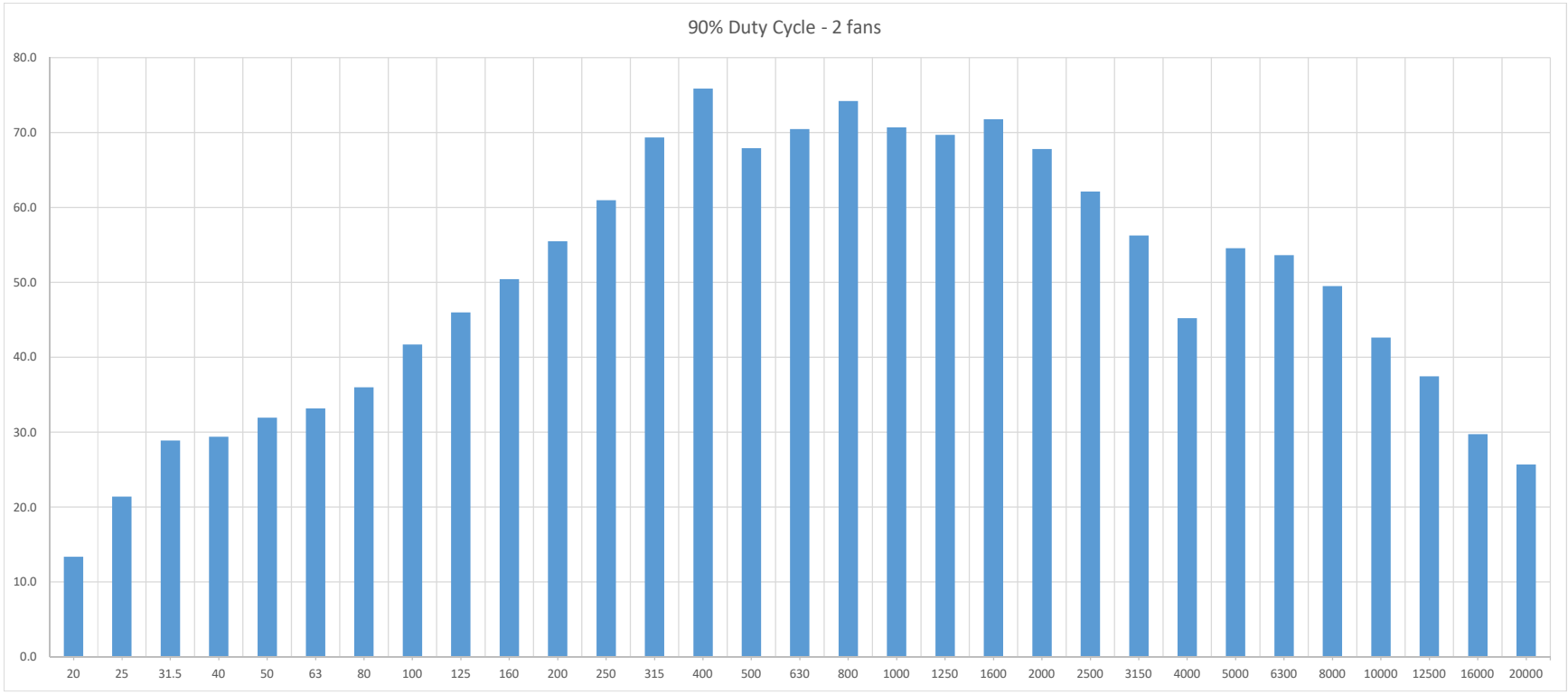
Tesla Megapack Data Sound Level Measurement Data

2 Fans - Sound Power						
Command	Top	Right	Rear	Left	Front	Front Inlet
90%	81.4	81.4	83.0	86.3	79.8	79.2
80%	79.1	78.0	79.9	82.3	77.2	77.2
70%	77.1	76.5	78.1	80.0	75.7	75.3
60%	74.2	72.8	76.5	76.9	72.3	72.5
40%	68.4	67.9	70.6	71.1	66.9	66.5
1 Fan - Sound Power						
95%	78.7	77.4	81.1	81.4	80.8	78.7

