EQUINIX SV12, SV13, AND SV14 (FORMALLY XILINX) PROJECT NOISE ASSESSMENT SAN JOSÉ, CALIFORNIA

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INTRODUCTION

This report presents the results of the noise assessment completed for the Equinix SV12, SV13, and SV14 project proposed to the north of Santa Teresa Boulevard, between San Ignacio Avenue and Great Oaks Boulevard in San José, California. The project would develop the northeastern 18-acres of the 34-acre site with three data center buildings. Additionally, a substation would be constructed about 2,000 feet northwest of the Equinix site, adjacent to State Route 85 (SR 85).

The report is divided into two sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise and groundborne vibration, summarizes applicable regulatory criteria, and discusses the results of the ambient noise measurements and modeling completed to document existing and future conditions; and 2) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project with respect to adjacent noise and vibration sources and noise-sensitive land uses.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. - 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (*DNL* or L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Typically, the highest steady traffic noise level during the daytime is about equal to the DNL and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA DNL with open windows and 65-70 dBA DNL if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The DNL as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA DNL. At a DNL of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the DNL increases to 70 dBA, the percentage of the population highly annoyed increases to about 25-30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between a DNL of 60-70 dBA. Between a DNL of 70-80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the DNL is 60 dBA, approximately 30-35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reactions of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Criteria – Noise

The State of California and the City of San José have established plans and policies designed to limit noise exposure at noise sensitive land uses. These plans and policies are contained in the following documents: (1) the State California Environmental Quality Act (CEQA) Guidelines, Appendix G, (2) the City of San José Noise Element of the General Plan, and (3) the City of San José Municipal Code.

State CEQA Guidelines. The CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks the following applicable questions. Would the project result in:

(a) Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?

(b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

(d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

(e) For a project located within an airport land use plan or, where such a plan has not been adopted within two miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels?

(f) For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels?

Of these guidelines, only items (a), (b), (c), and (d) are applicable to the proposed project. The project is not located in the vicinity of a public airport or private airstrip; therefore, checklist items (e) and (f) are not carried forward in this analysis.

CEQA does not define what noise level increase would be considered substantial. Typically, project-generated noise level increases of 3 dBA DNL or greater would be considered significant where exterior noise levels would exceed the normally acceptable noise level standard (60 dBA DNL for residential land uses). Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA DNL or greater would be considered significant.

City of San José General Plan. The Environmental Leadership Chapter in The Envision San José 2040 General Plan sets forth policies related to noise and vibration control in the City of San José. The following policies are applicable to the proposed project:

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3, and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.3 Mitigate noise generation of new nonresidential land uses to 55 dBA DNL at the property line when located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

EC-1.7 Require construction operations within San José to use best available noise suppression devices and techniques and limit construction hours near residential uses per the City's Municipal Code. The City considers significant construction noise impacts to occur if a project located within 500 feet of residential uses or 200 feet of commercial or office uses would:

- Involve substantial noise generating activities (such as building demolition, grading, excavation, pile driving, use of impact equipment, or building framing) continuing for more than 12 months.

For such large or complex projects, a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

EC-2.3 Require new development to minimize vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, a vibration limit of 0.08 in/sec PPV (peak particle velocity) will be used to minimize the potential for cosmetic damage to a building. A vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

City of San José Municipal Code. The City's Municipal Code contains a Zoning Ordinance that limits noise levels at adjacent properties. Chapter 20.30.700 states that sound pressure levels generated by any use or combination of uses on a property shall not exceed 55 dBA at any property line shared with land zoned for residential use, except upon issuance and in compliance with a Conditional Use Permit.

Chapter 20.40.600 states that sound pressure levels generated by any use or combination of uses on a property shall not exceed 60 dBA at any property line shared with land zoned for commercial or other non-residential purposes, except upon issuance and in compliance with a Conditional Use Permit.

Chapter 20.100.450 of the Municipal Code establishes allowable hours of construction within 500 feet of a residential unit between 7:00 a.m. and 7:00 p.m. Monday through Friday unless permission is granted with a development permit or other planning approval. No construction activities are permitted on the weekends at sites within 500 feet of a residence.

Existing Noise Environment

The project includes the development of three data centers on the Equinix (formerly Xilinx) site, located north of Santa Teresa Boulevard between San Ignacio Avenue and Great Oaks Boulevard, a substation located south of SR 85, and a transmission line connecting the two sites. The sites are currently undeveloped. A noise monitoring survey was made between Tuesday, January 26, 2016 and Thursday, January 28, 2016 to document existing noise conditions at the project site and at nearby receptors. The noise monitoring survey included two long-term measurements (LT-1 and LT-2) and three short-term measurements (ST-1 through ST-3). Noise measurement locations are shown in Figure 1. Appendix 1 summarizes the data collected at the long-term measurement sites.

Long-term noise measurement LT-1 was located about 100 feet north of the center of Santa Teresa Boulevard and 300 feet east of the center of San Ignacio Avenue. Noise levels measured at this site were primarily the result of traffic along the Santa Teresa Boulevard. Hourly average noise levels ranged from 60 to 67 dBA L_{eq} during the day and evening between 7:00 a.m. and 10:00 p.m. and from 50 to 62 dBA L_{eq} at night between 10:00 p.m. and 7:00 a.m. The day-night average noise level at this location was calculated to be 65 dBA DNL. Long-term noise measurement LT-2 was located at the end of Miyuki Drive, about 350 feet south of SR 85. Noise levels measured at this site were primarily the result of traffic along SR 85. Hourly average noise levels ranged from 64 to 68 dBA L_{eq} during the day and evening and from 51 to 65 dBA L_{eq} at night. The day-night average noise level at this location was calculated to be 68 dBA DNL.

