Appendix G

Noise and Vibration Assessment

MARKET PARK
NOISE AND VIBRATION ASSESSMENT

San José, California

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INTRODUCTION

A residential mixed-use project is proposed for the 61.5-acre site currently occupied by the San José Flea Market and adjacent to the Berryessa/North San José Bay Area Rapid Transit (BART) station in San José, California. The proposed project would consist of 14 blocks of office, residential, retail, and park space, with a total of 3,450 residential units. Two different options exist for development of commercial space at the site: the applicant's proposed 2.2 million square feet and the City's preferred 3.4 million square feet. The maximum proposed building height is 270 feet. The buildings occupying the western side of the site are planned for residences only while those on the northeastern and southeastern areas are planned for commercial and office space. Approximately 17 acres of public park and open space use is proposed for the site including a plaza adjacent to the BART station, a central garden plaza, and a recreation center with tennis courts and a mini baseball field. Sierra Road to the north would be extended through the site to connect to Mabury Road to the south. As part of the proposed project, the existing flea market structures would be demolished.

This report evaluates the project's potential to result in significant noise and vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency Section discusses noise and land use compatibility utilizing policies in the City's General Plan; and, 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents measures, where necessary, to mitigate the impacts of the project on sensitive receptors in the vicinity.

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 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level* (L_{dn} or *DNL*) 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. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA DNL. 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 or frequent intermittent vibration levels produce. The guidelines in Table 3 represent syntheses of vibration criteria for human response and potential damage to buildings resulting from construction vibration.

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 cause 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. 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 paint flaking or minimal extension of cracks in building surfaces; minor, including limited surface cracking; or major, that may threaten the structural integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher. The damage criteria presented in Table 3 include several categories for ancient, fragile, and historic structures, the types of structures most at risk to damage. Most buildings are included within the categories ranging from “Historic and some old buildings” to “Modern industrial/commercial buildings”. 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.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at 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.

Railroad and light-rail operations are potential sources of substantial ground vibration depending on distance, the type and the speed of trains, and the type of railroad track. People’s response to ground vibration from rail vehicles has been correlated best with the average, root mean square (RMS) velocity of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1 x 10-6 in/sec RMS, which equals 0 VdB, and 1 in/sec equals 120 VdB. Although not a universally accepted notation, the abbreviation “VdB” is used in this document for vibration decibels to reduce the potential for confusion with sound decibels.

Typical background vibration levels in residential areas are usually 50 VdB or lower, well below the threshold of perception for most humans. Perceptible vibration levels inside residences are attributed to the operation of heating and air conditioning systems, door slams and foot traffic. Construction activities, train operations, and street traffic are some of the most common external sources of vibration that can be perceptible inside residences. Table 4 illustrates some common sources of vibration and the association to human perception or the potential for structural damage.

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 sounds 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 pm and 7:00 am.
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 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
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 Reaction 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	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

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

TABLE 4 Typical Levels of Groundborne Vibration

Human/Structural Response	Velocity Level, VdB	Typical Events (50-foot setback)
Threshold for risk of minor cosmetic damage for fragile buildings	100	Blasting, pile driving, vibratory compaction equipment
		Heavy tracked vehicles (Bulldozers, cranes, drill rigs)
Difficulty with tasks such as reading a computer screen	90	
		Commuter rail, upper range
Residential annoyance, infrequent events	80	Rapid transit, upper range
		Commuter rail, typical Bus or truck over bump or on rough roads
Residential annoyance, frequent events	70	Rapid transit, typical
Limit for vibration-sensitive equipment. Approximate human threshold of perception of vibration		Buses, trucks, and heavy street traffic
	60	
		Typical background vibration
Lower limit for equipment ultra-sensitive to vibration	50	

Source: Transit Noise and Vibration Impact Assessment, US Department of Transportation Federal Transit Administration, September 2018.

Regulatory Background - Noise

The State of California and the City of San José have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. The CEQA guidelines are used in this analysis to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would result in:

(a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies;

(b) Generation of excessive groundborne vibration or groundborne noise levels; or

(c) For a project located within the vicinity of a private airstrip or 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, if the project would expose people residing or working in the project area to excessive noise levels.

2016 California Green Building Standards Code (Cal Green Code). The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2016 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). Section 5.507 states that either the prescriptive (Section 5.507.4.1) or the performance method (Section 5.507.4.2) shall be used to determine environmental control at indoor areas. The prescriptive method is very conservative and not practical in most cases; however, the performance method can be quantitatively verified using exterior-to-interior calculations. For the purposes of this report, the performance method is utilized to determine consistency with the Cal Green Code. The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

The performance method, which establishes the acceptable interior noise level, is the method typically used when applying these standards.

2016 California Building Code, Title 24, Part 2. The California Building Code (CBC) requires interior noise levels in multi-family residential units attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA DNL/CNEL in any habitable room.

Santa Clara County Airport Land Use Commission Comprehensive Land Use Plan. The Comprehensive Land Use Plan adopted by the Santa Clara County Airport Land Use Commission contains standards for projects within the vicinity of San José International Airport, which are relevant to this project:

<u>4.3.2.1 Noise Compatibility Policies</u>

Policy N-3 Noise impacts shall be evaluated according to the Aircraft Noise Contours presented on Figure 5.

Policy N-4 No residential or transient lodging construction shall be permitted within the 65 dB CNEL contour boundary unless it can be demonstrated that the resulting interior sound levels will be less than 45 dB CNEL and there are no outdoor patios or outdoor activity areas associated with the residential portion of a mixed-use residential project or a multi-unit residential project. (Sound wall noise mitigation measures are not effective in reducing noise generated by aircraft flying overhead.)

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:

    - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.

Table EC-1: Land Use Compatibility Guidelines for Community Noise in San José

LAND USE CATEGORY	EXTERIOR NOISE EXPOSURE (DNL IN DECIBELS (DBA)) 55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care[1]						
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds						
3. Schools, Libraries, Museums, Meeting Halls, Churches						
4. Office Buildings, Business Commercial, and Professional Offices						
5. Sports Arena, Outdoor Spectator Sports						
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters						

[1]Noise mitigation to reduce interior noise levels pursuant to Policy EC-1.1 is required.

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.

Conditionally Acceptable:

- Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:

- New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

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-1.4 Include appropriate noise attenuation techniques in the design of all new General Plan streets projected to adversely impact noise sensitive 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-1.9 Require noise studies for land use proposals where known or suspected loud intermittent noise sources occur which may impact adjacent existing or planned land uses. For new residential development affected by noise from heavy rail, light rail, BART, or other single-event noise sources, implement mitigation so that recurring maximum instantaneous noise levels do not exceed 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

EC-1.14 Require acoustical analyses for proposed sensitive land uses in areas with exterior noise levels exceeding the City's noise and land use compatibility standards to base noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency.

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 20.100.450 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.

Regulatory Background – Vibration

Federal Transit Administration. The Federal Transit Administration (FTA) has identified vibration impact criteria for sensitive buildings, residences, and institutional land uses near rail transit and railroads. The thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

City of San José General Plan. The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of vibration through appropriate land use policies in the City of San José. The following policies are applicable to the proposed project:

EC-2.1 Near light and heavy rail lines or other sources of ground-borne vibration, minimize vibration impacts on people, residences, and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration. Require new development within 100 feet of rail lines to demonstrate prior to project approval that vibration experienced by residents and vibration sensitive uses would not exceed these guidelines.

EC-2.3 Require new development to minimize continuous vibration impacts to adjacent uses during demolition and construction. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous 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 continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction. Equipment or activities typical of generating continuous vibration include but are not limited to: excavation equipment; static compaction equipment; vibratory pile drivers; pile-extraction equipment; and vibratory compaction equipment. Avoid use of impact pile drivers within 125 feet of any buildings, and within 300 feet of historical buildings, or buildings in poor condition. On a project-specific basis, this distance of 300 feet may be reduced where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction. Transient vibration impacts may exceed a vibration limit of 0.08 in/sec PPV only when and where warranted by a technical study by a qualified professional that verifies that there will be virtually no risk of cosmetic damage to sensitive buildings from the new development during demolition and construction.

Existing Noise and Vibration Environment

The site is bordered by Mabury Road to the south, Coyote Creek to the west, Berryessa Road to the north, and the Santa Clara Valley Transportation Authority (VTA) BART Silicon Valley – Berryessa Extension Project (Phase I Project) to the east. Commercial and residential uses are located to the south, industrial uses are located across the creek to the west, approved residential and commercial development are located to the north, and residential uses are located to the east. The site is approximately 2.5 miles east of Norman Y. Mineta San José International Airport, placing it outside of the airport's 60 CNEL noise contour. BART is scheduled to begin operations on the Berryessa Extension in June 2020. Noise from the Berryessa Extension is, therefore, included in the baseline.

Measured Noise Levels

Several noise surveys have been conducted at the project site since 2001. Measurements taken between 2001 and 2005 found noise levels in the site vicinity between 57 and 62 dBA DNL, and noise levels along Berryessa and Mabury Roads at 72 and 76 dBA DNL, respectively. The past noise environment resulted primarily from traffic along Berryessa and Mabury Roads, and industrial activity west of Coyote Creek.

A new noise monitoring survey was performed in the site vicinity beginning on Tuesday, August 27, 2019 and concluding on Thursday, August 29, 2019. The monitoring survey included five long-term (LT-1 to LT-5) noise measurements and two observed, short-term (ST-1, ST-2) noise measurements. Long-term measurements were made to quantify the daily trend in noise levels at the project site and at sensitive receptors in the site vicinity, including residences to the north and east and commercial uses to the south. Attended short-term measurements were made to document ambient noise levels at additional residences in the site vicinity. Measurement locations are shown in Figure 1. As concluded in the 2001 and 2005 surveys, the existing noise environment at the project site results primarily from vehicular traffic along Berryessa and Maybury Roads, and industrial activities at sites to the west across Coyote Creek. Day-night average noise levels at long-term measurement locations were calculated for Wednesday, August 28, 2019.

Long-term noise measurement LT-1 was made approximately 50 feet southeast of the centerline of Mabury Road at the southeast corner of the intersection of Mabury and Lenfest Roads. The primary noise source at this location was vehicular traffic on Mabury Road. Hourly average noise levels at this location ranged from 67 to 72 dBA L_{eq} during the day and from 58 to 70 dBA L_{eq} at night. The day-night average noise level was 72 dBA DNL.

Long-term noise measurement LT-2 was made at the southwestern end of Salamoni Court, approximately 310 feet east of the project site. The primary noise source at this location was vehicular traffic along Berryessa Road to the north and King Road to the east. Hourly average noise levels at this location typically ranged from 48 to 55 dBA L_{eq} during the day and from 38 to 52 dBA L_{eq} at night. The day-night average noise level was 54 dBA DNL.