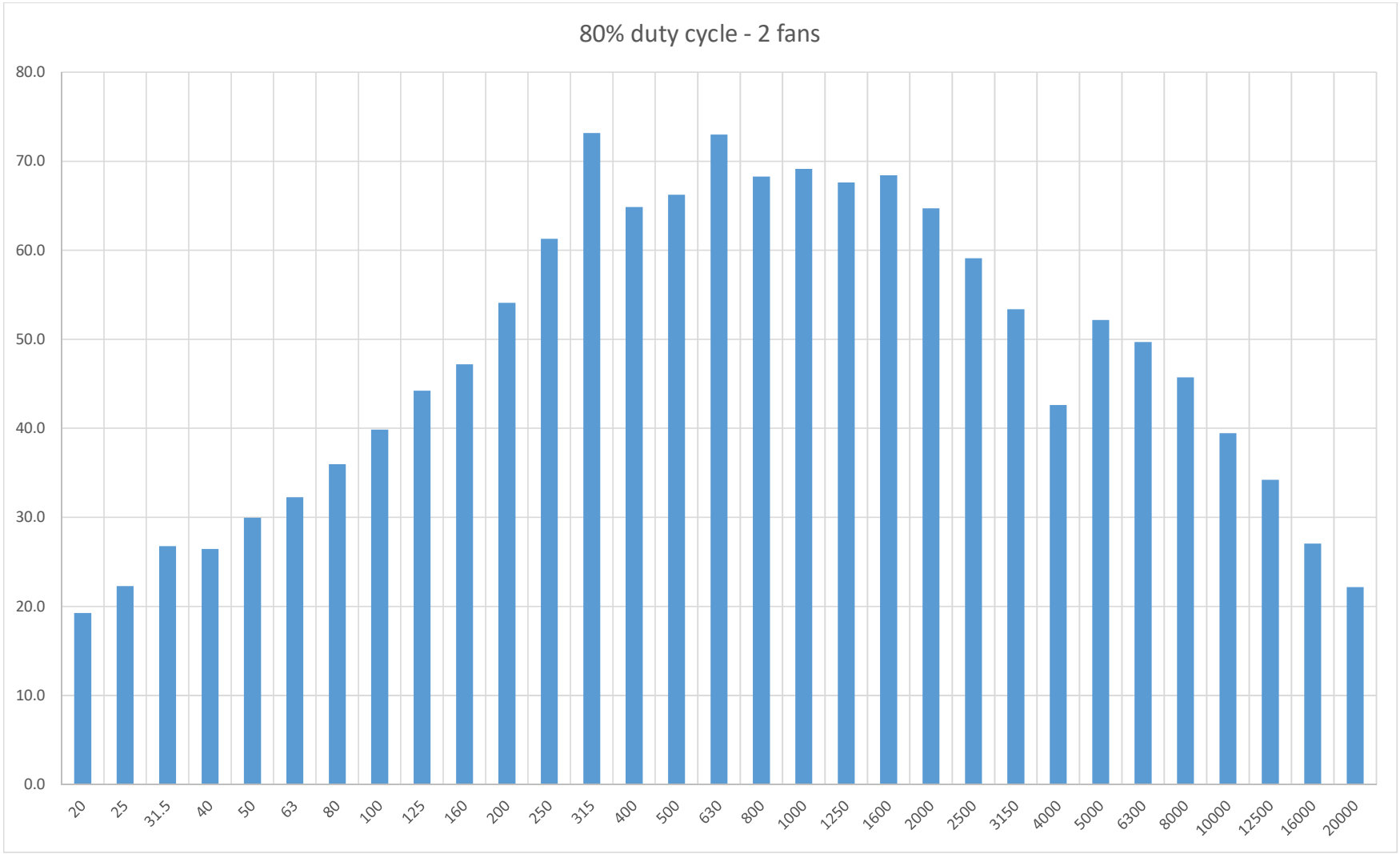


Top View - Back of enclosure, 6 fans per enclosure

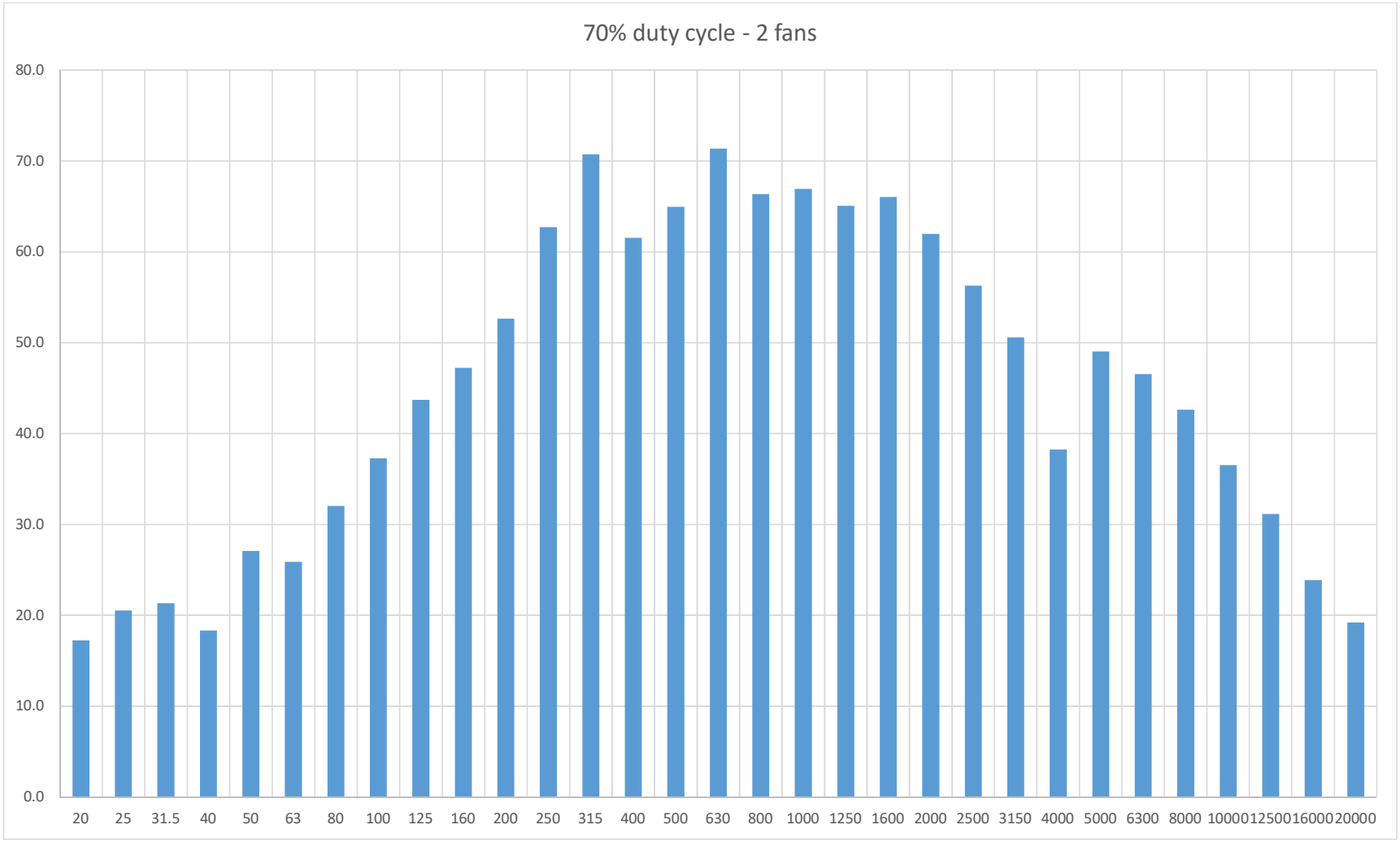
	Top	Right	Rear	Left	Front	Front Inlet
20	13.4	-5.1	35.5	40.1	5.1	5.3
25	21.4	1.7	41.9	42.8	3.0	12.8
31.5	28.9	9.1	45.9	46.6	3.6	18.8
40	29.4	15.2	48.0	52.2	9.7	25.5
50	31.9	30.3	51.5	56.3	31.6	47.2
63	33.2	29.4	54.8	57.1	29.1	43.1
80	36.0	33.1	55.1	54.2	32.6	37.5
100	41.7	38.9	55.5	56.4	39.5	42.4
125	46.0	46.4	53.0	52.9	45.1	46.8
160	50.4	50.8	52.5	55.8	50.5	54.9
200	55.5	54.2	56.7	60.4	54.6	55.6
250	61.0	60.3	62.0	65.7	59.9	60.2
315	69.3	68.8	69.9	75.0	67.8	67.4
400	75.8	77.8	78.4	82.2	74.8	75.7
500	67.9	67.1	68.9	72.3	65.0	68.0
630	70.5	69.6	71.3	74.8	68.1	68.3
800	74.2	73.5	75.8	79.2	73.2	70.2
1000	70.7	70.1	72.4	75.1	69.7	67.1
1250	69.7	69.3	71.8	73.8	68.1	66.0
1600	71.8	68.9	71.5	73.2	68.1	63.5
2000	67.8	66.4	68.6	69.4	65.6	59.2
2500	62.1	61.7	64.2	63.1	61.1	54.7
3150	56.3	56.2	59.6	54.2	55.8	52.1
4000	45.2	49.7	56.1	54.1	51.5	55.9
5000	54.5	51.9	46.6	59.6	51.4	59.8
6300	53.6	51.2	53.6	57.0	51.7	55.5
8000	49.5	47.5	50.3	52.4	47.2	49.6
10000	42.6	41.0	43.0	46.4	40.5	42.0
12500	37.5	33.8	34.4	38.8	32.8	37.0
16000	29.7	17.8	27.0	25.4	20.0	21.0
20000	25.7	21.1	23.0	29.0	20.9	23.0
Total	**81.4**	**81.4**	**83.0**	**86.3**	**79.8**	**79.2**


90% Duty Cycle - 2 fans
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

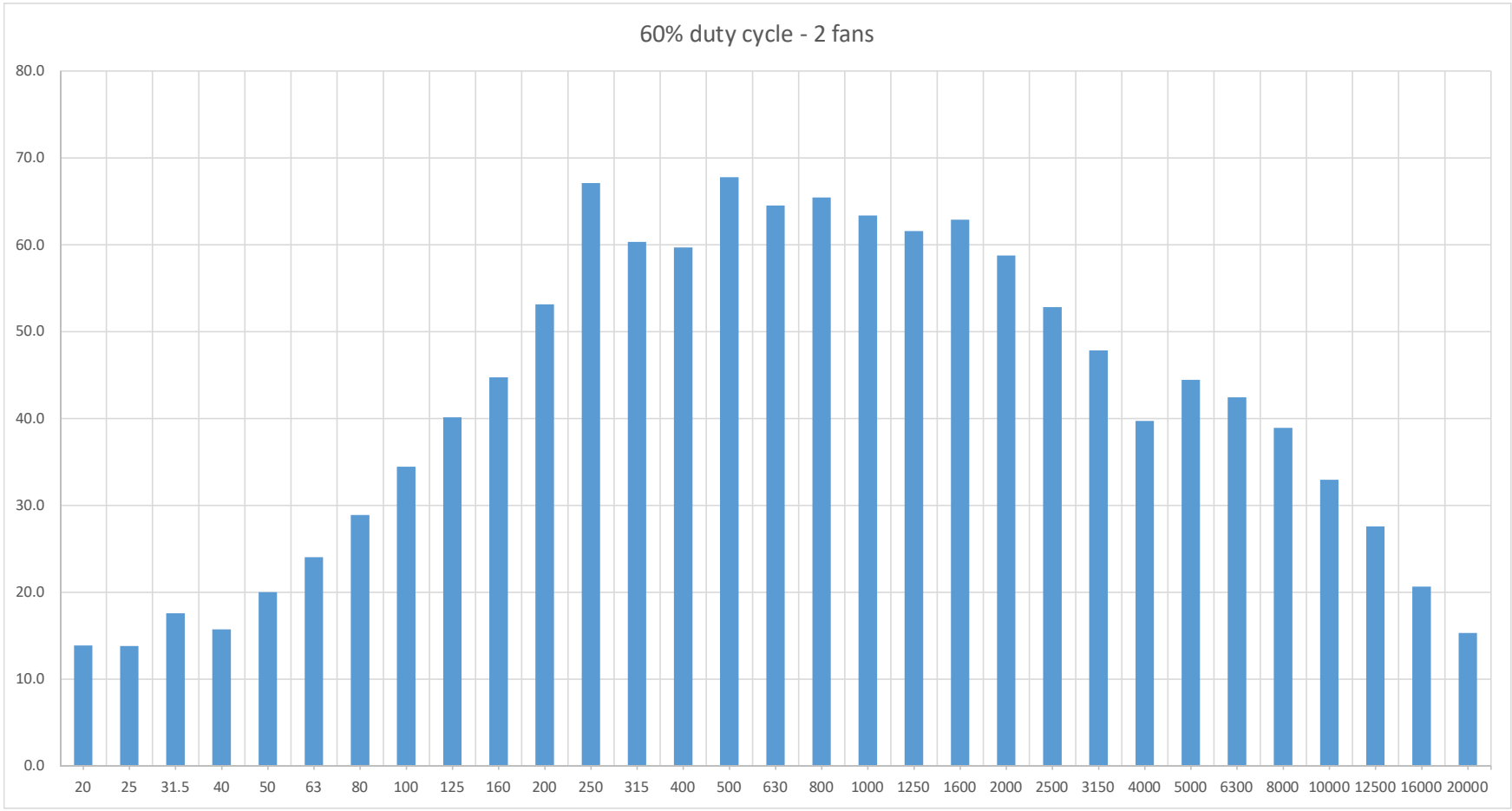
	Top	Right	Rear	Left	Front	Front Inlet
20	19.3	-1.1	34.1	24.9	-0.4	4.9
25	22.3	1.0	38.5	27.1	-16.8	12.0
31.5	26.8	2.3	44.2	29.6	4.5	18.7
40	26.5	9.9	47.1	33.6	10.2	31.7
50	30.0	16.5	49.4	40.0	17.2	39.9
63	32.3	26.5	50.0	35.7	24.0	34.3
80	36.0	32.3	49.7	39.2	30.1	35.7
100	39.9	38.3	47.8	45.4	41.1	40.4
125	44.2	45.4	46.3	48.3	44.0	48.3
160	47.2	47.6	48.3	52.6	48.1	52.3
200	54.1	52.8	54.3	58.3	52.7	54.8
250	61.3	60.5	62.3	66.0	60.1	61.0
315	73.2	73.2	74.5	77.3	71.4	72.6
400	64.9	63.8	66.5	70.1	61.6	65.0
500	66.2	65.1	66.8	70.1	63.1	66.0
630	73.0	71.0	72.3	75.3	71.4	71.4
800	68.3	67.1	69.8	72.0	66.5	64.8
1000	69.1	68.0	70.9	72.4	67.9	65.7
1250	67.6	66.4	68.6	70.7	65.3	63.5
1600	68.4	65.5	68.1	69.4	65.2	60.4
2000	64.7	63.4	65.4	65.6	62.7	53.5
2500	59.1	58.3	60.9	59.1	58.0	48.2
3150	53.4	53.0	56.7	50.5	53.2	49.9
4000	42.6	48.3	54.5	50.5	49.9	55.4
5000	52.2	48.6	49.9	55.4	47.9	57.6
6300	49.7	47.4	48.0	51.3	47.8	52.3
8000	45.7	43.6	46.0	47.4	43.2	46.0
10000	39.5	37.5	40.1	42.0	36.7	39.1
12500	34.2	30.3	25.3	34.2	29.4	33.8
16000	27.1	12.8	20.9	22.6	11.2	19.9
20000	22.2	18.2	19.7	23.9	16.9	19.8
Total	**79.1**	**78.0**	**79.9**	**82.3**	**77.2**	**77.2**