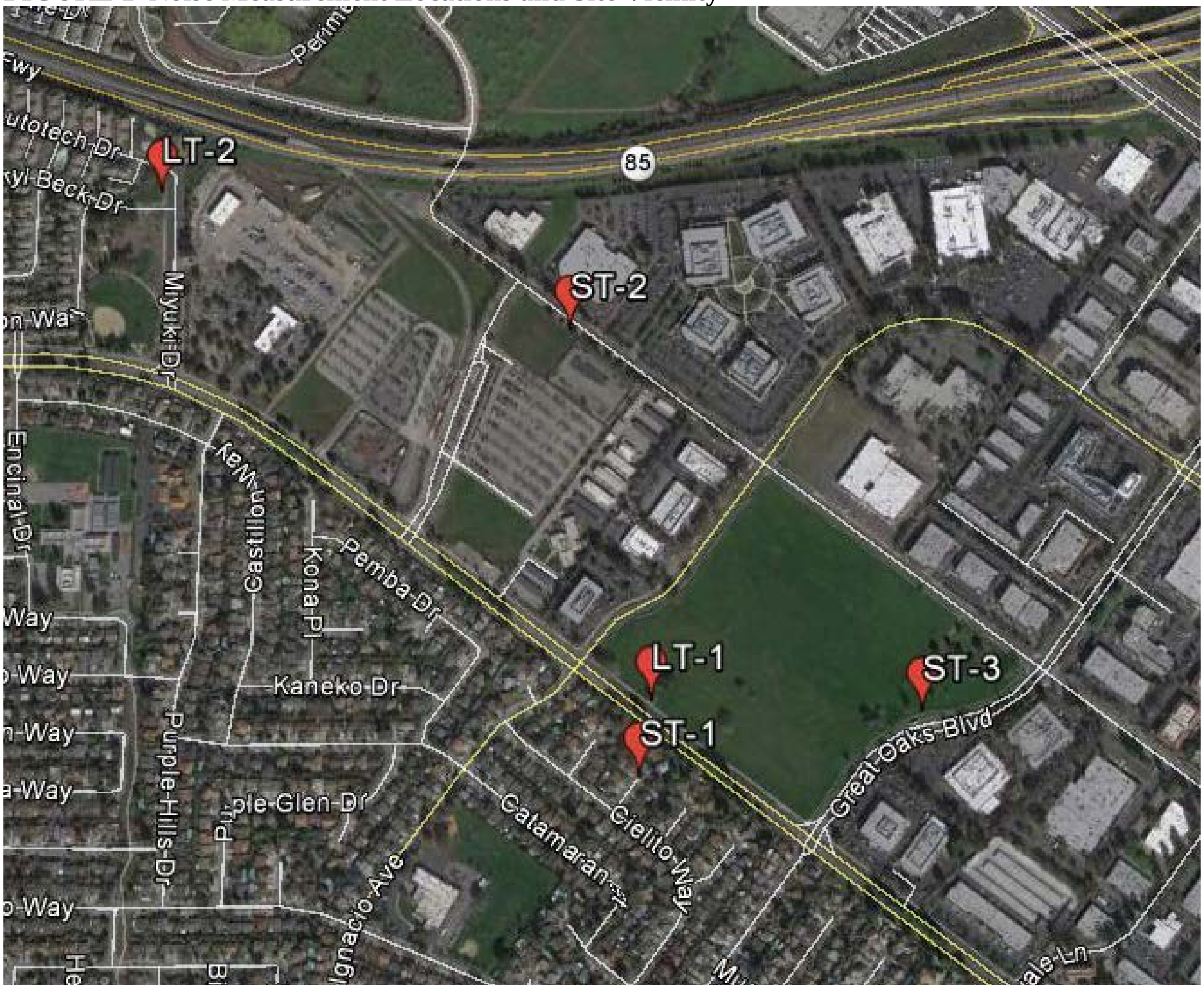
Short-term noise measurement ST-1 was made in front of the residence located at 214 Paraiso Court. The primary noise source at this location was traffic on Santa Teresa Boulevard, although the measurement location was shielded from the roadway by intervening structures. The ten-minute average noise level, which included a 70 dBA L_{max} jet flyover, was 55 dBA L_{eq}. Short-term noise measurement ST-2 was located across from industrial uses at 6450 Via Del Oro. The ten-minute average noise level at this location, generated by traffic on SR 85 and Via Del Oro, was 62 dBA L_{eq}. Short-term noise measurement ST-3 was made across from industrial uses at 160 Great Oaks Boulevard at a distance of 75 feet from the center of the road. The ten-minute average noise level at this location, generated primarily by traffic on Great Oaks Boulevard, was 59 dBA L_{eq}. A summary of the results of the short-term measurements is shown in Table 4.

TABLE 4 Summary of Short-Term Noise Measurement Data

Noise Measurement Location	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	DNL	Primary Noise Sources
ST-1: Front of 214 Paraiso Court. (1/28/2016, 12:20 p.m.-12:30 p.m.)	69	55	49	47	55	57	Traffic on Santa Teresa Boulevard (shielded by residence)
ST-2: 50 feet from center of Via Del Oro. (1/28/2016, 12:40 p.m.-12:50 p.m.)	71	66	56	53	62	64	Traffic on SR 85 & Via Del Oro, Parking lot and bus yard activities
ST-3: 75 feet from center of Great Oaks Boulevard. (1/28/2016, 1:00 p.m.-1:10 p.m.)	67	64	56	52	60	62	Traffic on Great Oaks Boulevard

Note: DNL approximated from long term measurement data.

FIGURE 1 Noise Measurement Locations and Site Vicinity



Source: Google Earth

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

Paraphrasing from Appendix G of the CEQA Guidelines, a project would normally result in significant noise impacts if noise levels generated by the project conflict with adopted environmental standards or plans, if the project would expose people to or generate excessive groundborne vibration levels, or if ambient noise levels at sensitive receivers would be substantially increased over a permanent, temporary, or periodic basis. The following criteria were used to evaluate the significance of environmental noise and vibration resulting from the project:

1. **Project Operational Noise:** A significant impact would be identified if the project operational noise sources would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code or substantially increase noise levels at sensitive receptors in the vicinity.
   - A significant noise impact would be identified if operational noise levels are anticipated to exceed 55 dBA L_{eq} at any property line shared with land zoned for residential use and/or 60 dBA L_{eq} at any property line shared with land zoned for commercial or other non-residential noise sensitive purposes.
   - A substantial permanent noise increase would occur if: a) the noise level increase is 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) the noise level increase is 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

2. **Groundborne Vibration:** A significant impact would be identified if the construction of the project would expose persons to excessive vibration levels. Groundborne vibration levels exceeding 0.2 in/sec PPV would have the potential to result in "architectural" damage to normal buildings.