Long-term noise measurement LT-3 was made near the center of the northwestern property line of the site, approximately 75 feet southeast of the centerline of Berryessa Road. The primary noise source at this location was vehicular traffic on Berryessa Road. Hourly average noise levels at this

location typically ranged from 69 to 72 dBA L_{eq} during the day and from 59 to 70 dBA L_{eq} at night. The day-night average noise level was 73 dBA DNL.

Long-term noise measurement LT-4 was made near the site's western property line, approximately 480 northeast of the Yard Court cul-de-sac across Coyote Creek. The primary noise sources at this location included distant traffic and local industrial land uses. Hourly average noise levels at this location typically ranged from 53 to 58 dBA L_{eq} during the day and from 41 to 52 dBA L_{eq} at night. The day-night average noise level was 57 dBA DNL.

Long-term noise measurement LT-5 was made near the western property line, approximately 415 southeast of the Berryessa Road centerline. The primary noise sources at this location included vehicular traffic on Berryessa Road and industrial land uses. Hourly average noise levels at this location typically ranged from 55 to 58 dBA L_{eq} during the day, and from 43 to 54 dBA L_{eq} at night. The day-night average noise level was 61 dBA DNL.

Two attended, ten-minute short-term measurements were made between 10:30 a.m. and 11:00 a.m. on Tuesday, August 27, 2019. Measurement ST-1 was made on Commodore Drive near residences approximately 745 feet east of the site boundary. The equivalent sound level at this location was 54 dBA L_{eq}. Measurement ST-2 was made approximately 125 feet northwest of the site near the northeastern corner of Berryessa Road and Sierra Road. The equivalent sound level at this location was 69 dBA L_{eq}.

Noise measurement results are summarized in Table 5. Daily trends in noise levels at long-term measurement sites are shown in Appendix Figures A1 through A15.

BART Noise and Vibration

A BART alignment and the BART Berryessa/North San José Station adjoin the east boundary of the project site. The first phase of BART Silicon Valley would be a 9.9-mile segment that would include stations in Milpitas and the Berryessa area of north downtown San José. Although the alignment is not currently operational, BART is scheduled to begin operations on the Berryessa Extension in June of 2020. Noise from the Berryessa Extension is, therefore, included in the baseline. The BART track along the east boundary of the site is approximately 28 feet above grade. Trains are anticipated to approach the station at a speed of approximately 50 miles per hour before slowing to a stop. The FTA Noise and Vibration Impact Assessment Manual provides formulas to calculate noise levels for transit train operations. The Manual lists a Sound Exposure Level of 82 dBA for a single transit car traveling at 50 miles per hour at a distance of 50 feet. Information from the Manual along with results from section 4.13 of the BART Silicon Valley 2nd Supplemental EIR[1] were used to calculate expected noise levels from BART operations at the site. It is anticipated that operations during regular daytime hours of 7:00 a.m. to 10:00 p.m., noise levels at 50 feet from an average of 16 trains would reach 72 dBA L_{eq}. Noise from an average of 10 nighttime trains operating between 10:00 p.m. and 1:30 a.m. is anticipated to reach 70 dBA L_{eq} at 50 feet. The FTA Noise and Vibration Manual lists estimated maximum levels from rail car pass-bys at a distance of 50 feet of

[1] Santa Clara Valley Transportation Authority, "BART Silicon Valley Phase 1 – Berryessa Extension Draft 2nd Supplemental Environmental Impact Report," November 2010.

80 dBA L_{max}. Over a 24-hour period, BART operations at the site are expected to generate day-night average noise levels of 75 dBA DNL at a distance of 50 feet.

A seven-level parking structure was constructed to serve the BART station. It is located between the BART alignment and Berryessa Station Way, approximately 220 feet east of the nearest proposed site buildings at blocks O3 and F2. Noise associated with the parking structure would primarily result from car engine startups, door closings, and horns being sounded. Comparable parking structures in Petaluma and Berkeley, California were analyzed by *Illingworth & Rodkin, Inc.* in 2006 and 2016, respectively. Typical maximum noise levels at the structure in Petaluma were measured to be between 53 and 58 dBA L_{max} at ground level, at a distance of 75 feet. Typical car horn noise levels ranged between 62 and 70 dBA L_{max} at the same distance. The highest noise level associated with mechanical equipment at the structure in Berkeley was anticipated to be 59 dBA at a distance of 10 feet. Noise associated with the seven-level structure servicing the Berryessa/North San José station is anticipated to reach maximum levels between 35 and 43 dBA L_{max} at site buildings. This is well below the ambient noise level at the site; therefore, the parking structure is not expected to be a substantial noise source affecting the noise environment at the project site.

Berryessa Station Way is currently an unused road which runs along the BART alignment from Berryessa Road to the north to Mabury Road to the south. It will open with the Berryessa/North San José station. Points along the southbound lane of Berryessa Station Way come within approximately 250 feet of proposed site buildings. As ridership of BART at this station increases, traffic noise along Berryessa Station Way will increase. The traffic noise level from this road was modeled under future 2040 traffic conditions as provided in the project's traffic study, completed by *Hexagon Transportation Consultants, Inc*[2]. Traffic noise levels at the site associated with Berryessa Station Way are anticipated to reach 58 dBA DNL at the nearest proposed site building. Much of the site will be shielded from the road by the BART station and its parking structure.

Two transit power substations are located within the site vicinity, beneath the elevated BART tracks east of the site. The nearest proposed site buildings are located approximately 90 feet from the southern substation. The BART Silicon Valley 2nd Supplemental EIR predicts a continuous noise level of 41 dBA at 165 feet for a substation transformer located at the system facility north of Montague Expressway. Accounting for the decrease in distance between the noise source and receptors, at 90 feet a continuous noise level of 46 dBA would be anticipated. Additionally, the substations in the site vicinity are surrounded with a noise wall that would further decrease the noise level produced by the substations. Noise associated with the substations is not anticipated to have an impact at any location on the site.

Other potential noise sources originating from BART operations include occasional train horns and the station's public address system. Neither of these sources are expected to contribute substantially to the overall operational noise level, nor were they addressed in detail in the BART Silicon Valley 2nd Supplemental EIR.

[2] Hexagon Transportation Consultants, Inc., "Market Park South Village Development Draft Transportation Analysis," August 30, 2019, Updated May 18, 2020.

The BART Silicon Valley Phase I Extension was designed with vibration mitigation measures in place to reduce impacts at nearby sensitive receptors to below the FTA's 72 VdB threshold for residences and buildings where people usually sleep. Due to the elevated alignment of the tracks, there were no potential vibration impacts identified along the site boundary. While in operation, vibration levels produced by BART trains are expected to occasionally be perceptible at locations along the eastern property line of the site.

FIGURE 1 Noise Measurement Locations

Source: Google Earth 2018

TABLE 5 Summary of Noise Measurement Data (dBA)

Noise Measurement Location	Daytime Noise Levels (dBA L_{eq})	Nighttime Noise Levels (dBA L_{eq})	Day-Night Average Level (dBA DNL)
LT-1: 50 ft south of Mabury Road centerline (8/27/19 9:00 a.m.- 8/29/19 10:10 a.m.)	64 – 72	58 – 70	72
LT-2: West end of Salamoni Court (8/27/19 9:20 a.m.- 8/29/19 10:00 a.m.)	48 – 55	38 – 52	54
LT-3: 75 feet south of Berryessa Road centerline (8/27/19 9:40 a.m.- 8/29/19 10:00 a.m.)	69 – 72	59 – 70	73
LT-4: Western property line (8/27/19 10:00 a.m.- 8/29/19 10:20 a.m.)	53 – 58	41 – 52	57
LT-5: Western property line (8/27/19 10:20 a.m. - 8/29/19 10:10 a.m.)	55 – 58	43 – 54	61
ST-1: Residences on Commodore Drive. (8/27/19 10:30 a.m. - 8/27/19 10:40 a.m.)	54	-	-
ST-2: 70 feet north of Berryessa Road centerline (8/27/19 10:30 a.m. - 8/27/19 10:40 a.m.)	69	-	-

GENERAL PLAN CONSISTENCY ANALYSIS

Noise and Land Use Compatibility

The Environmental Leadership Chapter in the Envision San José 2040 General Plan sets forth policies with the goal of minimizing the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies in the City of San José. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- The City's maximum normally acceptable exterior noise level objective is 60 dBA DNL for residential uses, 65 dBA DNL for neighborhood parks, and 70 dBA DNL for office uses (Table EC-1).

- The City's maximum conditionally acceptable exterior noise level objective is 75 dBA DNL for residential uses, 80 dBA DNL for neighborhood parks, and 80 dBA DNL for office uses (Table EC-1).

- The California Building Code and the City of San José's standard for interior noise levels in residences is 45 dBA DNL.

- The City's maximum instantaneous noise level limit for residences affected by BART pass-bys is 50 dBA L_{max} in bedrooms and 55 dBA L_{max} in other rooms.

- The California Green Building Standards Code's interior noise level limit for new non-residential buildings is an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