80% duty cycle - 2 fans
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

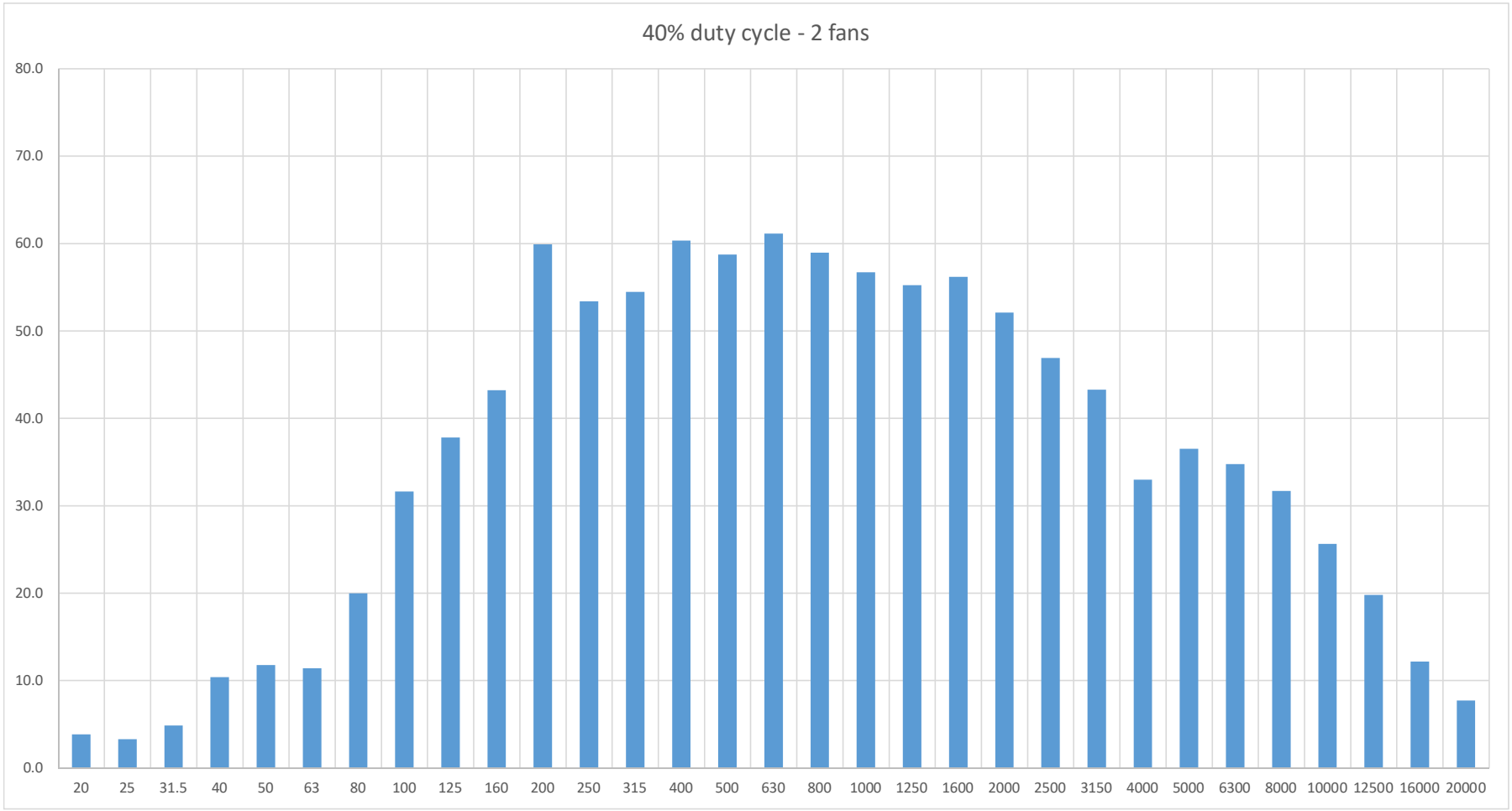
	Top	Right	Rear	Left	Front	Front Inlet
20	17.2	-13.6	33.1	28.7	4.3	4.6
25	20.5	-1.0	37.9	31.9	8.0	12.2
31.5	21.3	3.2	42.5	34.5	7.6	17.8
40	18.3	19.1	43.1	36.0	12.6	26.2
50	27.1	19.3	47.8	36.4	14.0	30.4
63	25.9	23.9	46.3	35.0	25.4	32.7
80	32.0	37.0	48.4	49.2	39.4	33.0
100	37.3	36.2	46.4	47.1	37.6	39.2
125	43.7	45.0	46.3	47.4	40.6	47.6
160	47.2	47.3	48.8	52.4	49.3	49.5
200	52.6	51.5	54.6	57.0	53.2	53.7
250	62.7	61.9	63.2	66.6	61.7	61.5
315	70.7	70.5	71.8	75.1	69.6	70.3
400	61.5	62.3	63.5	65.7	59.6	62.1
500	64.9	64.4	65.9	68.4	62.2	63.9
630	71.4	70.7	71.6	73.7	70.0	70.2
800	66.3	66.1	68.1	69.7	65.1	62.6
1000	66.9	66.1	68.6	69.1	66.1	63.1
1250	65.0	65.3	66.6	67.4	63.5	60.7
1600	66.0	63.5	66.1	65.2	63.1	57.7
2000	62.0	61.2	63.5	60.5	60.2	51.4
2500	56.3	56.1	59.4	52.7	55.1	36.5
3150	50.6	51.0	54.8	46.7	50.0	50.1
4000	38.2	46.7	51.8	51.9	47.3	54.6
5000	49.0	46.1	48.5	52.6	46.1	54.5
6300	46.5	44.7	48.8	47.7	45.1	49.0
8000	42.6	40.9	43.7	42.9	40.5	42.4
10000	36.5	35.2	36.3	37.7	34.4	36.0
12500	31.1	28.4	29.1	29.0	27.3	31.3
16000	23.9	15.6	20.8	17.6	15.6	18.1
20000	19.2	15.9	18.8	19.3	14.9	16.7
Total	**77.1**	**76.5**	**78.1**	**80.0**	**75.7**	**75.3**