3. **Construction Noise:** A significant impact would be identified if the project construction would generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code or cause a substantial temporary increase in noise levels at sensitive receptors in the vicinity.
   - The San José Municipal Code and General Plan specify hours of construction and construction techniques for all construction operations within the City of San José.
   - Hourly average construction noise levels intermittently exceeding 60 dBA L_{eq}, and the ambient by at least 5 dBA L_{eq}, for a period exceeding one year would constitute a significant temporary noise increase at adjacent noise sensitive land uses.

Impact 1: **Operational Noise.** Operational noise is not anticipated to exceed the noise limits presented in the City of San José Municipal Code. **This is a less than significant impact.**

The project includes construction of three data center buildings on the Equinix site, a substation at a site adjacent to SR 85 to the northwest, and a transmission line connecting the two sites. In accordance with the San José Municipal Code and General Plan, operational noise sources are limited to a noise level of 55 dBA L_{eq} at any residential property line and 60 dBA L_{eq} at any commercial property line. In addition, a substantial permanent noise increase would be identified if project operations were to cause a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater, at adjacent residences.

The majority of land uses surrounding the site are non-noise sensitive industrial park uses such as parking, bus yards, etc. Residences are located as close as 700 feet south of the Equinix site and 1,000 feet west and south of the substation site.

Equinix Site

The project proposes to construct three data centers buildings, each approximately 188,000 square feet in size on the northern 18-acres of the existing Equinix site. The new data center buildings would house computer servers and supporting equipment for private clients, as well as associated office uses, in environmentally controlled structures.

The predominant noise source at these data centers would be the testing and operation of standby diesel generators. Standby backup electricity for each building would be provided by seven generators with Caterpillar diesel-fueled engines located in the equipment yards adjacent to each building, for a total of 21 generators. The electric generating capacity of each generator would be approximately 3 megawatts (MW) at 480 volts. The SV13 data center generators would be located along the southern side of the building, with a 25-foot high precast concrete panel wall provided as shielding to receptors to the south. The SV12 and SV14 data center generators are proposed north of the buildings and the buildings themselves, as well as the proposed precast walls would provide shielding to receptors to the south.

During normal facility operation, these engines would not be operated other than for periodic testing and maintenance requirements. It is understood that testing of each generator would generally be performed twice per month to make sure that they are ready to come online when needed in the event of a power failure. The testing is proposed to normally take place on weekdays between the hours of 8:00 a.m. to 5:00 p.m. Normal generator testing at no load for five minutes would occur monthly and generator testing at full load (100 percent load) for one hour would occur one per month for 11 months of the year. In addition to the normal engine testing and operation for maintenance purposes, each engine would undergo generator load testing for up to four hours per year with the engine at full load. Total generator engine operation under normal conditions is expected to be about 16 hours per year, per engine. The generators would run continuously during power outages.

The manufacturer performance data for the generator specifies a sound power level of 135 dB for the exhaust and 126 dB for the mechanical components of the generator at 100% load, resulting in a total sound pressure level of 106 dBA at a distance of 25 feet from each unit. The project proposes to use sound attenuated enclosures and an interior silencer, resulting in a noise level of 78 dBA at a distance of 23 feet for each generator. With all seven generators operating simultaneously, the total sound pressure level would be about 86 dBA at a distance of 25 feet.

Noise modeling using SoundPLAN v7.4 was conducted to calculate the noise level exposure of residences to the south to noise generated by the seven SV13 generators located behind the proposed 25-foot high precast concrete panel wall. Based on the results of the modeling, the proposed 25-foot high wall is calculated to provide about 16 dBA of shielding to residences located 700 feet to the south, resulting in a total noise exposure level of 40 dBA L_{eq} at these residences during simultaneous operation of all seven generators at full load. Due to the attenuation provided by the SV12 and SV14 data center buildings, noise levels produced by the generators located north of SV12 and SV14 would not measurably increase the resulting noise level produced by the SV13 generators. This noise level is well below the Municipal Code threshold of 55 dBA L_{eq}, would not be audible above existing ambient traffic noise generated by vehicles on Santa Teresa Boulevard, and would not cause a measureable increase in noise levels above ambient at this location (increase is calculated to be less than 1 dBA). Other noise sources proposed with the project, such as mechanical HVAC equipment, would be even lower in noise level as these equipment produce substantially less noise as compared to a generator. This is a **less-than-significant** impact.

Substation and Transmission Line

The project also proposes to construct a new distribution line to connect existing lines in Miyuki Drive to the proposed new substation and two feeder lines to connect the new substation to the proposed data center buildings. The proposed distribution lines would all be routed underground. The proposed substation would be approximately 2.1-acres in size and would include a control building, circuit breakers, switchgear, transformers, dead-end structures, and other miscellaneous electrical equipment. The only notable noise sources at the substation are anticipated to be the transformers. The project proposes to initially install one 45 MVA 115/21 kV transformer, with a buildout condition of three of these transformers. The transformers are specified to generate a noise level of 72 dB at a distance of 6 feet during full load with fans and pumps running. At the nearest noise sensitive locations, residences located about 1,000 feet to the west and south, the noise level from all three transformers operating simultaneously would be below 40 dBA L_{eq}. This would be 10 to 30 dB below daytime and nighttime ambient hourly average noise levels at these residences (see LT-1 and LT-2). As a result, transformer noise is not anticipated to be audible at the nearest sensitive receptor locations and would not cause a measureable increase in noise above ambient noise levels (increase would be less than 1 dBA). This is a **less-than-significant** impact.

Mitigation Measures: None Needed.

Impact 2: **Groundborne Vibration.** Construction-related vibration would not be excessive at nearby residential land uses. **This is a less-than-significant impact.**

Construction of the project is anticipated to take about 29 months. A significant impact would be identified if the construction of the project would generate groundborne vibration levels at adjacent structures exceeding 0.2 in/sec PPV because these levels would have the potential to result in “architectural” damage to normal buildings.

Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity of the work area. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 6 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet.