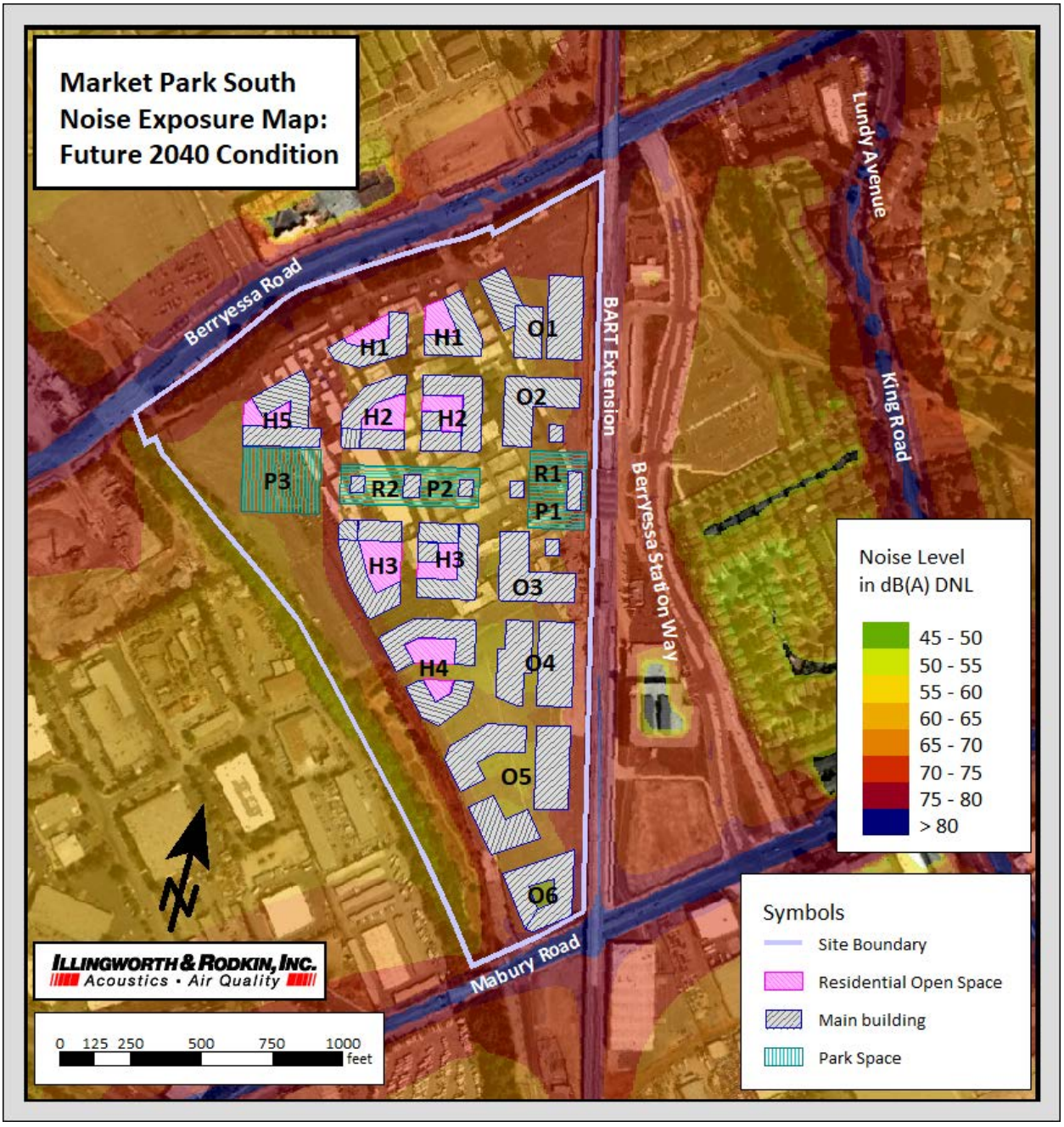
Future Exterior Noise Environment

The future exterior noise environment at the project site, based on most recent plans dated December 12, 2019, would continue to result from vehicular traffic along Berryessa and Maybury Roads, industrial activities at sites to the west across Coyote Creek, and BART train pass-bys to the east. Vehicular activity along the new site access road connecting Berryessa and Mabury Roads would dominate the noise environment at adjacent buildings. Based on traffic volumes provided by *Hexagon Transportation Consultants, Inc*, Year 2040 peak hour traffic noise levels along roadways in the site vicinity are expected to increase by up to 8 dBA L_{eq} above existing levels as a result of development in the surrounding area.

The existing and future noise exposure of the site was calculated using SoundPLAN, a three-dimensional noise modeling software that considers site geometry, the characteristics of the noise sources, and shielding from structures. The existing model was validated to noise levels measured in the noise monitoring survey (see Setting Section) and to the BART noise level results from section 4.13 of the BART Silicon Valley 2nd Supplemental EIR (also described in the Setting Section). Worst-case Year 2040 traffic volumes were used for the future scenario. The future DNL noise contours for the site, resulting from all environmental noise sources, including vehicular and

rail traffic and industrial activities, are provided in Figure 2. Peak hour L_{eq} noise levels are approximately 2 dBA lower than DNL levels.

FIGURE 2 Future DNL Noise Exposure Map



Future exterior noise levels at proposed parks and open space areas are provided in Table 6.

TABLE 6 Calculated Exterior Noise Levels at Proposed Park and Open Space Areas

Open Space Location	Calculated Noise Levels (dBA DNL)
H1 Open Space East	**69**
H1 Open Space West	**72**
H2 Open Space East	52
H2 Open Space West	52
H2 Rooftop Garden East	**61**
H2 Rooftop Garden West	**64**
H3 Open Space East	47
H3 Open Space West	50
H3 Rooftop Garden East	59
H3 Rooftop Garden West	**62**
H4 Open Space North	56
H4 Open Space South	54
H5 Open Space	**68**
H5 Rooftop Garden	**65**
P1/R1 Park Space	**67**
P2/R2 Park Space	**59 – 67**
P3 Park Space	**66**

Noise levels would exceed the normally acceptable objective of 60 dBA DNL for residential open space at the H1 open spaces, H2 rooftop gardens, western H3 rooftop garden, H5 open space, and H5 rooftop garden. Noise levels would exceed the normally acceptable objective of 65 dBA DNL at the P1/R1 park space and P2/R2 park space. With construction of four-foot parapet walls along portions of perimeters of rooftops as shown in Figure 3, noise levels at the H2, H3, and H5 rooftop gardens would be reduced below 60 dBA DNL. With construction of six-foot noise walls along segments of the arterial site access road as shown in Figure 3, noise levels at park spaces P2 and P3 would be reduced below 65 dBA DNL. As park space P1 is adjacent to the elevated BART track, it is not acoustically feasible to reduce noise levels below 65 dBA DNL. It would not be acoustically feasible to reduce noise levels at the H1 or H5 open spaces without construction of a noise wall along Berryessa Road or without redesigning building orientations to avoid direct exposure to Berryessa Road. Noise levels at outdoor use areas would fall below the conditionally acceptable objective of 75 dBA DNL for residential spaces and 80 dBA DNL for neighborhood parks.

Future Interior Noise Environment

Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are

partially open for ventilation. Standard new construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. The façade elements which contribute to the composite sound isolation of the assembly are the exterior wall assemblies themselves, along with significant openings/penetrations to the wall assembly, such as windows or exterior doors.

Both the City of San José and the California Building Code require that interior noise levels be maintained at 45 dBA DNL or less for residences. The Cal Green Code limits noise levels inside occupied non-residential spaces to 50 dBA $L_{eq(1\text{-}hr)}$ during any hours of operation. Table 7 lists calculated exterior noise exposures at building façades.

Window to wall ratios would vary from building to building. Assuming a window to wall ratio of 40% or less, the following general observations can be made relative to exterior to interior noise control to maintain a habitable interior environment:

1. In exterior noise environments below 60 dBA DNL, interior noise levels in residences and non-residential areas would be considered acceptable with standard construction and windows in the open or closed position.

2. In noise environments with exterior façade noise exposures of 60 to 65 dBA DNL, interior noise levels in residences would be considered acceptable with standard construction and the incorporation of an adequate forced-air mechanical ventilation system to allow occupants the option of keeping windows closed for noise control. Non-residential spaces would meet the Cal Green Code with standard construction and windows in the open or closed position. (Indicated in Orange in Figure 3 and Table 7)

3. In noise environments with exterior façade noise exposures of 65 to 70 dBA DNL, interior noise levels in residences and non-residential areas would be considered acceptable with standard construction and the incorporation of an adequate forced-air mechanical ventilation system to allow occupants the option of keeping windows closed for noise control. (Indicated in Orange in Figure 3 and Table 7)

4. In exterior noise environments of 70 to 75 dBA DNL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods (typically windows with STC 30 to 40) would be required to meet the interior residential noise level limit. Non-residential spaces would meet the Cal Green Code with standard construction and the incorporation of an adequate forced-air mechanical ventilation system to allow occupants the option of keeping windows closed for noise control. A combination of forced-air mechanical ventilation and sound-rated construction methods (typically windows with STC 28 or higher) would be required to meet the Cal Green Code objective for non-residential areas in exterior noise environments exceeding 70 dBA DNL. (Indicated in Red in Figure 3 and Table 7)

As seen in Figure 3, outlined in red, some building façades nearest major roads and the BART tracks are anticipated to be exposed to average noise levels between 70 and 75 dBA DNL. Outlined in orange are façades where noise levels are expected to range between 60 to 70 dBA DNL.

Façades outlined in orange will require adequate forced-air mechanical ventilation. Those outlined in red will require sound-rated construction methods in addition to forced-air mechanical ventilation.

FIGURE 3 Noise Reduction Measures Needed for General Plan Consistency

TABLE 7 Calculated Exterior Noise Levels at Building Façades

Building	Calculated Noise Level (DNL)			
	North	South	East	West
H1 East	68 – 69	61	64	64 – 65
H1 West	69 – 70	63	64 – 65	68
H2 East	61 – 62	61 – 63	61	62 – 63
H2 West	63 – 64	63 – 65	63 – 64	68 – 69
H3 East	60 – 61	59	59	58 – 59
H3 West	61 – 63	62	58 – 59	67 – 68
H4 North	60 – 61	60 – 63	57	67 – 68
H4 South	58 – 62	62	60	67 – 68
H5	68 – 70	65	67 – 68	67 – 68
O1	68 – 69	62 – 63	66 – 67	64 – 66
O2	62 – 64	63 – 64	68 – 72	60 – 63
O3	62 – 63	61 – 62	68 – 72	55 – 57
O4	61 – 62	59 – 60	58 – 62	57 – 58
O5 North	60	61	58 – 59	67 – 68
O5 South	60 – 61	65 – 65	66 – 67	68 – 69
O6	66	74 – 75	73 – 75	68 – 69
P1/R1 North	66	66	69	62
P1/R1 East	68	68	72	58
P1/R1 South	66	66	69	61
P1/R1 West	62	63	64	59
P2/R2 East	60	61	62	60
P2/R2 Center	63	62	61	64
P2/R2 West	64	64	61	66

Recommended Conditions of Approval

For consistency with the General Plan the following Conditions of Approval are recommended for consideration by the City:

- When refining the project's site plan, continue to locate common outdoor areas away from adjacent noise sources and continue to shield noise-sensitive outdoor spaces with buildings or noise barriers where feasible. Site plan refinements would be needed to reduce noise levels at the H1 or H5 open spaces to meet the City's 60 dBA DNL normally acceptable guideline for residential outdoor spaces.

- Construction of 4-foot-high parapet walls along portions of perimeters of rooftops, as shown in Figure 3, would reduce noise levels at the H2, H3, and H5 rooftop gardens to

meet the 60 dBA DNL objective. To be effective, walls must be constructed with a solid material with no gaps in the face of the wall or at the base. Openings or gaps between sound wall materials or the ground substantially decrease the effectiveness of the sound wall. Suitable materials for sound wall construction should have a minimum surface weight of 3 pounds per square foot (such as 1-inch-thick wood, ½-inch laminated glass, masonry block, concrete, or metal one-inch).