70% duty cycle - 2 fans
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

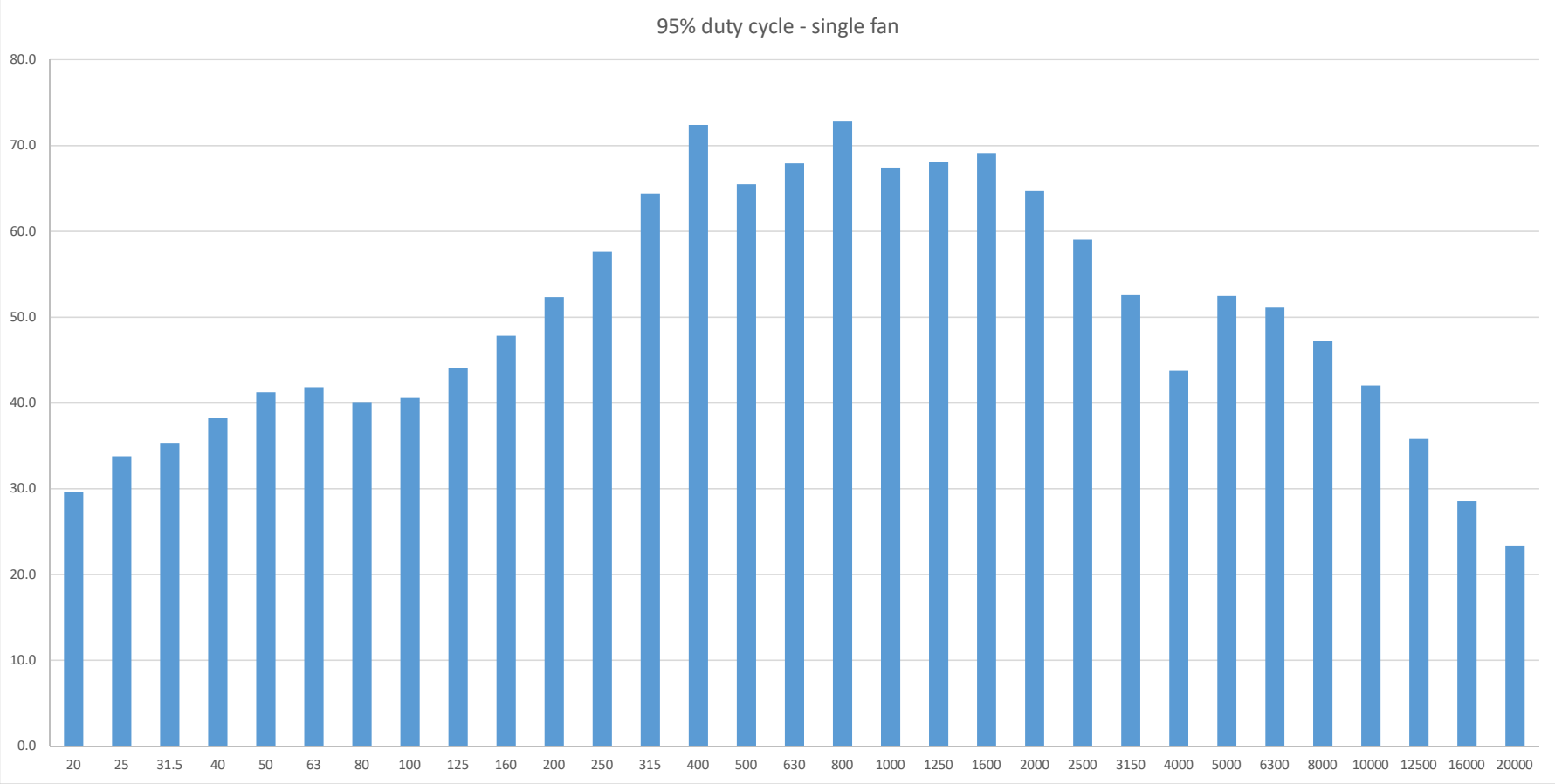
	Top	Right	Rear	Left	Front	Front Inlet
20	13.8	-6.4	31.1	25.8	0.8	3.8
25	13.8	-12.5	35.9	25.6	1.1	11.8
31.5	17.6	1.3	38.7	32.2	5.4	14.8
40	15.7	3.8	42.0	32.8	4.3	21.7
50	20.0	17.0	43.6	35.8	13.1	27.5
63	24.0	22.0	45.1	34.3	15.9	31.9
80	28.9	27.4	42.0	36.6	25.5	31.1
100	34.4	32.8	44.0	40.6	33.1	37.7
125	40.1	40.5	44.4	45.2	39.0	44.2
160	44.7	44.9	47.8	49.2	45.4	48.3
200	53.1	51.5	55.8	56.6	52.6	54.1
250	67.1	66.3	70.8	72.2	65.7	66.9
315	60.3	58.7	62.0	63.7	58.8	59.9
400	59.7	59.9	62.7	63.8	58.1	59.9
500	67.8	65.9	69.1	69.8	64.7	67.5
630	64.5	62.8	66.3	66.9	63.0	62.5
800	65.4	63.7	67.3	67.3	63.4	60.8
1000	63.4	62.6	66.0	65.3	62.3	59.3
1250	61.6	60.5	63.7	62.4	59.9	57.4
1600	62.9	59.4	63.6	60.1	59.7	53.9
2000	58.7	57.7	60.2	55.1	56.6	45.9
2500	52.8	52.8	55.7	45.3	52.0	33.4
3150	47.8	47.8	51.3	48.3	47.7	47.6
4000	39.7	45.2	48.5	50.6	45.8	52.1
5000	44.4	41.0	47.1	47.8	40.8	49.7
6300	42.4	40.5	45.6	42.8	40.6	44.9
8000	38.9	36.7	40.6	37.9	36.5	38.5
10000	32.9	30.9	34.1	33.1	30.6	32.4
12500	27.6	23.3	27.1	25.3	23.1	27.4
16000	20.6	1.6	12.3	14.4	10.1	11.3
20000	15.3	11.7	15.8	13.9	11.2	13.6
Total	**74.2**	**72.8**	**76.5**	**76.9**	**72.3**	**72.5**


60% duty cycle - 2 fans
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

	Top	Right	Rear	Left	Front	Front Inlet
20	3.8	-7.0	24.1	11.0	-22.3	-1.2
25	3.3	1.1	29.3	13.0	-6.0	6.6
31.5	4.8	0.2	32.2	12.8	1.4	11.4
40	10.4	7.0	34.2	11.0	11.3	18.5
50	11.7	6.5	35.9	20.8	15.1	22.8
63	11.4	17.9	38.4	27.1	20.1	25.7
80	20.0	24.9	35.1	29.1	26.0	29.2
100	31.6	29.5	37.3	35.4	28.3	33.8
125	37.8	37.9	39.3	40.3	35.6	39.5
160	43.2	42.7	45.2	47.4	43.9	47.1
200	59.9	57.6	63.2	64.0	58.8	60.8
250	53.4	52.7	56.1	57.0	53.7	52.9
315	54.5	54.2	56.1	58.2	53.7	53.2
400	60.3	61.1	62.8	63.6	58.7	59.7
500	58.7	58.3	60.6	61.7	56.4	57.2
630	61.1	60.3	62.2	62.8	58.8	58.0
800	58.9	59.0	61.4	61.5	58.1	54.5
1000	56.7	56.6	59.5	59.2	56.2	53.1
1250	55.2	55.4	57.8	57.1	53.9	50.9
1600	56.2	53.5	57.1	55.5	52.9	48.4
2000	52.1	51.0	54.3	51.1	49.8	41.4
2500	46.9	46.8	50.3	44.4	45.7	37.0
3150	43.3	43.5	46.6	36.3	42.9	38.8
4000	33.0	35.4	39.2	40.8	36.9	43.3
5000	36.5	33.8	39.3	39.6	33.1	41.4
6300	34.8	33.3	37.9	35.8	32.7	37.0
8000	31.7	30.1	33.6	31.9	29.2	31.3
10000	25.6	24.5	27.2	26.9	23.4	25.3
12500	19.8	17.0	19.3	18.2	15.6	20.1
16000	12.1	2.4	4.4	0.9	6.1	8.2
20000	7.7	6.4	5.9	8.6	4.3	6.3
Total	**68.4**	**67.9**	**70.6**	**71.1**	**66.9**	**66.5**