TABLE 6 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft. (in/sec)	Approximate L_v at 25 ft. (VdB)
Pile Driver (Impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (Sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

The closest existing structures to the Equinix project site are industrial park buildings located about 100 feet north of the site, across Via Del Oro. Industrial park structures are also located about 150 feet to the east and west of the Equinix site. Residences are located about 700 feet south of the Equinix site. The closest structures to the substation site are industrial park structures located about 400 feet to the east, west, and south. Structures are as close as 80 feet to the location of the proposed transmission line, which would run along Via Del Oro between the substation and the Equinix site.

Impact or vibratory pile driving is not anticipated as part of project construction activities. Based on the levels shown in Table 6, vibration could exceed 0.2 in/sec PPV when located within about 25 feet of existing structures. Vibration levels produced by heavy equipment (vibratory rollers, clam shovel drops) during for data center and substation construction are calculated to be 0.05 in/sec PPV or less at a distance of 100 feet, 0.03 in/sec PPV or less at a distance of 150 feet, 0.01 in/sec PPV or less at a distance of 400 feet, and 0.005 in/sec PPV or less at a distance of 700 feet.[1] Vibration levels at 80 feet from the transmission line installation would be 0.025 in/sec PPV, generated by drilling and large earthmoving equipment. Vibratory rollers and clam shovel drops are not anticipated as part of the transmission line construction. Vibration levels would be lower

[1] These levels are calculated assuming normal propagation conditions and a conservative assumption of hard soil conditions, using a standard equation of $PPV_{eqmt}\text{-}PPV_{ref} * (25/D)^{1.1}$.

at structures located further from the project site and as construction moves away from the property lines of the site. Vibration levels during heavy construction may occasionally be perceptible at the commercial uses to the north when construction is located directly adjacent to these areas, but would not approach the 0.2 in/sec PPV threshold for architectural damage. This is a **less-than-significant** impact.

Mitigation Measures: None Needed.

Impact 3: **Construction Noise.** Noise levels generated by construction activities associated with the project would be in compliance with the San José Noise Ordinance and would not cause a substantial temporary noise increase at noise sensitive receptors for a period exceeding one year. **This is a less-than-significant impact.**

In accordance with the San José Municipal Code, construction located within 500 feet of residences would be restricted to within the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday. No construction activities are permitted on the weekends at sites within 500 feet of a residence. Additionally, the San José General Plan specifies that construction operations within San José are required to use best available noise suppression devices and techniques. Construction located within 500 feet of residences or within 200 feet of noise sensitive commercial uses that involves substantial noise generating activities continuing for more than 12 months would require a construction noise logistics plan that specifies hours of construction, noise and vibration minimization measures, posting or notification of construction schedules, and designation of a noise disturbance coordinator who would respond to neighborhood complaints will be required to be in place prior to the start of construction and implemented during construction to reduce noise impacts on neighboring residents and other uses.

In addition to the Municipal Code and General Plan requirements, construction noise would be considered a significant temporary noise increase if hourly average noise levels received at noise sensitive residential land uses would exceed 60 dBA L_{eq} and at least 5 dBA L_{eq} above the ambient noise environment when the duration of the noise-generating activities last for more than one year.

Noise impacts resulting from construction depend upon the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance between construction noise sources and noise-sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Project construction would take place over a period of about 29 months and would include construction of the substation, the transmission line, and the three data centers. Construction noise levels would vary by phase and vary within phases based on the amount of equipment in operation and location where the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 7 and 8. Table 7 shows the average noise level range by construction phase and Table 8 shows the maximum noise level range for different construction equipment. Table 7 levels are consistent with construction noise levels calculated for the project in the Federal Highway Administration Roadway Construction Noise Model, including the anticipated equipment that would be used for each phase of the project. Most demolition and construction noise is in the range of 80 to 90 dBA at a distance of 50 feet from the source.

TABLE 7 Typical Ranges of Construction Noise Levels at 50 Feet, dBA L_{eq}

	Domestic Housing	**Office Building, Hotel, Hospital, School, Public Works**		**Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station**		**Public Works Roads & Highways, Sewers, and Trenches**	
	I II	**I**	**II**	**I**	**II**	**I**	**II**
Ground Clearing	8383	84	84	84	83	84	84
Excavation	8875	89	79	89	71	88	78
Foundations	8181	78	78	77	77	88	88
Erection	8165	87	75	84	72	79	78
Finishing	8872	89	75	89	74	84	84
I - All pertinent equipment present at site, **II** - Minimum required equipment present at site.							

Source: U.S. EPA., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 8 Construction Equipment 50-foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

1 Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

3 Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Table 9 shows the calculated construction noise levels for each phase of construction, based on the equipment specified for the project, at a distance of 100 feet from the center of the construction activity and the calculated distance to the 60 dBA L_{eq} noise contour for each construction phase.