- As indicated in Figure 3, construction of 6-foot-high sound barriers to shield proposed park and open space areas P2 and P3 would reduce exterior noise levels in these areas to meet the normally acceptable 65 dBA DNL objective. To be effective, walls must be constructed with a solid material with no gaps in the face of the wall or at the base. Openings or gaps between sound wall materials or the ground substantially decrease the effectiveness of the sound wall. Suitable materials for sound wall construction should have a minimum surface weight of 3 pounds per square foot (such as 1-inch-thick wood, ½-inch laminated glass, masonry block, concrete, or metal one-inch).

- Project-specific acoustical analyses are required by the state building code to confirm interior noise levels in residences will be reduced to 45 dBA DNL or lower and interior levels in non-residential areas are 50 dBA L_{eq} or less. The specific determination of what treatments are necessary will be conducted on a unit-by-unit basis. Results of the analysis, including the description of the necessary noise control treatments, will be submitted to the City along with the building plans and approved prior to issuance of a building permit.

- Building sound insulation requirements would need to include the provision of forced-air mechanical ventilation for the units detailed in Figure 3 and Table 7 so that windows could be kept closed at the occupant's discretion to control noise.

- Special building techniques (e.g. sound-rated windows and building façade treatments) may be required to maintain interior noise levels at or below acceptable levels. These treatments would include, but are not limited to, sound-rated windows and doors, sound-rated wall constructions, acoustical caulking, protected ventilation openings, etc. Preliminary calculations indicate that residential units would require sound-rated windows and doors with ratings ranging from STC 28 to 40 to assure that the 45 dBA DNL and 50 dBA $L_{eq\ (1\ hr)}$ objectives are met.

- Maximum noise levels inside residential units should be limited as low as reasonable and feasible to reduce the potential for sleep disturbance and activity interference during railroad train pass-by events.

Future Vibration Environment

The BART Silicon Valley Phase I Extension was designed with vibration mitigation measures in place to reduce impacts at nearby sensitive receptors to below the FTA's 72 VdB threshold for residences and buildings where people usually sleep. The FTA Guidance Manual specifies that groundborne vibration is rarely a problem for elevated railways except when guideway supports are located within 50 feet of buildings. Office building O6, the nearest proposed site building to

the BART railway, is located approximately 50 feet southwest of the near track. There are no vibration sensitive receptors proposed within 50 feet of the tracks; therefore, there is no location on site where vibration levels are anticipated to exceed FTA vibration impact criteria.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise resulting from the project:

1. **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase over ambient noise levels at existing noise-sensitive receptors surrounding the project site and that would exceed applicable noise standards presented in the General Plan or Municipal Code at existing noise-sensitive receptors surrounding the project site.

    - Temporary Noise Increase. A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. The City of San José considers large or complex projects involving substantial noise-generating activities and lasting more than 12 months significant when within 500 feet of residential land uses or within 200 feet of commercial land uses or offices.

    - Permanent Noise Increase. A significant permanent noise level increase would occur if project-generated traffic would result in: a) a noise level increase of 5 dBA DNL or greater, with a future noise level of less than 60 dBA DNL, or b) a noise level increase of 3 dBA DNL or greater, with a future noise level of 60 dBA DNL or greater.

    - Operational Noise in Excess of Standards. A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan.

2. **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would generate excessive vibration levels surrounding receptors. For sensitive historic structures, including ruins and ancient monuments or building that are documented to be structurally weakened, a continuous 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 continuous vibration limit of 0.20 in/sec PPV will be used to minimize the potential for cosmetic damage at buildings of normal conventional construction.

3. **Excessive Aircraft Noise.** A significant noise impact would be identified if the project would expose people residing or working in the project area to excessive aircraft noise levels.

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would be exposed to a substantial temporary increase in ambient noise levels due to project construction activities. This is a **potentially significant** temporary noise impact.

The potential for temporary noise impacts due to project construction activities would 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. Policy EC-1.7 of the City's General Plan requires all construction operations within the City to use best available noise suppression devices and techniques and to limit construction hours near residential uses per the Municipal Code allowable hours, which are between the hours of 7:00 a.m. and 7:00 p.m. Monday through Friday when construction occurs within 500 feet of a residential land use. Further, 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.

Construction activities generate considerable amounts of noise, especially during earth-moving activities and during the construction of the building's foundation when heavy equipment is used. The highest noise levels would be generated during grading, excavation, and foundation construction. Pile driving is not anticipated as a foundation construction technique, given that mid-rise buildings are proposed, but pile driving has not been explicitly ruled out at the time this analysis was completed. The hauling of excavated materials and construction materials would generate truck trips on local roadways, as well. The total construction period would be at least 5 years.

For the purpose of assessing construction noise, the project can be divided into three subareas (see Figure 3):

North subarea – Including the portion of the project adjoining Berryessa Road to roughly the first collector street (Upper Penitencia Creek Open Space, development areas H1 and O1, and the north corner of the Coyote Creek Open Space.)

Center subarea - Including the portion of the project surrounding the Town Square/Park (development areas H2, H3, H5, O2, O3, P1/R1, P2/R2, P3, and the central portion of Coyote Creek Open Space.)

South subarea - Including the southern portion of the project (development areas H4, O4, O5, O6, and southern portion of Coyote Creek Open Space.)

A detailed list of construction equipment was not available at the time of this study. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 8 and 9. Table 8 shows the maximum noise levels for different construction equipment, and Table 9 shows the average noise level range by construction phase. Most demolition and construction noise is within the range of 80 to 90 dBA at a distance of 50 feet from the source. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor.

There are three residential areas potentially affected by construction noise; residences across Berryessa Road from the north subarea, residences in the Salamoni Court/Pala Ranch Circle area east of the new BART Station, and the Bridge Housing Communities temporary residences across Mabury Road to the south. As of this writing, the Bridge Housing Communities temporary residences are approved for operation until the start of 2022, before project construction is scheduled to begin. However, as the Bridge Housing Communities project may be renewed and operational in following years and throughout project construction, it will be considered a residential sensitive receptor for the purpose of this analysis. Maximum construction noise levels in each construction subarea were predicted from a source location nearest the affected residences, and typical construction noise levels were predicted near the center of each construction subarea. Noise reduction due to shielding from intervening buildings or structures was not accounted for in the calculations.

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 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	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	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

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

Long-term measurements made at the site resulted in ambient levels of 73 dBA DNL at the residences to north across Berryessa Road, 54 dBA DNL at the residences east of the site on Salamoni Court, and 72 dBA DNL along Mabury Road approximately 730 feet east of the Bridge Housing Communities site. Noise from construction activity would periodically exceed these levels.

During construction in the north subarea, construction noise levels at the nearest Berryessa Road residences would range from 66 to 80 dBA L_{eq} when construction is occurring adjacent to Berryessa Road and from 57 to 71 dBA L_{eq} when construction is occurring throughout most of the subarea. Construction noise levels at the nearest residences in the Salamoni Court/Pala Ranch Circle neighborhood would range from 53 to 67 dBA L_{eq} when construction is occurring at development area O1 and from 47 to 61 dBA L_{eq} when construction is occurring throughout most of the subarea.

During construction in the center subarea, the most affected receptors would be residences in the Salamoni Court/Pala Ranch Circle neighborhood. Noise from construction would range from 59 to 73 dBA L_{eq} when construction is occurring adjacent to BART and from 50 to 64 dBA L_{eq} when construction is occurring throughout most of the subarea. Construction noise levels at the nearest Berryessa Road residences would range from 55 to 69 dBA L_{eq} when construction is occurring at the closest location in development areas O2 and H2 and from 49 to 63 dBA L_{eq} when construction is occurring throughout most of the subarea. These residences are shielded by an existing 8-foot high sound barrier, which would be anticipated to provide about 8 dBA of noise reduction to ground level construction activities.

During construction in the south subarea, the affected receptors would be residences in the Salamoni Court/Pala Ranch Circle neighborhood and residences at the Bridge Housing

Communities. At residences in the Salamoni Court/Pala Ranch Circle neighborhood, noise from construction would range from 57 to 71 dBA L_{eq} when construction is occurring adjacent to BART and from 50 to 64 dBA L_{eq} when construction is occurring throughout most of the subarea. At residences part of the Bridge Housing Communities, noise from construction would range from 67 to 82 dBA L_{eq} when construction is occurring along the southern property line, and from 50 to 64 dBA L_{eq} when construction is occurring throughout most of the subarea. Construction noise levels at the nearest Berryessa Road residences would not make a measurable contribution to the noise environment at Salamoni Court/Pala Ranch Circle or Bridge Housing Community residences.

The nearest Berryessa Road residences would be located within 500 feet of construction activities in the north and center subareas of the project. The Salamoni Court/Pala Ranch Circle neighborhood would be located within 500 feet of construction activities in the center and south subareas of the project. The Bridge Housing Communities temporary residences would be located within 500 feet of construction activities in the southern subarea of the project. While a detailed, complete schedule for construction is not currently available, it is reasonable to assume these residential areas would experience elevated noise levels for a period exceeding one year. This is a **potentially significant** impact.

Mitigation Measure 1a:

The potential short-term noise impacts associated with construction of the project would be mitigated by the implementation of General Plan Policy EC-1.7. This policy states:

> Construction operations within the City will be required to use available noise suppression devices and techniques and continue to 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.

The following standard noise control measures shall be implemented:

- Construction will be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday for any on-site or off-site work within 500 feet of any residential unit. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Planning, Building

and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

- The contractor shall use "new technology" power construction equipment with state-of-the-art noise shielding and muffling devices. All internal combustion engines used on the project site shall be equipped with adequate mufflers and shall be in good mechanical condition to minimize noise created by faulty or poorly maintained engines or other components.

- The unnecessary idling of internal combustion engines shall be prohibited.

- Staging areas and stationary noise-generating equipment shall be located as far as possible from noise-sensitive receptors such as residential uses (a minimum of 200 feet).

- The surrounding neighborhood shall be notified early and frequently of the construction activities.

- A "noise disturbance coordinator" shall be designated to respond to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., beginning work too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. A telephone number for the disturbance coordinator would be conspicuously posted at the construction site.

A "construction noise logistics plan," in accordance with Policy EC-1.7, would be required. Typical construction noise logistics plan would include, but not be limited to, the following measures to reduce construction noise levels as low as practical:

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists.

- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment.

- Construct temporary noise barriers, where feasible, to screen stationary noise-generating equipment when located within 200 feet of adjoining sensitive land uses. Temporary noise barrier fences would provide a 5 dBA noise reduction if the noise barrier interrupts the line-of-sight between the noise source and receptor and if the barrier is constructed in a manner that eliminates any cracks or gaps.