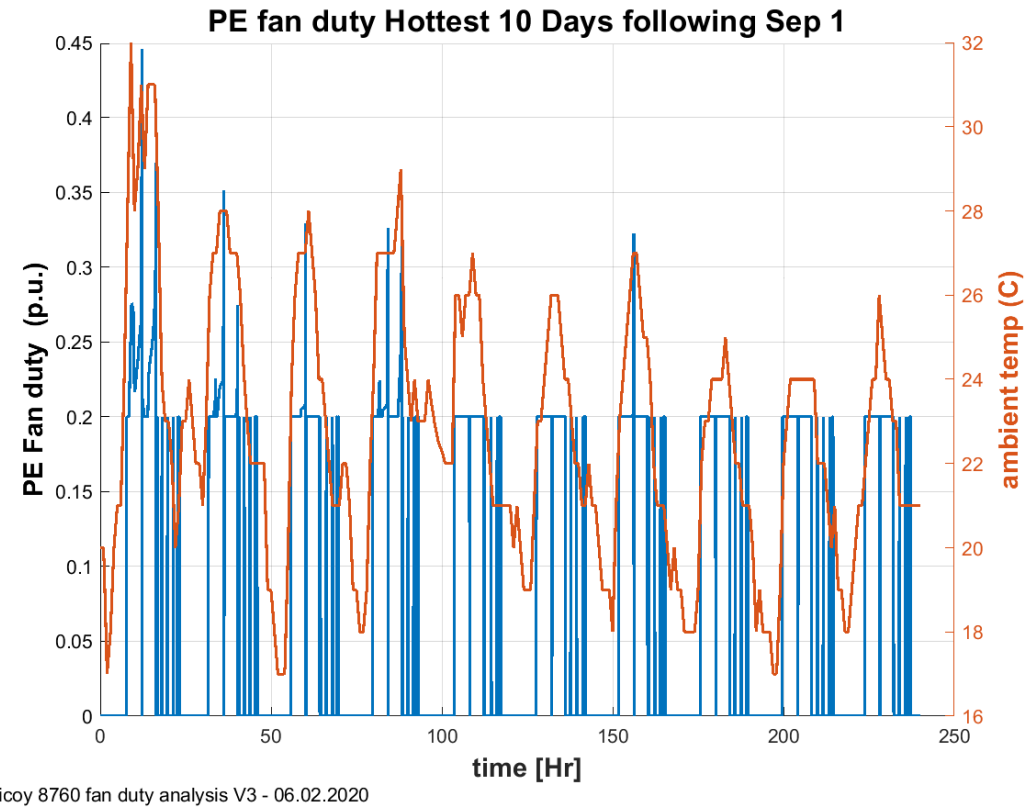

40% duty cycle - 2 fans
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

	Top	Right	Rear	Left	Front	Front Inlet
20	29.6	1.1	23.9	33.9	-0.9	-11.4
25	33.8	8.0	27.4	42.4	-3.0	2.1
31.5	35.3	14.8	29.1	45.7	7.5	6.0
40	38.2	20.0	30.8	43.7	5.0	-3.2
50	41.2	35.2	32.8	48.6	28.2	21.2
63	41.8	34.8	34.1	51.0	33.2	26.9
80	40.0	32.4	34.7	50.9	33.9	29.2
100	40.6	39.2	38.3	50.0	39.7	35.1
125	44.0	44.5	46.4	49.7	44.7	42.8
160	47.8	49.2	47.9	49.4	50.0	49.9
200	52.3	53.7	52.0	53.9	54.7	52.7
250	57.6	56.1	58.3	60.2	60.2	57.7
315	64.4	63.8	67.3	66.3	67.2	64.2
400	72.4	75.2	76.7	73.5	75.9	74.4
500	65.4	65.4	67.5	66.9	67.1	64.6
630	67.9	64.2	69.9	68.9	68.5	67.1
800	72.8	67.6	73.8	76.8	75.0	72.4
1000	67.4	63.4	69.9	71.1	69.3	67.1
1250	68.1	64.7	71.2	71.6	70.0	67.9
1600	69.1	58.3	69.0	71.0	68.3	65.7
2000	64.7	52.7	66.0	66.6	64.2	63.3
2500	59.0	30.2	60.8	62.3	58.5	59.0
3150	52.6	51.3	56.1	58.2	47.7	52.6
4000	43.8	53.2	50.2	54.1	50.8	47.0
5000	52.5	56.1	51.2	44.2	54.3	49.9
6300	51.1	52.0	51.1	51.2	51.1	49.3
8000	47.2	46.7	47.6	48.2	47.2	45.6
10000	42.0	39.7	41.7	40.8	41.4	39.3
12500	35.8	34.0	34.5	32.8	33.4	32.2
16000	28.5	21.3	21.5	25.6	15.9	23.1
20000	23.3	20.7	21.7	23.2	23.6	19.6
Total	**78.7**	**77.4**	**81.1**	**81.4**	**80.8**	**78.7**

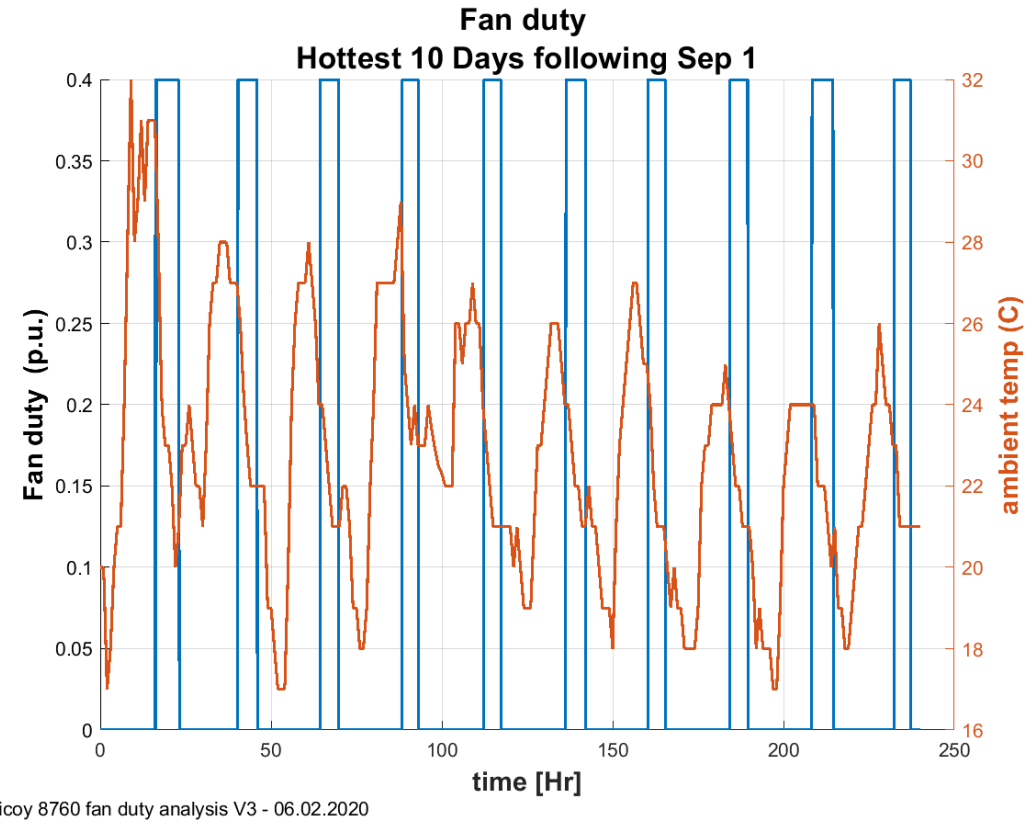

95% duty cycle - single fan
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
20
25
31.5
40
50
63
80
100
125
160
200
250
315
400
500
630
800
1000
1250
1600
2000
2500
3150
4000
5000
6300
8000
10000
12500
16000
20000

Attachment 4

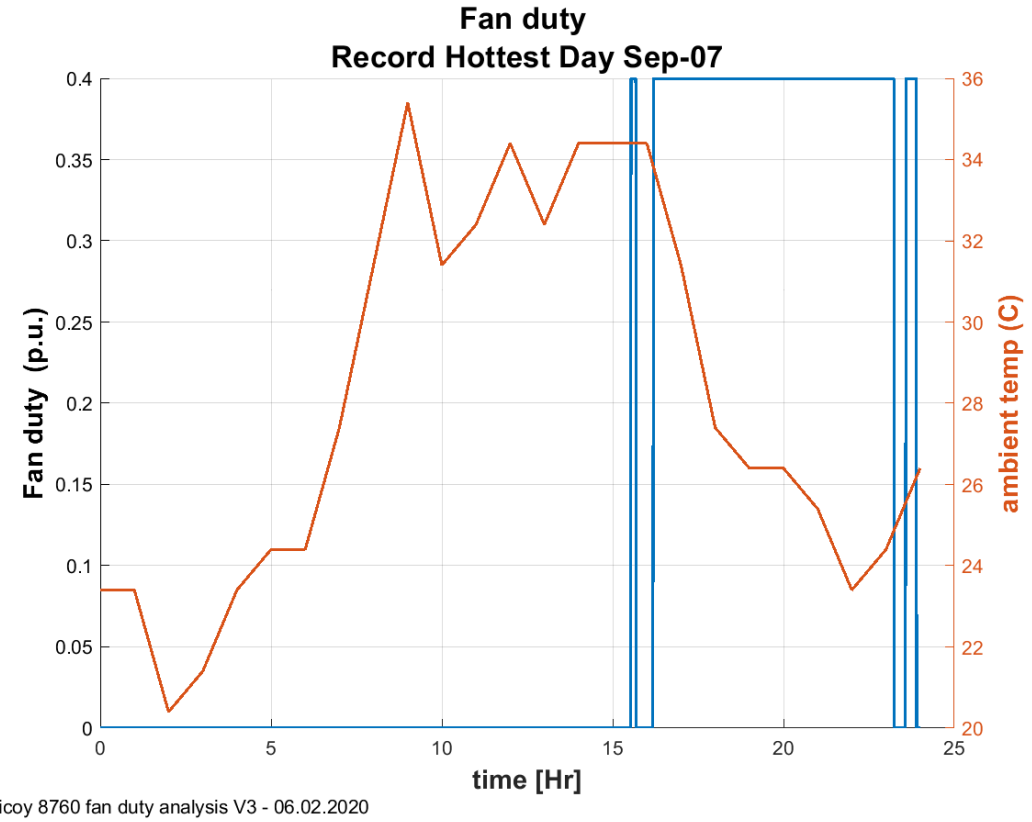
Tesla Megapack Hottest Day and Hottest 10-day Fan Operation Data