TABLE 9 Calculated Construction Noise Levels for Each Phase of Construction

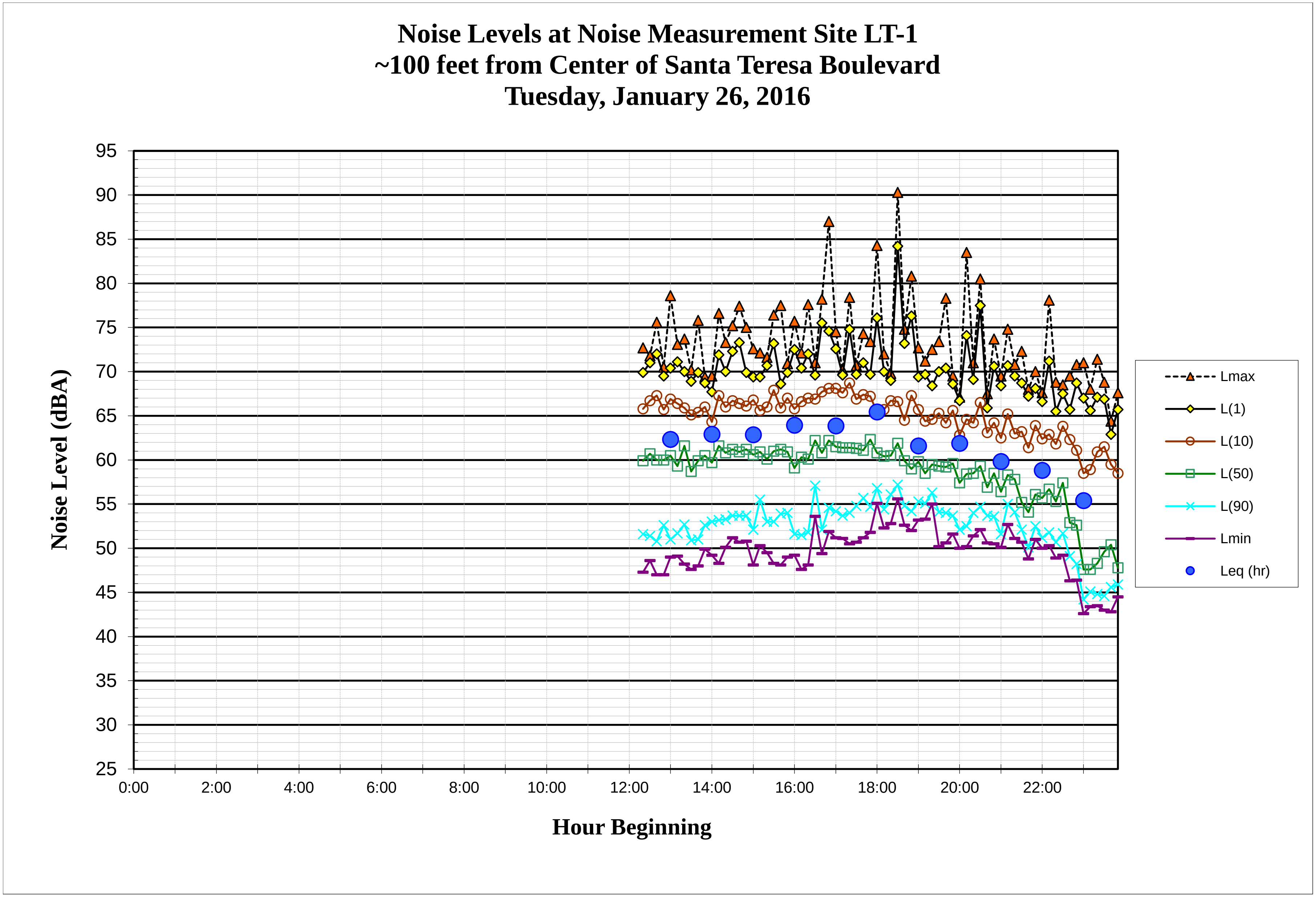
Construction Phase		At Distance of 100 ft[1]		Distance to 60 dBA L_{eq} Contour[2]
		L_{eq}, dBA	L_{max}, dBA	
Substation and Transmission Line	Relocation of On-Site Storage (20 days)	68	69	250 ft
	Site Preparation/Grading (40 days)	73	75	475 ft
	Excavation of Foundations (40 days)	74	75	500 ft
	Trenching: Substation (20 days)	74	75	500 ft
	Building: Substation (40 days)	76	76	600 ft
	Building: Overhead Transmission Line TSPs (8 days)	76	76	600 ft
	Building: Underground Distribution Line (40 days)	74	78	500 ft
	Paving: Substation (20 days)	68	74	250 ft
SV12, SV13, and SV14 Buildings	Trenching/Grading (20 days)	76	78	600 ft
	Building Exterior (230 days)	77	77	700 ft
	Building Interiors (20 days)	69	72	275 ft
	Paving (20 days)	75	75	550 ft

[1] All pertinent equipment at site.
[2] Calculated using a standard drop off rate for point sources of 6 dB per doubling of distance.

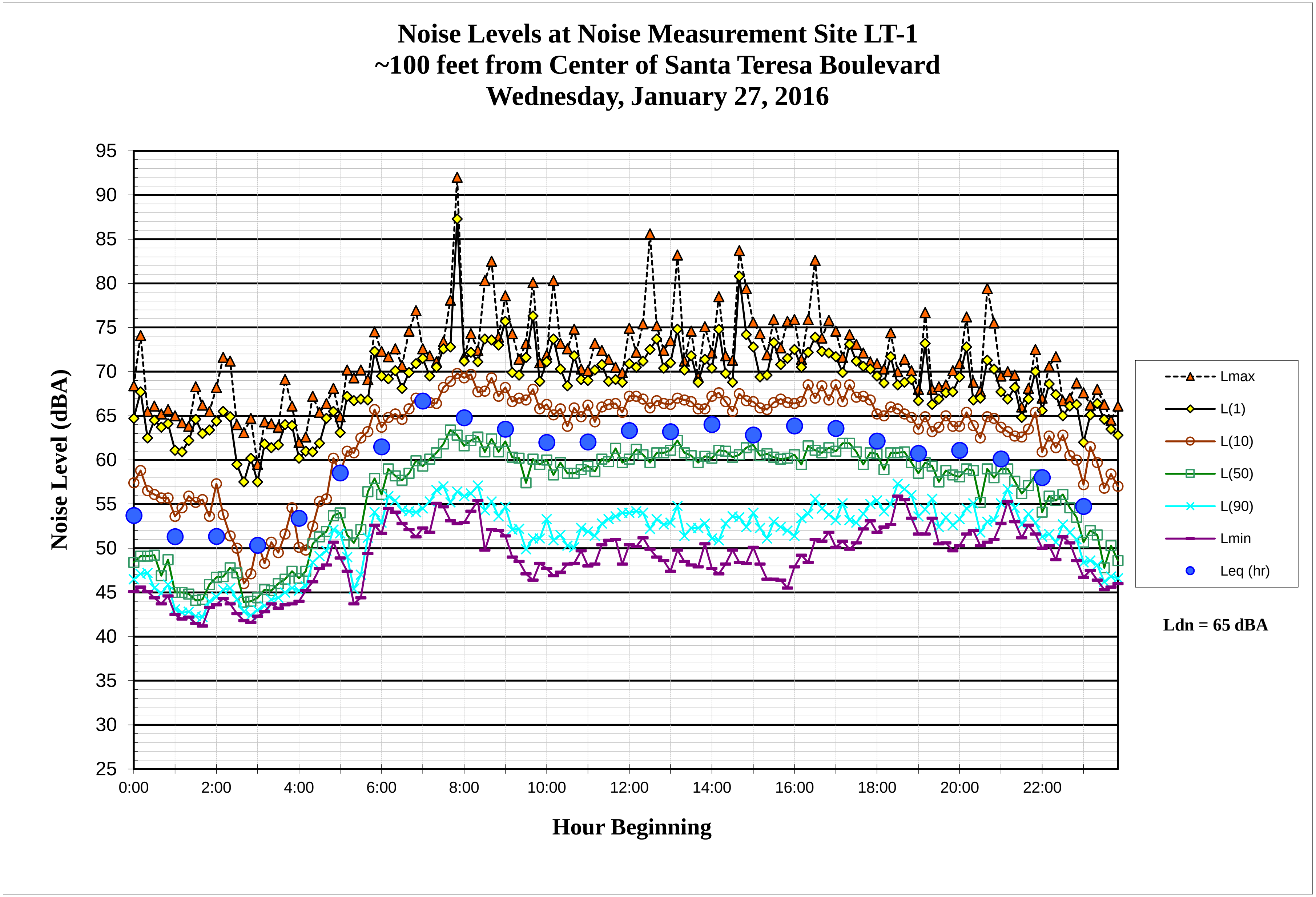
As indicated in Table 9, construction noise levels would reach 69 to 78 dBA L_{max} and 68 to 77 dBA L_{eq} at a distance of 100 feet from construction activities. Construction noise typically drops off at a rate of 6 dB per doubling of distance. Construction noise levels would be low 60 dBA L_{eq} for all construction phases at distances of 700 feet or further from construction. Intervening structures or terrain provide additional noise reduction, typically on the order of 10 to 20 dBA.