- If stationary noise-generating equipment must be located near receptors, adequate muffling (with enclosures where feasible and appropriate) shall be used. Any enclosure openings or venting shall face away from sensitive receptors.

- Ensure that generators, compressors, and pumps are housed in acoustical enclosures.

- Locate cranes as far from adjoining noise-sensitive receptors as possible.

- During final grading, substitute graders for bulldozers, where feasible. Wheeled heavy equipment are quieter than track equipment and should be used where feasible.

- Substitute nail guns for manual hammering, where feasible.

- Substitute electrically-powered tools for noisier pneumatic tools, where feasible.

- The contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with adjacent residential land uses so that construction activities can be scheduled to minimize noise disturbance.

With the implementation of GP Policy EC-1.7, Municipal Code requirements, and the above measures, the temporary construction noise impact would be reduced to a **less-than-significant** level.

Impact 1b: **Permanent Noise Level Increase.** The proposed project is not expected to cause a substantial permanent noise level increase at the existing residential land uses in the project vicinity. **This is a less-than-significant impact.**

According to Policy EC-1.2 of the City's General Plan, a significant permanent noise increase would occur if the project would increase noise levels at noise-sensitive receptors by 3 dBA DNL or more where ambient noise levels exceed the "normally acceptable" noise level standard. Where future noise levels are at or below the "normally acceptable" noise level standard, noise level increases of 5 dBA DNL or more would be considered significant. The City's General Plan defines the "normally acceptable" outdoor noise level standard for the residential land uses to be 60 dBA DNL. Existing ambient levels, based on the measurements made in the project vicinity, exceed 60 dBA DNL. Therefore, a significant impact would occur if traffic due to the proposed project would permanently increase ambient levels by 3 dBA DNL. For reference, a 3 dBA DNL noise increase would be expected if the project would double existing traffic volumes along a roadway.

AM and PM peak hour traffic volumes provided by *Hexagon Transportation Consultants, Inc* (received May 18, 2020) were reviewed to calculate potential traffic noise level increases attributable to the project expected along roadways serving the site. Roadways affecting the site evaluated in the analysis included Berryessa Road, Mabury Road, King Road, Lundy Avenue, Berryessa Way, and US 101. Existing + Project traffic volumes were not available. Roadway link traffic volumes under the Year 2040 GP + Proposed Project and Year 2040 GP + City's Development Alternative scenarios were compared to Year 2040 GP No Project conditions to calculate the traffic noise increase attributable to the project during AM and PM peak hour conditions. Traffic volumes for the Year 2040 Build conditions included the changes proposed for the Mabury Interchange Network or the Berryessa Interchange Network. Based on these values, project-generated traffic increases will not increase noise levels by 3 dBA DNL or greater at any noise sensitive location. This is a **less-than-significant** impact.

Mitigation Measure 1b: **None required.**

Impact 1c: **Noise Levels in Excess of Standards.** The proposed project would not generate noise in excess of standards established in the City's General Plan at the nearby sensitive receptors. Implementation of established project conditions of approval would ensure noise levels to be below the City's Municipal Code threshold of 55 dBA DNL. **This is a less-than-significant impact.**

As a mixed-use development project, residential uses are proposed above or in proximity to commercial uses. Future operations at existing and proposed noise-producing land uses are dependent on many variables and information which are currently unavailable to allow meaningful projections of noise. Noise conflicts may be caused by noise sources such as outdoor dining areas or bars, mechanical equipment, emergency backup generators, outdoor maintenance areas, truck loading docks and delivery activities, public address systems, and parking lots (e.g., opening and closing of vehicle doors, people talking, car alarms). Development under the proposed project would introduce new noise-generating sources adjacent to existing noise-sensitive areas and new noise-sensitive uses adjacent to existing noise sources.

The nearest noise sensitive receptors to the project site are Bridge Housing Community residences located about 125 feet south of the site, residences under construction about 200 feet north of the site across Berryessa Road, and residences in the Salamoni Court/Pala Ranch Circle area, located east of the new BART Line and Station, about 310 feet east of the site, and shielded by an existing 8-foot high sound wall. Specific information on selection of generators including model, placement, number of generators, testing schedule, and sound data were not determined as of this assessment. A worst-case placement of one rooftop emergency backup generator per office building would locate the generators approximately 140 feet north of the nearest residence to the south and 400 feet west of the nearest residence to the east. A typical 1,000 kW generator tested at full load and unequipped with any sound attenuation would result in a noise level of about 86 dBA at a distance of 140 feet, and a noise level of 77 dBA at a distance of 400 feet. Generator testing typically occurs monthly for durations of 15 minutes to one hour. A one-hour test at full load would result in a noise level of 72 dBA DNL at the nearest residences to the south, and 63 dBA DNL at the nearest residences to the east, not accounting for attenuation from intervening structures. Generators should be placed 1,000 feet or greater away from residences or equipped with sound attenuation such as exhaust filters and enclosures to minimize impact to nearby residences. Emergency generator operations outside of testing would be exempt from the noise ordinance.

The implementation of General Plan Policies EC-1.2, EC-1.3, and EC-1.9 would reduce potential impacts associated with new noise-producing land uses facilitated by the project to a less-than-significant level. Policy EC-1.2 limits noise generation by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible, to avoid substantial increases to ambient noise. General Plan Policy EC-1.3 would be implemented and would require new projects to mitigate noise generation to 55 dBA DNL at the property line. Lastly, General Plan Policy EC-1.9 would be implemented and would require that studies be conducted to mitigate loud intermittent noise sources associated with new projects.

New noise-generating projects implemented by the project or the siting of noise sensitive receptors would be subject to the City's Municipal Code, mitigating the possibility that existing or proposed residences and other noise-sensitive land uses would be exposed to excessive noise. Compliance with the City's Municipal Code noise limits would result in a **less-than-significant** impact.

As a project condition of approval, mechanical equipment and generators shall be selected and designed to reduce excessive noise levels at the surrounding uses to meet the City's 55 dBA DNL noise level requirement at the nearby noise-sensitive land uses. A qualified acoustical consultant shall be retained to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's Municipal Code noise level requirements. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels and installation of noise barriers, such as enclosures and parapet walls, to block the line-of-sight between the noise source and the nearest receptors. Other alternate measures may be optimal, such as locating equipment in less noise-sensitive areas, such as along the building façades farthest from adjacent neighbors, where feasible.

Mitigation Measure 1c: None required.

Impact 2: Generation of Excessive Groundborne Vibration during Construction. Construction-related vibration levels would not exceed 0.2 in/sec PPV at adjacent buildings of normal conventional construction. **This is a less-than-significant impact.**

The construction of the project would generate vibration when heavy equipment or impact tools are used. Construction activities would include the demolition of existing structures, site preparation work, excavation of the below-grade parking level, foundation work, and new building framing and finishing. Pile driving is not anticipated as a foundation construction technique, given that mid-rise buildings are proposed, but pile driving has not been explicitly ruled out at the time this analysis was completed.

Policy EC-2.3 of the City of San José General Plan establishes a vibration limit of 0.08 in/sec PPV to minimize the potential for cosmetic damage to sensitive historic structures, and a vibration limit of 0.2 in/sec PPV to minimize damage at buildings of normal conventional construction. The vibration limits contained in this policy are conservative and designed to provide the ultimate level of protection for existing buildings in San José. As discussed in detail below, vibration levels exceeding these thresholds would be capable of cosmetically damaging adjacent buildings. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls. Based on review of the City of San José Historic Resource Inventory[3], there are no historic structures located within 500 feet of the project site. Therefore, the 0.2 in/sec PPV criterion for structures of normal conventional construction would apply.

[3] City of San José Historic Resources Inventory, https://www.sanjoseca.gov/DocumentCenter/View/35475

Table 10 presents typical vibration levels from construction equipment at a reference distance of 25 feet and at distances representative of nearby structures to the project site. Jackhammers typically generate vibration levels of 0.035 in/sec PPV and drilling typically generates vibration levels of 0.09 in/sec PPV at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

Project-generated vibration levels from all activities other than pile installation would fall below the General Plan threshold of 0.20 in/sec PPV at buildings located 30 feet or more from the project site. Vibration from pile driving would fall below 0.2 in/sec PPV at buildings located at least 125 feet from the activity.

TABLE 10 Vibration Levels for Construction Equipment at Various Distances

Equipment		**PPV at 25 ft. (in/sec)**	**PPV at 60 ft. (in/sec)**	**PPV at 125 ft. (in./sec)**
Impact Pile Driver	Upper Range	1.158	0.442	0.197
	Lower Range	0.664	0.246	0.110
Sonic Pile Driver	Upper Range	0.734	0.280	0.125
	Lower Range	0.170	0.065	0.029
Clam shovel drop		0.202	0.077	0.034
Hydromill (slurry wall)	in soil	0.008	0.003	0.001
	in rock	0.017	0.006	0.003
Vibratory Roller		0.210	0.080	0.036
Hoe Ram		0.089	0.034	0.015
Large bulldozer		0.089	0.034	0.015
Caisson drilling		0.089	0.034	0.015
Loaded trucks		0.076	0.029	0.013
Jackhammer		0.035	0.013	0.006
Small bulldozer		0.003	0.001	0.001

Source: Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Office of Planning and Environment, U.S. Department of Transportation, September 2018, as modified by Illingworth & Rodkin, Inc., September 2019.

There are no structures of conventional construction located within 60 feet of general construction activities. Residential structures part of the Bridge Housing Communities site are located approximately 125 feet south of locations of potential pile driving. Structures located at the Bridge Housing Communities site would be outside of the range of potential construction-generated vibration impacts. Non-vibration sensitive structures, including the Tesla Repair Center, a storage facility, and a parking garage are located 125 feet or further from the project site. Again, these structures are outside of the potential impact area. The new BART Station structure is a specially engineered concrete structure that is not sensitive to potential vibration levels from pile driving and is located approximately 50 feet from the nearest proposed site building.

At these locations, and in other surrounding areas where vibration would not be expected to cause cosmetic damage, vibration levels may still be perceptible. However, as with any type of

construction, this would be anticipated and would not be considered significant, given the intermittent and short duration of the phases that have the highest potential of producing vibration (use of jackhammers, compactors, and other high-power tools). By use of administrative controls, such as notifying neighbors of scheduled construction activities and scheduling construction activities with the highest potential to produce perceptible vibration during hours with the least potential to affect nearby businesses, perceptible vibration can be kept to a minimum. This is a **less-than-significant** impact.