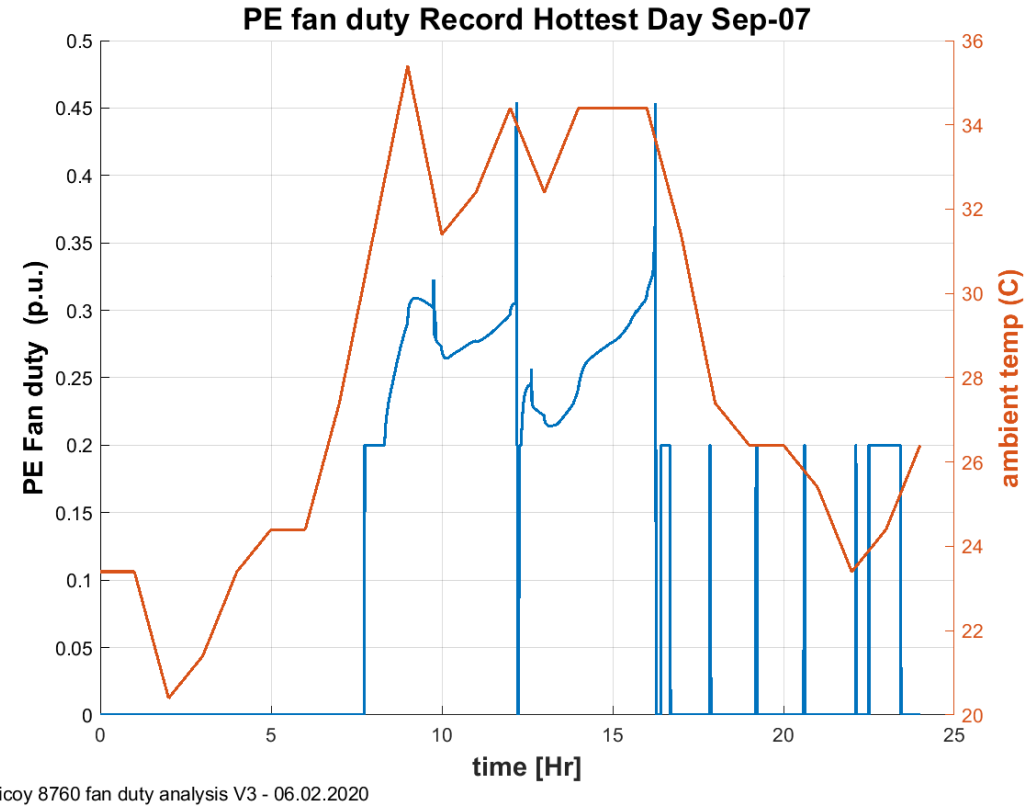
Saticoy 8760 fan duty analysis V3 - 06.02.2020



Saticoy 8760 fan duty analysis V3 - 06.02.2020



Saticoy 8760 fan duty analysis V3 - 06.02.2020

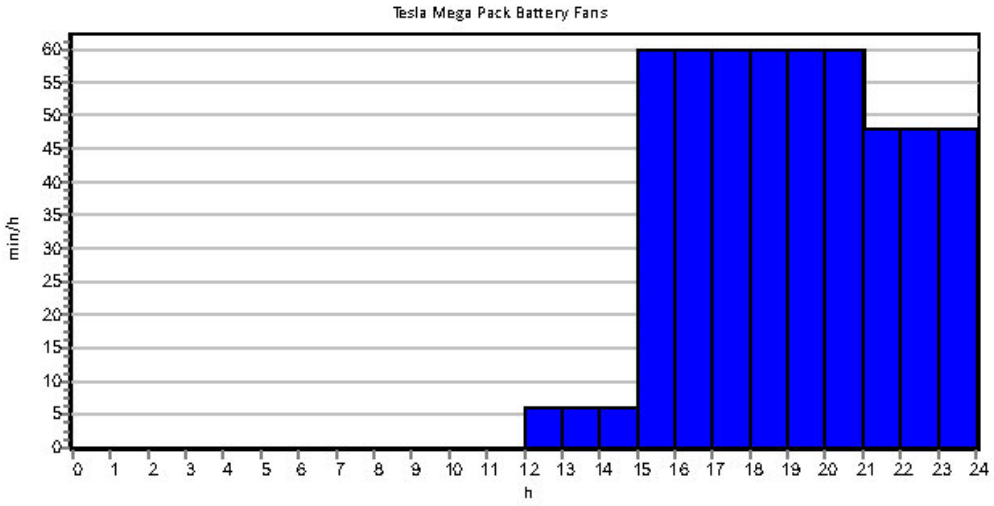


Saticoy 8760 fan duty analysis V3 - 06.02.2020

Battery Energy Storage Facility

Time.abs - SoundPLAN Time Histogram Library

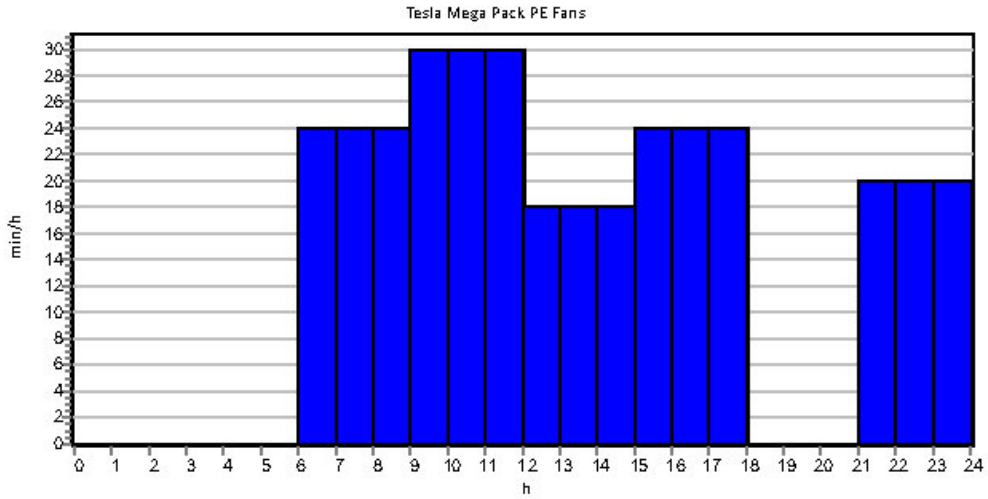
5 : Tesla Mega Pack Battery Fans



hour	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
min/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
hour	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16
min/h	0.00	0.00	0.00	0.00	6.00	6.00	6.00	60.00
hour	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
min/h	60.00	60.00	60.00	60.00	60.00	48.00	48.00	48.00

Battery Energy Storage Facility
Time.abs - SoundPLAN Time Histogram Library

6: Tesla Mega Pack PE Fans



hour	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8
min/h	0.00	0.00	0.00	0.00	0.00	0.00	24.00	24.00
hour	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16
min/h	24.00	30.00	30.00	30.00	18.00	18.00	18.00	24.00
hour	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
min/h	24.00	24.00	0.00	0.00	0.00	20.00	20.00	20.00

Attachment 5

Transformer Manufacturer Specifications

Transformer Performance Specification

For: For reference only Date: 3/20/2019

Quote: Item: Spec:

Rating								
Type	Substation Non-Auto	Class	H Winding		X Winding		Y Winding	
Phase	3		69	kV	34.5	kV	-	
Hertz	60	ONAN	72000	KVA	72000	KVA	-	KVA
Temp Rise	65 C	ONAF	96000	KVA	96000	KVA	-	KVA
Insulating Type	Mineral Oil	ONAF	120000	KVA	120000	KVA	-	KVA

Additional Tap Voltages	
H Winding (kV)	+2 -2 2.5%, DETC
X Winding (kV)	No Taps
Y Winding ()	-

Connections for Operation									
Transformers in Bank	To Transform from	Phase	Connected	To Transform from	Phase	Connected	To Transform To	Phase	Connected
1	69 kV	3	Delta	34.5 kV	3	Wye	-	3	-

Dielectric Tests				Insulation Levels	
Applied Voltage (To other windings and ground)	H Winding	34	kV	ITEMS	Basic Lightning Impulse Insulation Level (BIL kV)
	X Winding	34	kV		
	Y Winding	-	kV	H line	350
Induced Voltage	Enhancement level / 7200 Cycle (L-G)	72	kV	H neutral	-
				X line	150
	One hour level (L-G)	63	kV	X neutral	150
				Y line	-

Loss Data based on	NL @ 20C, LL @ 85C					
Based on loading at	69 kV	To	34.5 kV			
Winding Load KVA	H	72000	X	72000	Y	-
No Load Loss	TBD kW		Total Loss	TBD kW		

Regulation at		
69 kV	/	34.5 kV
72000		KVA
Power Factor	% Reg	% Load
1.0	TBD	100
0.8	TBD	100

Auxiliary Losses (Not included in above)	Percent Exciting Current	
	100% V	110% V
TBD kW	TBD	TBD

Average Sound Level	
dB(A)	Class
77	ONAN
79	ONAF
80	ONAF

Percent Impedance Voltage		
% IZ	Between Windings	At KVA
7.5	HV-XV	72000

Mechanical Data
Not for Construction Purposes

Drawing		
Height	(A)	216 in
Length	(B)	317 in
Width	(C)	188 in
Height over Cover	(D)	172 in
Untanking (Plus Slings)	(E)	291 in
Shipping Height		168 in
Shipping Width		118 in
Shipping Length		170 in
Oil Preservation		InertAir
Weights (approximate) (lbs)		
Core and Coils		112900 lbs
Tank and Fittings		66600 lbs
Fluid 7400 gal		54900 lbs
Total Weight		234400 lbs
Untanking Weight		112900 lbs
Shipping Weight		134900 lbs
Shipped in		Dry Air