The majority of land uses surrounding the site are non-noise sensitive industrial park uses such as parking, bus yards, etc. Residences are located as close as 700 feet south of the Equinix site and 1,000 feet west and south of the substation site. Existing daytime noise levels at residences to the south of the Equinix and substation sites are in the range of 60 to 67 dBA L_{eq} (see LT-1). Existing daytime noise levels at residences to the west of the substation site are in the range of 64 to 68 dBA L_{eq} (see LT-2). There is no construction located within 500 feet of residences or 200 feet of noise sensitive commercial uses. Additionally, as indicated in Table 9, construction noise levels are not anticipated to exceed 60 dBA L_{eq} at distances greater than 700 feet from construction activities during any of the construction phases. The resulting construction noise levels would generally be below ambient noise levels at the nearest residential uses. This is a **less-than-significant impact.**

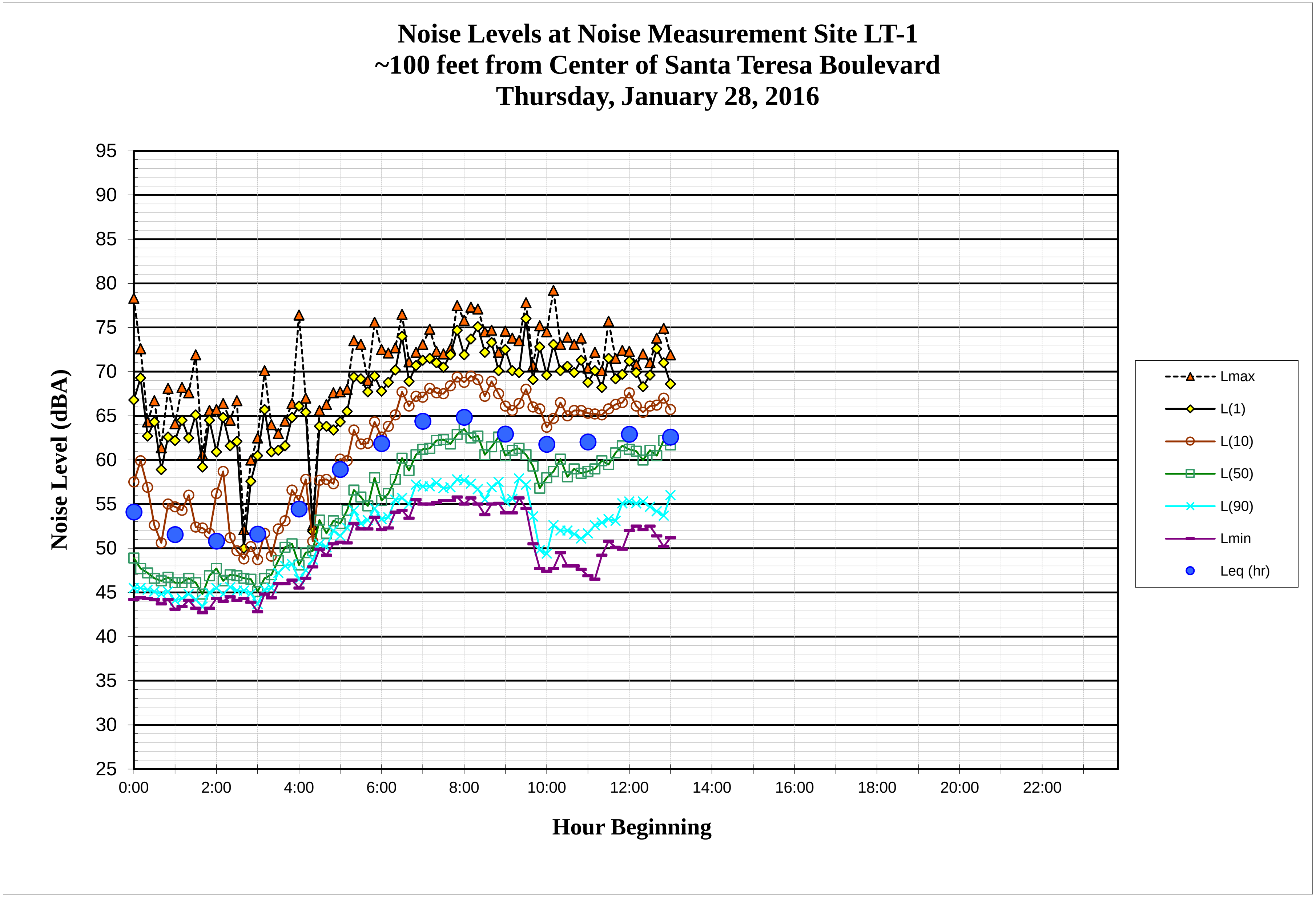
Mitigation Measures: None Needed.