Mitigation Measure 2: **None required.**

Impact 3: **Excessive Aircraft Noise.** The project site is located approximately 2.1 miles from a public airport or public use airport and would not expose people residing or working in the project area to excessive aircraft noise. **This is a less-than-significant impact.**

Norman Y. Mineta San José International Airport is a public use airport located approximately 2.1 miles west of the project site. The project site lies outside the 60 dBA CNEL 2027 noise contour of the airport, according to the Norman Y. Mineta San José International Airport Master Plan Update Project[4] report published in February 2010 as an addendum to the Environmental Impact Report (see Figure 4). This means that future exterior noise levels due to aircraft from Norman Y. Mineta San José International Airport are compatible with the proposed use. This would be a **less-than-significant** impact.

Mitigation Measure 3: **None required.**

[4] City of San José, "Norman Y. Mineta San José International Airport Master Plan Update Project: Eighth Addendum to the Environmental Impact Report," City of San José Public Project File No. PP 10-024, February 10, 2010.

FIGURE 4 2027 CNEL Noise Contours for SJIA Relative to Project Site

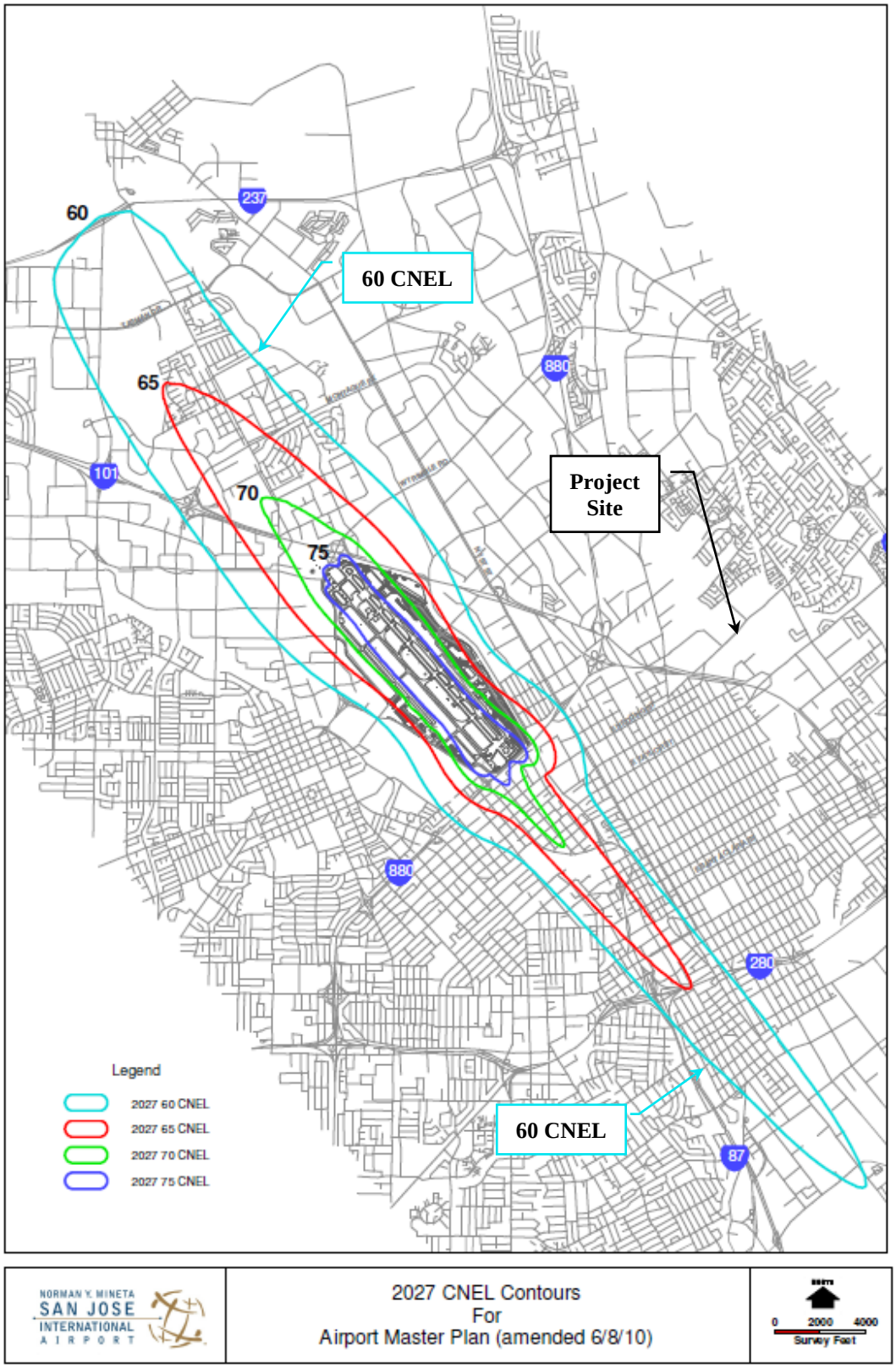


Figure A1 Noise Levels at Measurement Site LT-1 on Tuesday, August 27, 2019

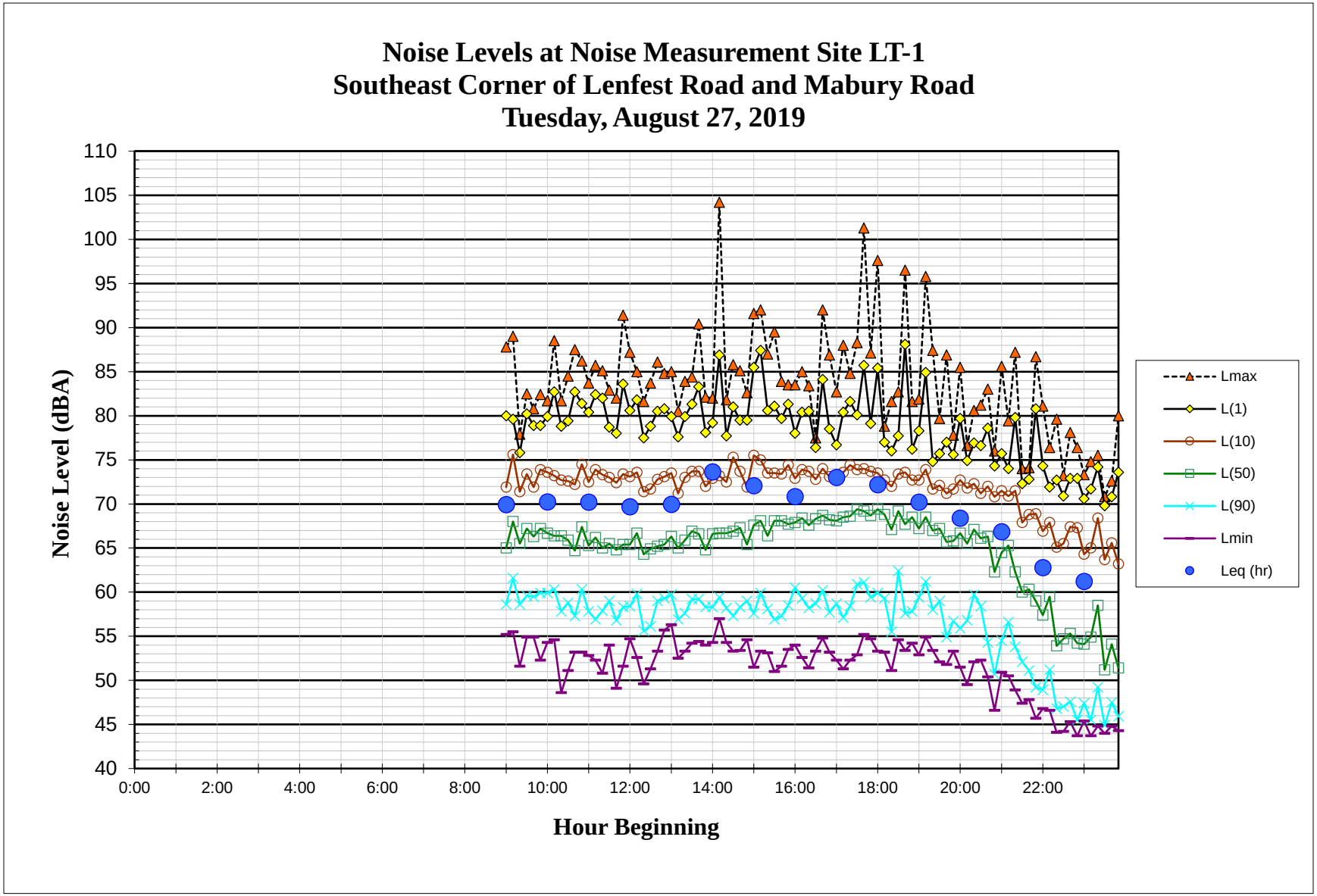


Figure A2 Noise Levels at Measurement Site LT-1 on Wednesday, August 28, 2019