For reference only – Losses and dimensions needs to be revised

WEG Transformers USA
One Pauwels Drive, Washington, MO 63090, USA
www.weg.net T: 1-636-239-9300 F: 1-636-239-9395

TECHNICAL SPECS

Customer Line No.:	Battery Storage System	**Quantity:**	36

Three Phase Pad-Mount Transformer(s)

kVA Rating:	3360 kVA	**Model #:**	
	Envirotemp FR3	**Cooling Class:**	KNAN
		Frequency:	60 Hz
		Avg. Winding Temp.	65 °C
Primary Voltage:	34500 Delta volts	**Secondary Voltage:**	600Y volts
Primary BIL Rating:	150 kV	**Secondary BIL Rating:**	45 kV
HV Winding Matl:	Aluminum	**LV Winding Matl:**	Aluminum
High Voltage Taps:	B Taps - Two 2.5% Taps below Nominal and Two 2.5% Taps above Nominal		
No Load Loss:	4200 Watts	**Load Loss:** 24300 Watts	**Total Loss:** 28500 Watts
Impedance:	5.75 %		

Tank Enclosure:
Welded Cover w/(1) Handhole(s) - 14x24
Cabinet Depth: 40 Inches, Pentahead Security Bolts
Steel HV-LV Barrier

Bushings:
Loop Feed ANSI Minimum Dimensions
Dead Front Primary Terminations: Integral Non-Loadbreak Bushings 600 Amp
Secondary Terminations: Epoxy Bushings w/Non-removable 12 Hole Spades, Spade Support

Protection:
PRCLF (), Weak Link Cartridge ()

Accessories:
Pressure Relief Valve Viat, Cover-Mounted Pressure Relief Device (), Drain valve w/Sampler
Liquid Level Gauge /w Contacts (Qty=1), Liquid Temperature Gauge, Pressure Vacuum Gauge

2-Winding SOLARPAD: Stadium Style Stacked Core Construction with Semi-Round Windings, Reduced Flux Density, Electrostatic Winding Shields, Increased Cooling, Door Gasketing, Hold down anchoring (x4 holes), Drain Valve & Sampler in External Box, Isolated Core Ground, Nitrogen Blanket, Schrader Valve, UL Listed

-Externally mounted gauges in pad lockable enclosure
-Externally mounted MV Switch in pad lockable enclosure
-HV located on the left and LV compartment located on the right
-Oil Temp Sensor: Analog output with 4-20mA transmitter, -50C to +150C
-Losses are at 20C core and 85C winding and are for reference only. ANSI tolerances will apply to quoted losses.

Switching:
Internally Isolated and Floating Neutral , One ON/OFF Transformer Switch (300 Amps)

Paint Color:
ASA #70 GRAY (Munsell 5.0BG7.0/0.4), Touch-up Paint Spray Can ,

Standards:
Quoted in compliance with the latest applicable ANSI standards unless otherwise specified by the customer.

Attachment 6

Sound Plan Results

Battery Energy Storage Facility
Run info
2021 Site Update Receivers without Berm

Project description

Project title:	Battery Energy Storage Facility
Project No.:	19-08526
Project engineer:	Maddux
Customer:	

Description:

Run description

Calculation type:	Single Point Sound
Title:	2021 Site Update Receivers without Berm
Group	
Run file:	RunFile.runx
Result number:	3
Local calculation (ThreadCount=8)	
Calculation start:	1/20/2021 12:13:11 PM
Calculation end:	1/20/2021 12:13:34 PM
Calculation time:	00:21:546 [m:s:ms]
No. of points:	11
No. of calculated points:	11
Kernel version:	SoundPLAN 8.2 (1/28/2020) - 64 bit

Run parameters

Reflection order:	3	
Maximum reflection distance to receiver		200 m
Maximum reflection distance to source		50 m
Search radius	5000 m	
Weighting:	dB(A)	
Allowed tolerance (per individual source):	0.100 dB	
Create ground effect areas from road surfaces:		Yes

Standards:

- Industry: ISO 9613-2: 1996
- Air absorption: ISO 9613-1

regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect

- Limitation of screening loss:
  - single/multiple 20.0 dB /25.0 dB
- Side diffraction: Outdated method (side paths also around terrain)
- Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss
- Environment:
  - Air pressure 1013.3 mbar
  - rel. humidity 70.0 %
  - Temperature 10.0 °C
  - Meteo. corr. C0(6-18h)[dB]=0.0; C0(18-22h)[dB]=0.0; C0(22-6h)[dB]=0.0;
  - Ignore Cmet for Lmax industry calculation: No
- Parameter for screening: C2=20.0
- Dissection parameters:
  - Distance to diameter factor 8

Minimal distance	1 m
Max. difference ground effect + diffraction	1.0 dB
Max. number of iterations	4
Attenuation	
Foliage:	ISO 9613-2
Built-up area:	ISO 9613-2
Industrial site:	ISO 9613-2
Assessment:	CNEL (CA)

Reflection of "own" facade is suppressed

Geometry data

2021_Battery Energy Storage without Berm.sit 1/20/2021 12:10:18 PM
- contains:

2021_Fans.geo	1/18/2021 12:33:30 PM
2021_Megapacks.geo	1/18/2021 10:32:08 AM
2021_Receivers.geo	1/19/2021 5:56:28 PM
2021_Substation.geo	1/18/2021 10:31:28 AM
2021_Transformers.geo	1/18/2021 10:30:40 AM
Calc_Area.geo	10/16/2019 11:26:26 AM

Battery Energy Storage Facility
Assessed receiver levels
2021 Site Update Receivers without Berm

2

Receiver	Fl	X m	Y m	Z m	Ldn dB(A)	
1	G	236318.75	3813944.97	1.54	53.5	
2	G	236367.93	3813916.28	1.54	54.4	
3	G	236374.88	3813897.18	1.54	52.9	
4	G	236373.70	3813847.20	1.54	51.4	
5	G	236324.41	3813839.55	1.54	53.4	
6	G	236302.18	3813893.67	1.54	71.6	
7	G	236419.88	3813915.86	1.54	48.2	
	F2			4.89	48.3	
	F3			8.24	49.4	
8	G	236427.39	3813912.52	1.54	47.6	
	F2			4.89	47.6	
	F3			8.24	48.7	
9	G	236338.22	3813945.29	1.54	54.6	
	F2			4.89	55.8	
	F3			8.24	57.0	
10	G	236333.84	3813952.15	1.54	53.8	
	F2			4.89	54.9	
	F3			8.24	56.0	
11	G	236326.38	3813966.74	1.54	51.0	
	F2			4.34	51.2	
	F3			7.14	53.4	

Battery Energy Storage Facility
Assessed receiver spectra in dB(A) - 2021 Site Update Receivers without Berm

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Receiver 1 Fl G X 236318.75 m Y 3813944.97 m Z 1.54 m Ldn 53.5 dB(A)									
Ldn	-20.5	4.9	24.8	53.1	41.6	36.3	22.0	14.1	-13.5
Leq,d	-25.1	0.3	20.2	46.6	37.0	31.7	17.4	9.5	-18.0
Leq,e	-22.5	3.0	22.8	46.8	39.6	34.4	20.1	12.2	-15.4
Leq,n	-28.7	-3.3	16.6	46.4	33.4	28.1	13.8	6.0	-21.6
Receiver 2 Fl G X 236367.93 m Y 3813916.28 m Z 1.54 m Ldn 54.4 dB(A)									
Ldn	-21.1	4.4	23.8	54.1	40.9	35.6	21.1	12.8	-15.9
Leq,d	-25.7	-0.1	19.2	47.5	36.4	31.0	16.5	8.3	-20.4
Leq,e	-23.1	2.4	21.8	47.6	39.0	33.6	19.1	10.9	-17.8
Leq,n	-29.3	-3.7	15.6	47.4	32.8	27.4	12.9	4.7	-24.0
Receiver 3 Fl G X 236374.88 m Y 3813897.18 m Z 1.54 m Ldn 52.9 dB(A)									
Ldn	-19.4	6.0	25.9	52.3	43.2	38.3	24.0	16.1	-11.6
Leq,d	-23.9	1.4	21.4	45.8	38.7	33.7	19.5	11.6	-16.0
Leq,e	-21.4	3.9	24.0	46.1	41.3	36.3	22.0	14.1	-13.7
Leq,n	-27.5	-2.2	17.8	45.5	35.1	30.1	15.9	8.0	-19.7
Receiver 4 Fl G X 236373.70 m Y 3813847.20 m Z 1.54 m Ldn 51.4 dB(A)									
Ldn	-19.6	4.4	23.1	50.9	40.9	36.1	22.1	14.0	-15.7
Leq,d	-24.1	-0.2	18.6	44.3	36.4	31.6	17.6	9.4	-20.2
Leq,e	-21.6	2.4	21.2	44.6	38.9	34.1	20.1	12.0	-17.7
Leq,n	-27.7	-3.8	15.0	44.1	32.8	28.0	14.0	5.8	-23.9
Receiver 5 Fl G X 236324.41 m Y 3813839.55 m Z 1.54 m Ldn 53.4 dB(A)									
Ldn	-18.4	7.1	27.3	52.7	43.6	38.2	23.8	15.9	-11.3
Leq,d	-23.0	2.6	22.8	46.2	39.1	33.7	19.2	11.4	-15.9
Leq,e	-20.4	5.2	25.4	46.6	41.7	36.3	21.8	13.9	-13.3
Leq,n	-26.6	-1.0	19.2	46.0	35.5	30.1	15.6	7.8	-19.5
Receiver 6 Fl G X 236302.18 m Y 3813893.67 m Z 1.54 m Ldn 71.6 dB(A)									
Ldn	-18.1	6.2	25.4	71.6	42.6	37.7	23.7	15.8	-13.1
Leq,d	-22.7	1.7	20.8	64.9	38.0	33.1	19.1	11.3	-17.6
Leq,e	-20.1	4.2	23.4	64.9	40.6	35.8	21.8	13.9	-15.0
Leq,n	-26.3	-1.9	17.2	64.9	34.4	29.5	15.6	7.7	-21.2
Receiver 7 Fl G X 236419.88 m Y 3813915.86 m Z 1.54 m Ldn 48.2 dB(A)									
Ldn	-27.2	-1.7	14.2	47.9	35.3	30.7	16.0	5.5	
Leq,d		-6.3	9.6	41.3	30.8	26.1	11.5	0.9	
Leq,e	-29.2	-3.7	12.2	41.5	33.4	28.7	14.1	3.6	
Leq,n		-9.9	6.0	41.2	27.2	22.5	7.9	-2.6	
Receiver 7 Fl F2 X 236419.88 m Y 3813915.86 m Z 4.89 m Ldn 48.3 dB(A)									
Ldn	-28.1	-1.8	19.2	48.0	35.2	29.9	15.0	4.8	
Leq,d		-6.4	14.6	41.4	30.6	25.3	10.4	0.3	
Leq,e		-3.8	17.2	41.5	33.2	27.9	13.0	2.9	
Leq,n		-10.0	11.0	41.3	27.0	21.7	6.8	-3.3	
Receiver 7 Fl F3 X 236419.88 m Y 3813915.86 m Z 8.24 m Ldn 49.4 dB(A)									