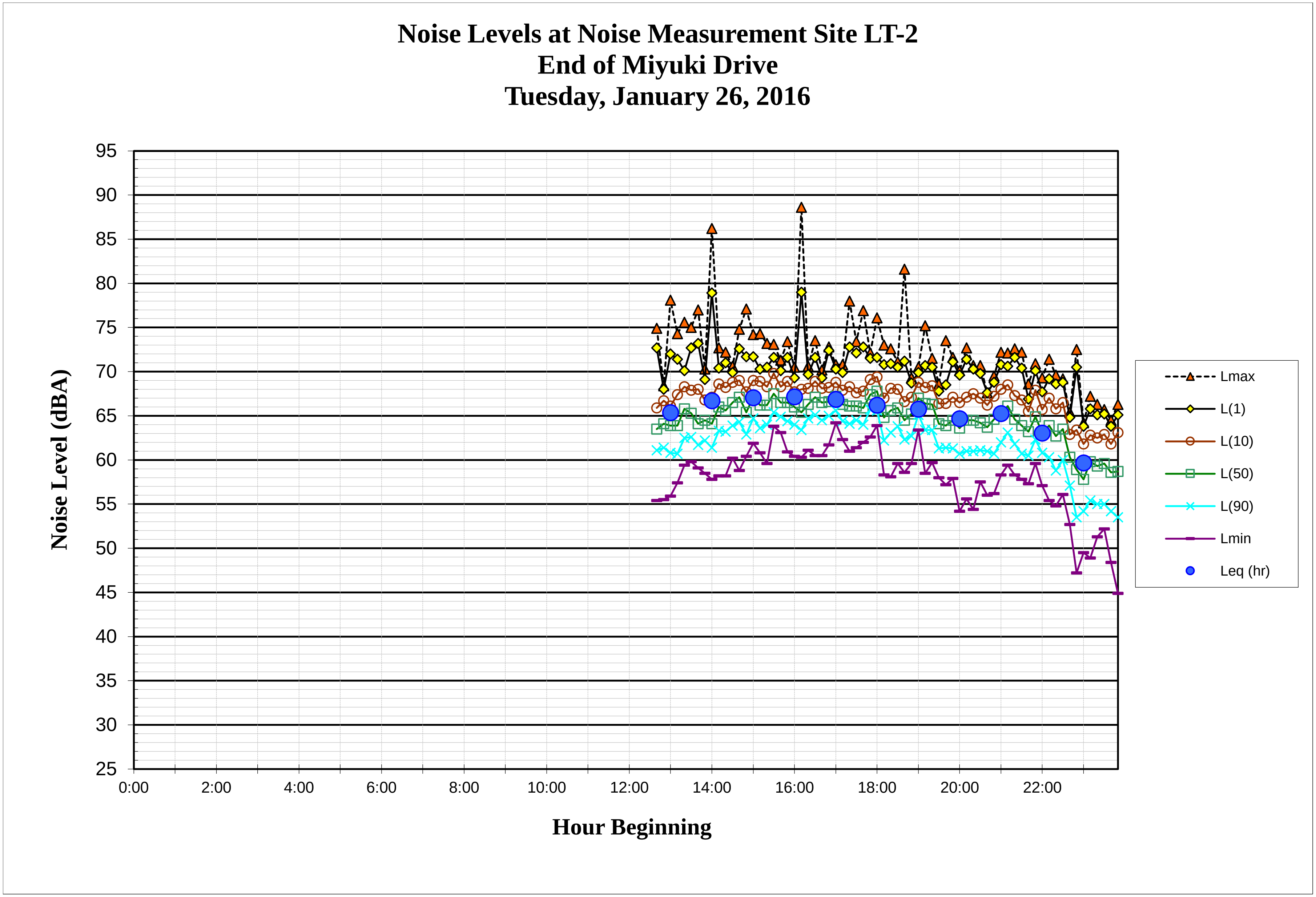
Noise Levels at Noise Measurement Site LT-1
~100 feet from Center of Santa Teresa Boulevard
Tuesday, January 26, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)

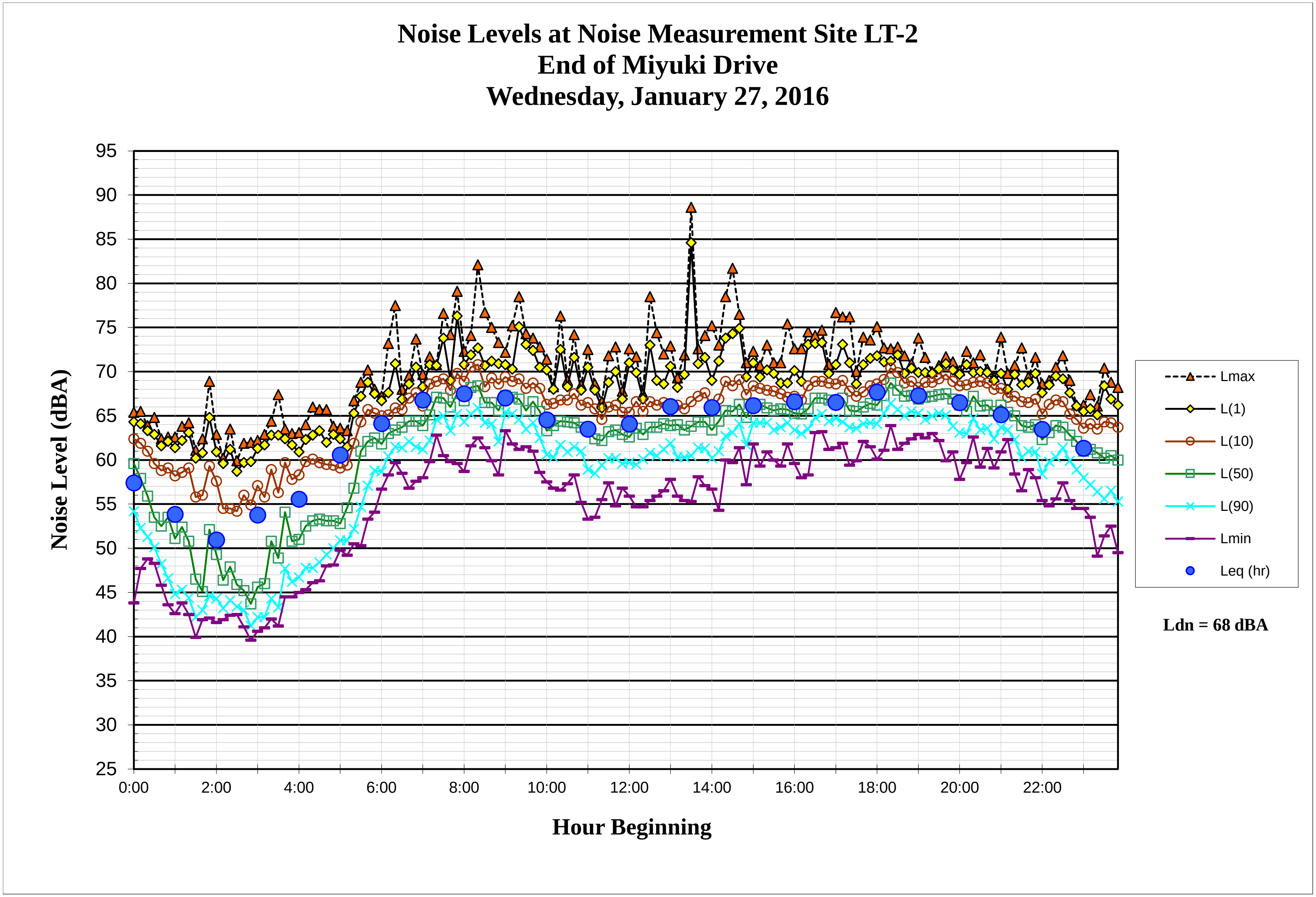


Noise Levels at Noise Measurement Site LT-1
~100 feet from Center of Santa Teresa Boulevard
Wednesday, January 27, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)
Ldn = 65 dBA

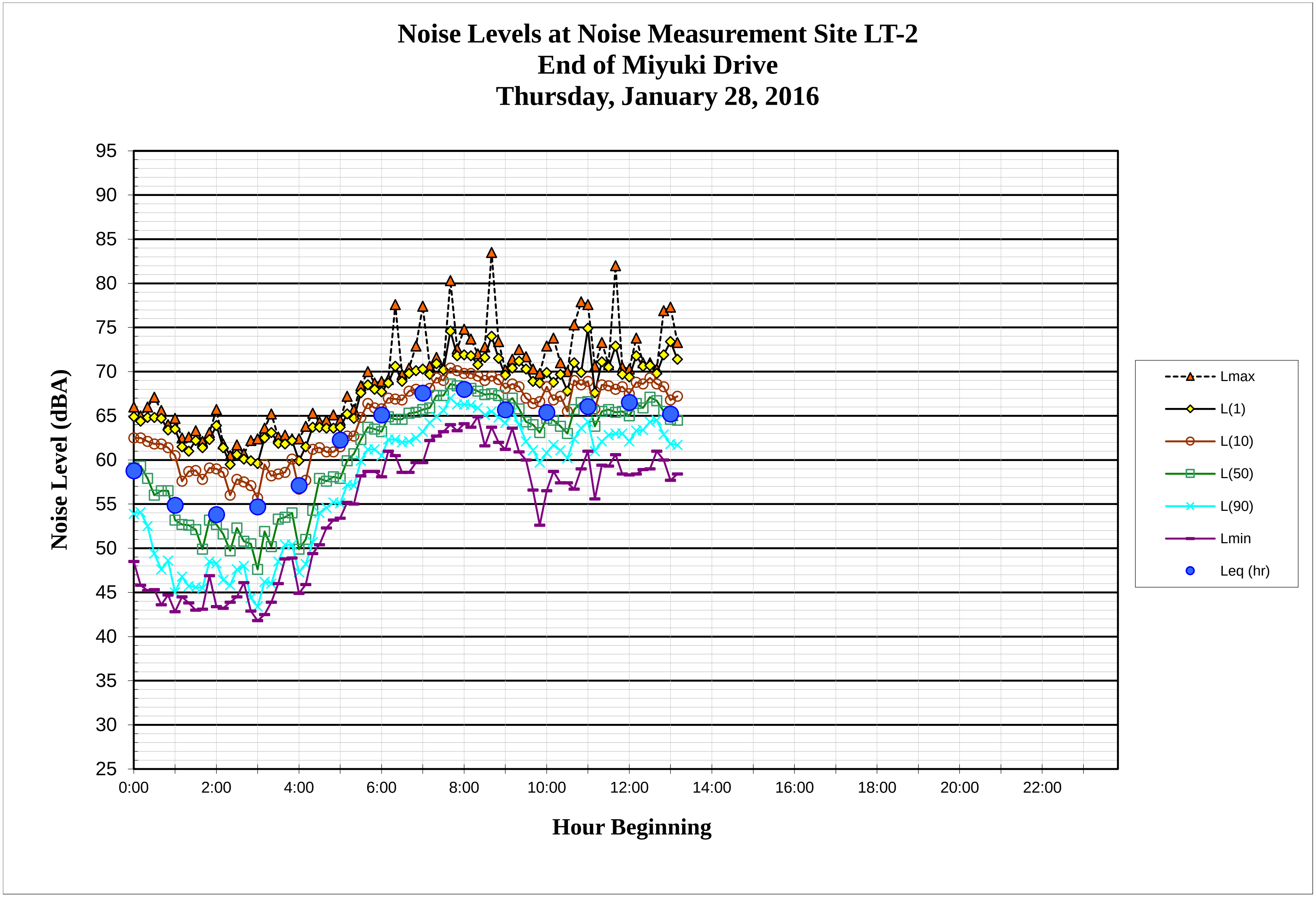


Noise Levels at Noise Measurement Site LT-1
~100 feet from Center of Santa Teresa Boulevard
Thursday, January 28, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)


Noise Levels at Noise Measurement Site LT-2
End of Miyuki Drive
Tuesday, January 26, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)



Noise Levels at Noise Measurement Site LT-2
End of Miyuki Drive
Wednesday, January 27, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)
Ldn = 68 dBA


Noise Levels at Noise Measurement Site LT-2
End of Miyuki Drive
Thursday, January 28, 2016
Noise Level (dBA)
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Hour Beginning
Lmax
L(1)
L(10)
L(50)
L(90)
Lmin
Leq (hr)