Battery Energy Storage Facility
Assessed receiver spectra in dB(A) - 2021 Site Update Receivers without Berm

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Ldn	-27.8	-1.6	19.6	49.1	35.6	30.5	16.4	7.4	-27.5
Leq,d		-6.2	15.0	42.5	31.0	26.0	11.7	2.8	
Leq,e	-29.8	-3.5	17.7	42.6	33.7	28.6	14.5	5.5	-29.4
Leq,n		-9.7	11.5	42.4	27.5	22.4	8.2	-0.8	
Receiver 8 Fl G X 236427.39 m Y 3813912.52 m Z 1.54 m Ldn 47.6 dB(A)									
Ldn	-27.7	-2.3	13.4	47.3	34.8	30.1	15.3	4.5	
Leq,d		-6.8	8.8	40.7	30.2	25.5	10.7	-0.1	
Leq,e	-29.8	-4.3	11.4	40.9	32.9	28.2	13.4	2.6	
Leq,n		-10.4	5.2	40.6	26.7	21.9	7.1	-3.7	
Receiver 8 Fl F2 X 236427.39 m Y 3813912.52 m Z 4.89 m Ldn 47.6 dB(A)									
Ldn	-28.6	-2.4	18.5	47.3	34.6	29.2	14.2	3.7	
Leq,d		-7.0	14.0	40.7	30.0	24.7	9.7	-0.9	
Leq,e		-4.4	16.6	40.8	32.6	27.3	12.3	1.8	
Leq,n		-10.6	10.4	40.6	26.4	21.1	6.1	-4.5	
Receiver 8 Fl F3 X 236427.39 m Y 3813912.52 m Z 8.24 m Ldn 48.7 dB(A)									
Ldn	-28.4	-2.2	19.0	48.4	35.0	29.8	15.4	6.0	-29.8
Leq,d		-6.7	14.4	41.8	30.4	25.3	10.8	1.4	
Leq,e		-4.1	17.1	42.0	33.0	27.9	13.5	4.1	
Leq,n		-10.3	10.9	41.7	26.8	21.7	7.2	-2.2	
Receiver 9 Fl G X 236338.22 m Y 3813945.29 m Z 1.54 m Ldn 54.6 dB(A)									
Ldn	-22.6	2.9	21.5	54.4	39.9	34.9	20.6	12.2	-17.7
Leq,d	-27.1	-1.6	16.9	47.7	35.4	30.4	16.1	7.6	-22.3
Leq,e	-24.7	0.9	19.5	47.8	37.9	32.9	18.6	10.2	-19.7
Leq,n		-5.2	13.3	47.7	31.8	26.8	12.5	4.0	-25.9
Receiver 9 Fl F2 X 236338.22 m Y 3813945.29 m Z 4.89 m Ldn 55.8 dB(A)									
Ldn	-23.4	2.9	24.1	55.6	40.2	35.2	21.7	14.9	-12.8
Leq,d	-27.9	-1.7	19.5	49.0	35.6	30.6	17.1	10.3	-17.4
Leq,e	-25.3	0.9	22.2	49.1	38.2	33.3	19.7	12.9	-14.8
Leq,n		-5.3	16.0	49.0	32.0	27.1	13.5	6.7	-21.0
Receiver 9 Fl F3 X 236338.22 m Y 3813945.29 m Z 8.24 m Ldn 57.0 dB(A)									
Ldn	-22.8	3.5	24.9	56.8	41.9	37.8	24.7	17.3	-11.6
Leq,d	-27.4	-1.1	20.3	50.2	37.3	33.2	20.1	12.8	-16.1
Leq,e	-24.8	1.5	22.9	50.3	39.9	35.8	22.7	15.4	-13.5
Leq,n		-4.7	16.7	50.1	33.7	29.6	16.5	9.2	-19.7
Receiver 10 Fl G X 236333.84 m Y 3813952.15 m Z 1.54 m Ldn 53.8 dB(A)									
Ldn	-23.3	2.2	20.5	53.6	39.2	34.2	19.9	11.3	-19.1
Leq,d	-27.8	-2.3	15.9	46.9	34.6	29.7	15.3	6.7	-23.7
Leq,e	-25.3	0.2	18.5	47.0	37.3	32.3	18.0	9.3	-21.0
Leq,n		-6.0	12.3	46.9	31.1	26.1	11.8	3.1	-27.2
Receiver 10 Fl F2 X 236333.84 m Y 3813952.15 m Z 4.89 m Ldn 54.9 dB(A)									
Ldn	-24.1	2.2	23.4	54.7	39.4	34.4	20.7	13.7	-14.3

Battery Energy Storage Facility
Assessed receiver spectra in dB(A) - 2021 Site Update Receivers without Berm

Time slice	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Leq,d	-28.6	-2.4	18.8	48.1	34.8	29.8	16.1	9.1	-18.8
Leq,e	-26.0	0.2	21.4	48.2	37.5	32.5	18.7	11.7	-16.2
Leq,n		-6.0	15.2	48.0	31.2	26.2	12.5	5.5	-22.4
Receiver 10 Fl F3 X 236333.84 m Y 3813952.15 m Z 8.24 m Ldn 56.0 dB(A)									
Ldn	-23.6	2.7	24.1	55.8	40.9	36.8	23.6	16.3	-12.8
Leq,d	-28.1	-1.8	19.5	49.2	36.3	32.2	19.1	11.7	-17.4
Leq,e	-25.5	0.8	22.1	49.3	38.9	34.8	21.7	14.4	-14.8
Leq,n		-5.4	15.9	49.1	32.7	28.6	15.5	8.2	-21.0
Receiver 11 Fl G X 236326.38 m Y 3813966.74 m Z 1.54 m Ldn 51.0 dB(A)									
Ldn	-25.2	0.4	17.7	50.7	37.4	32.4	17.9	8.7	-23.2
Leq,d	-29.7	-4.2	13.1	44.1	32.8	27.8	13.3	4.1	-27.8
Leq,e	-27.2	-1.6	15.8	44.3	35.4	30.4	16.0	6.7	-25.1
Leq,n		-7.8	9.5	44.0	29.2	24.2	9.7	0.5	
Receiver 11 Fl F2 X 236326.38 m Y 3813966.74 m Z 4.34 m Ldn 51.2 dB(A)									
Ldn	-26.0	0.2	21.1	50.9	37.3	32.1	17.8	9.2	-20.9
Leq,d		-4.4	16.6	44.3	32.7	27.5	13.2	4.6	-25.5
Leq,e	-28.0	-1.8	19.2	44.5	35.3	30.2	15.8	7.2	-22.9
Leq,n		-8.0	13.0	44.2	29.1	24.0	9.6	1.0	-29.1
Receiver 11 Fl F3 X 236326.38 m Y 3813966.74 m Z 7.14 m Ldn 53.4 dB(A)									
Ldn	-25.7	0.6	21.8	53.2	37.9	33.1	19.9	12.2	-17.7
Leq,d		-4.0	17.2	46.6	33.4	28.6	15.3	7.6	-22.3
Leq,e	-27.6	-1.4	19.9	46.7	36.0	31.2	18.0	10.3	-19.6
Leq,n		-7.6	13.7	46.5	29.8	25.0	11.8	4.0	-25.8