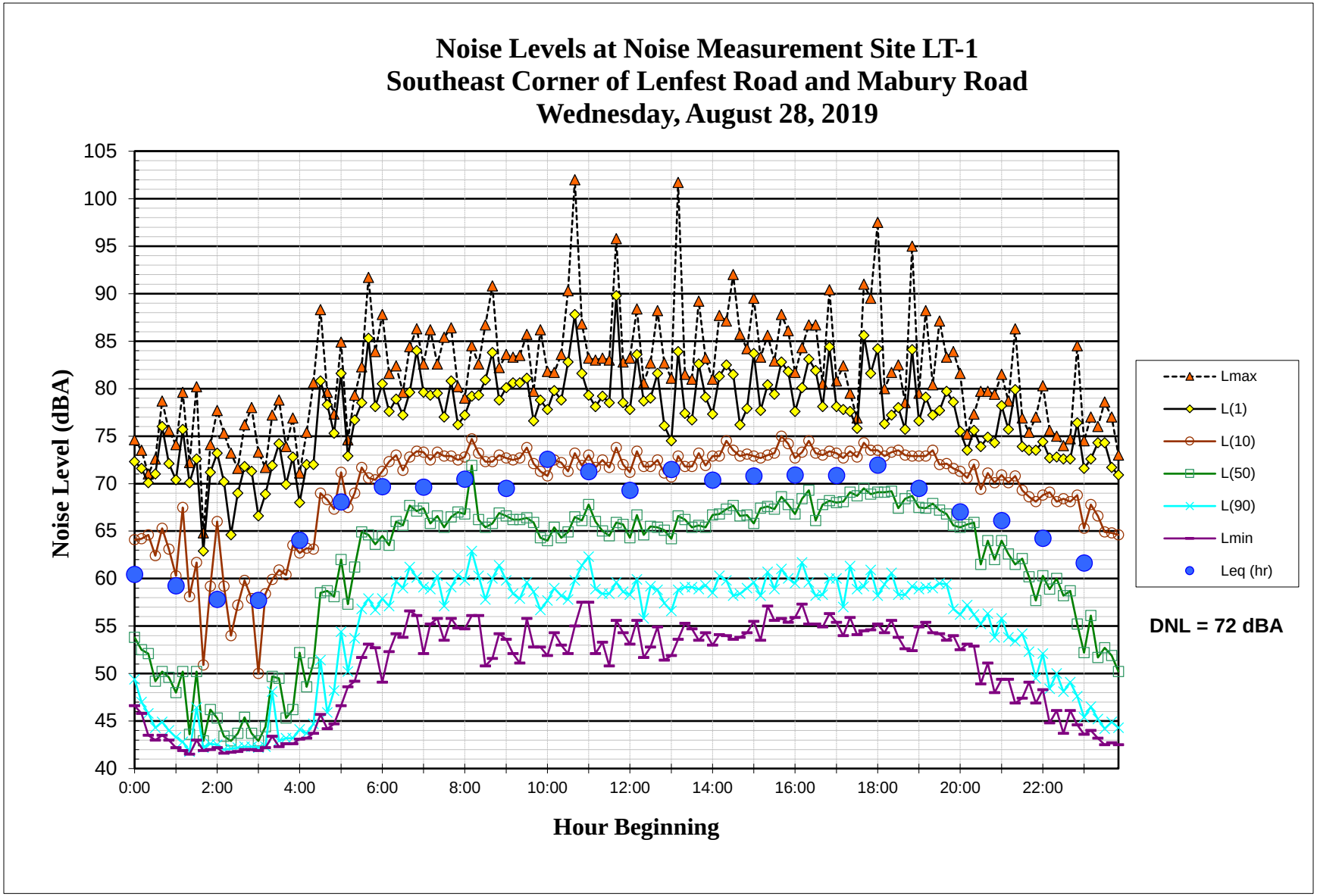


Figure A3 Noise Levels at Measurement site LT-1 on Thursday, August 29, 2019

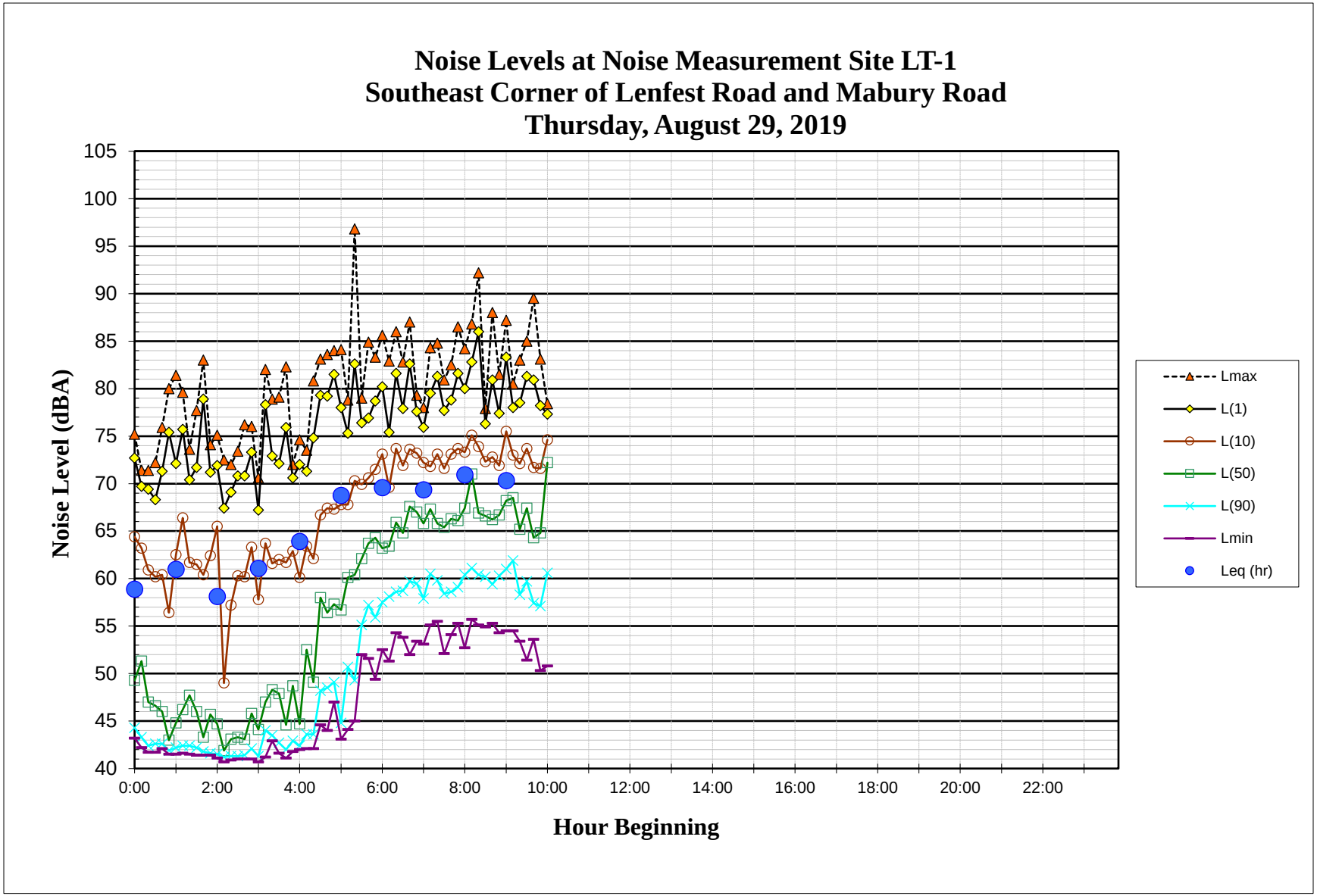


Figure A4 Noise Levels at Measurement Site LT-2 on Tuesday, August 27, 2019

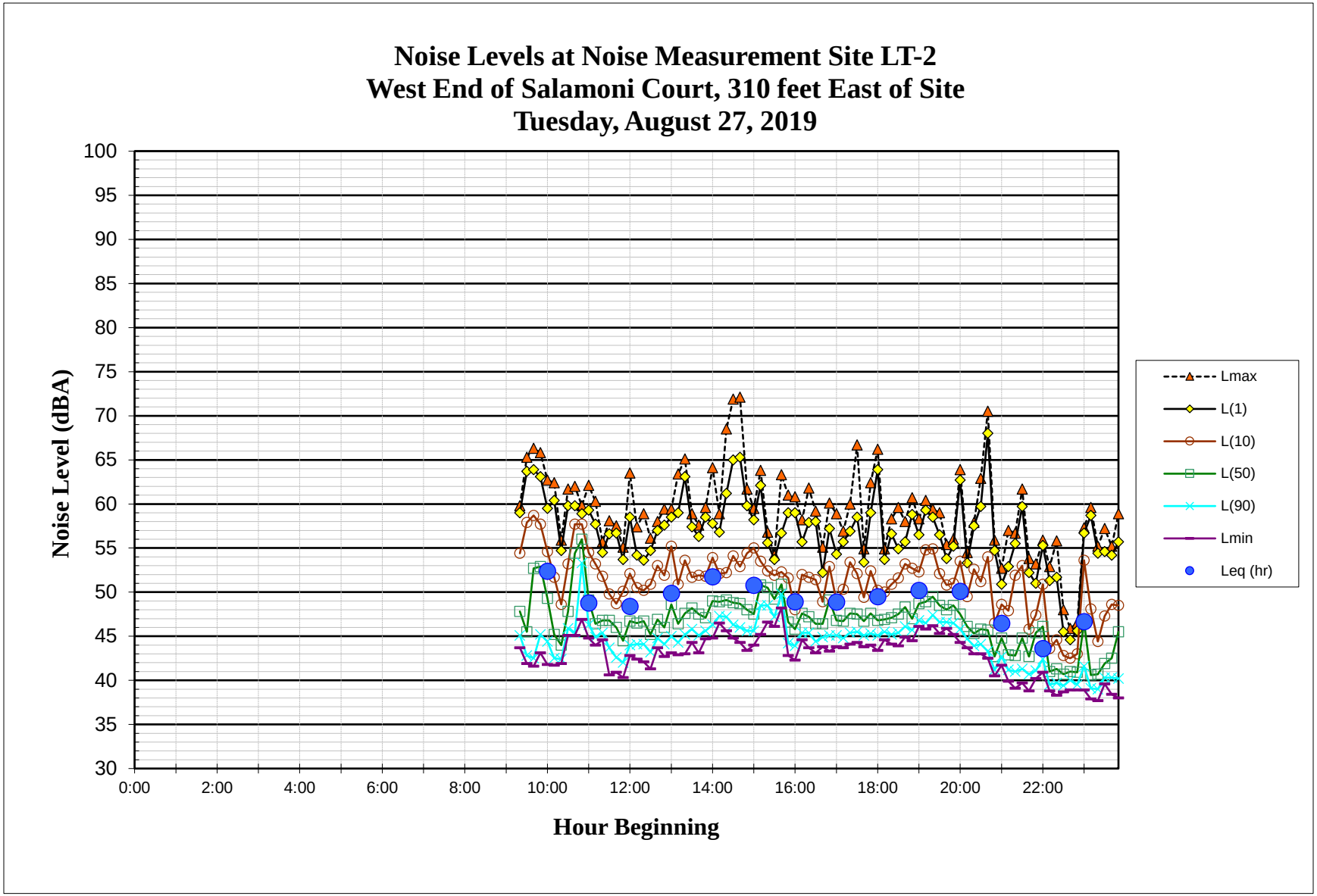


Figure A5 Noise Levels at Measurement Site LT-2 on Wednesday, August 28, 2019

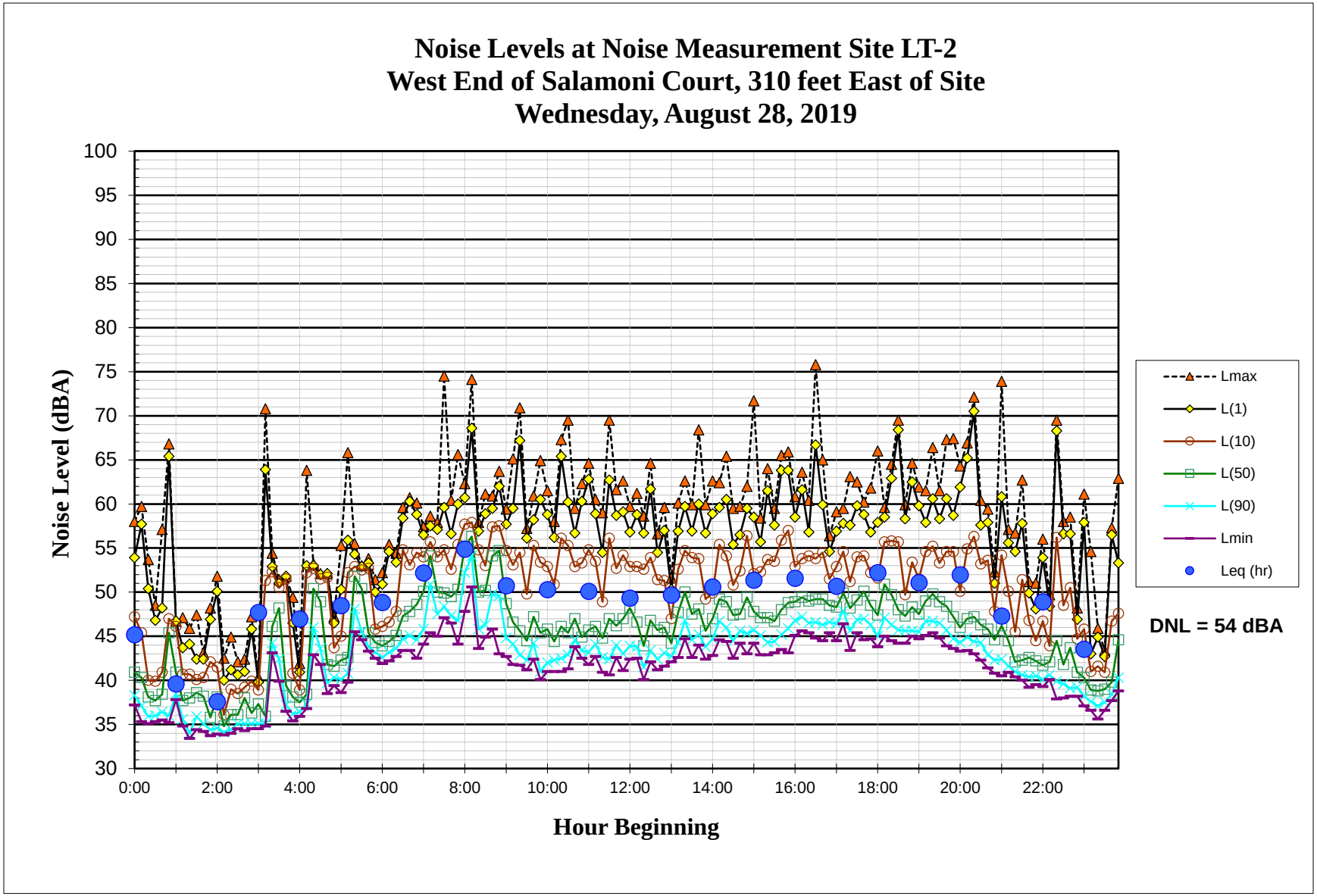


Figure A6 Noise Levels at Measurement site LT-2 on Thursday, August 29, 2019

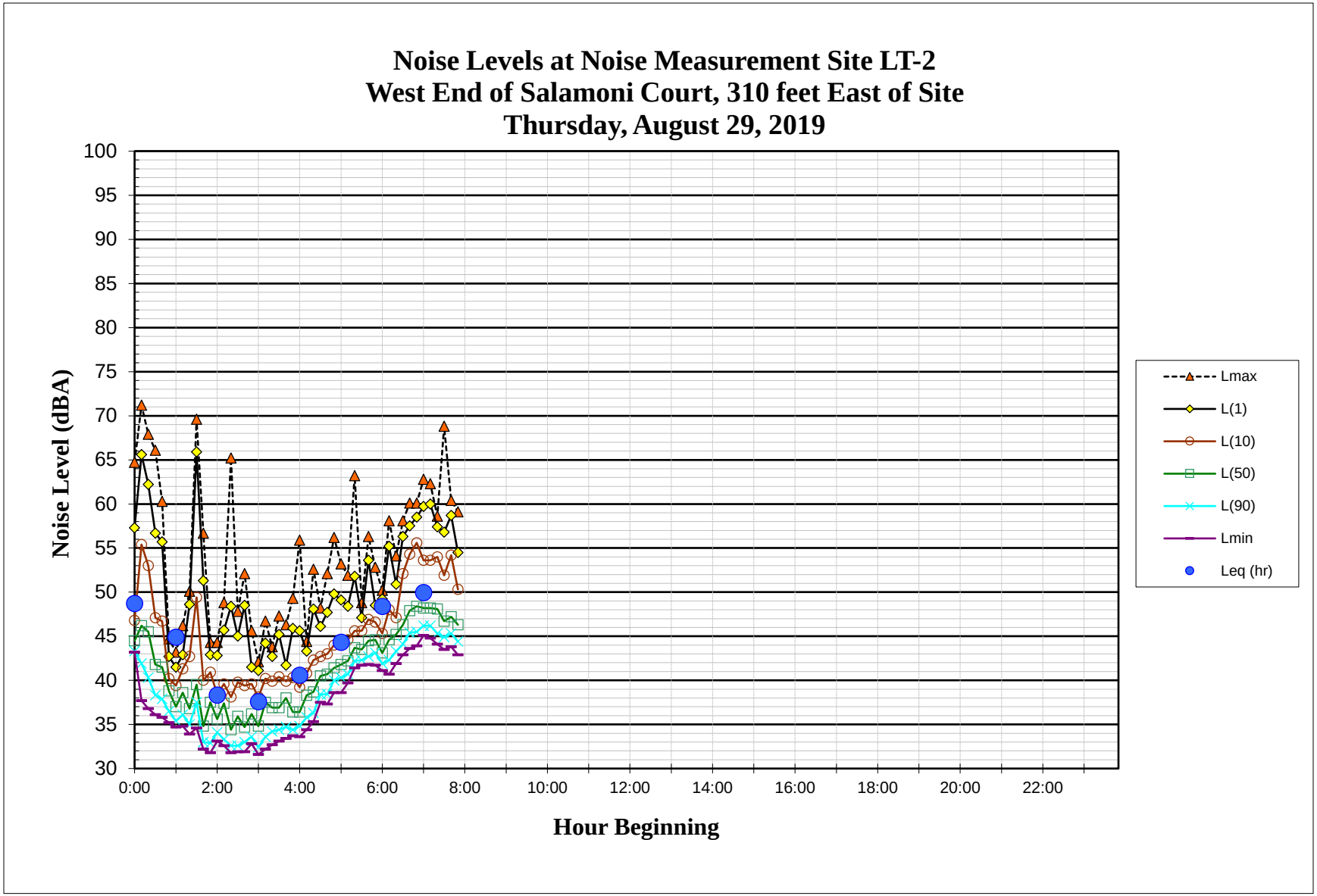


Figure A7 Noise Levels at Measurement Site LT-3 on Tuesday, August 27, 2019

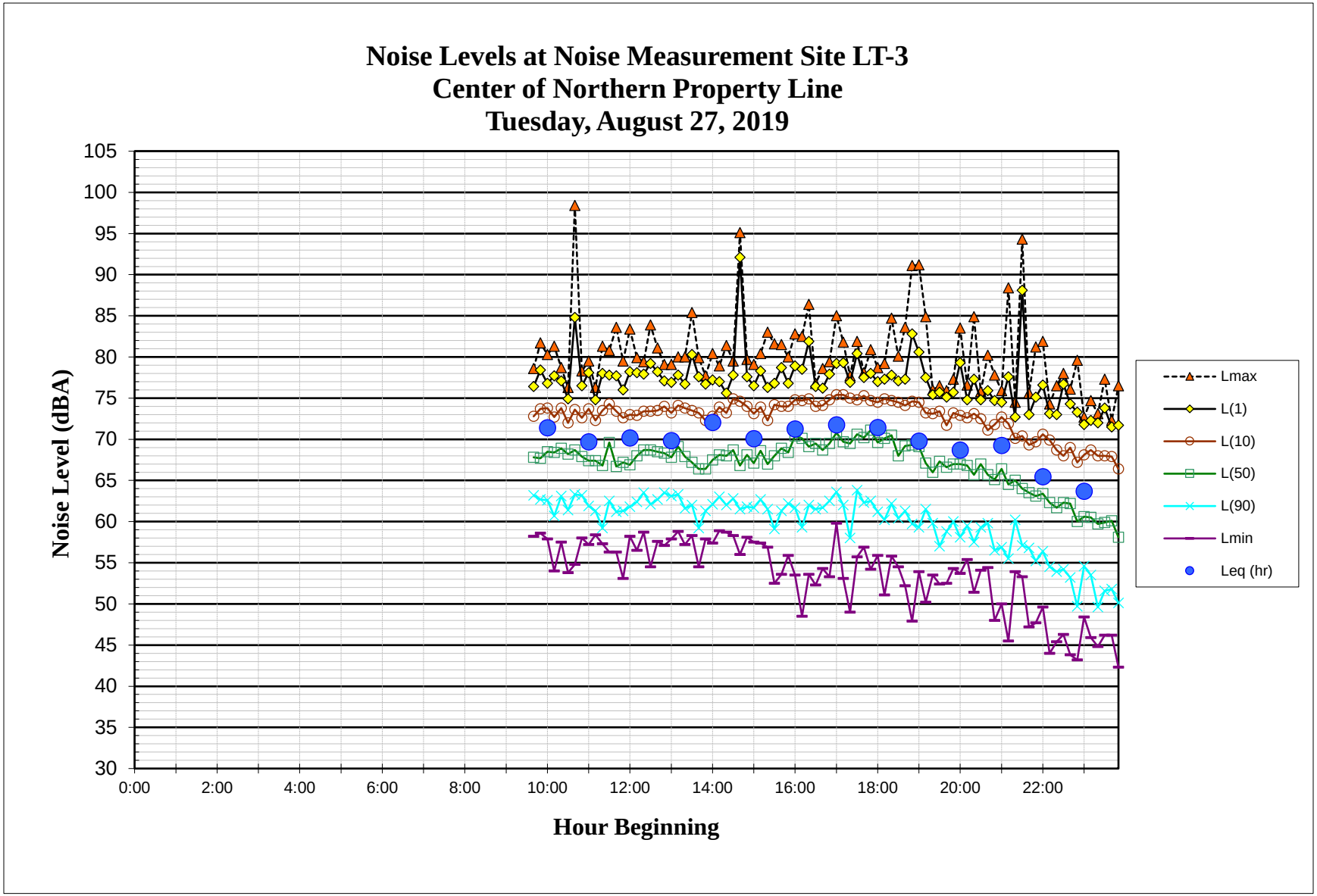


Figure A8 Noise Levels at Measurement site LT-3 on Wednesday, August 28, 2019

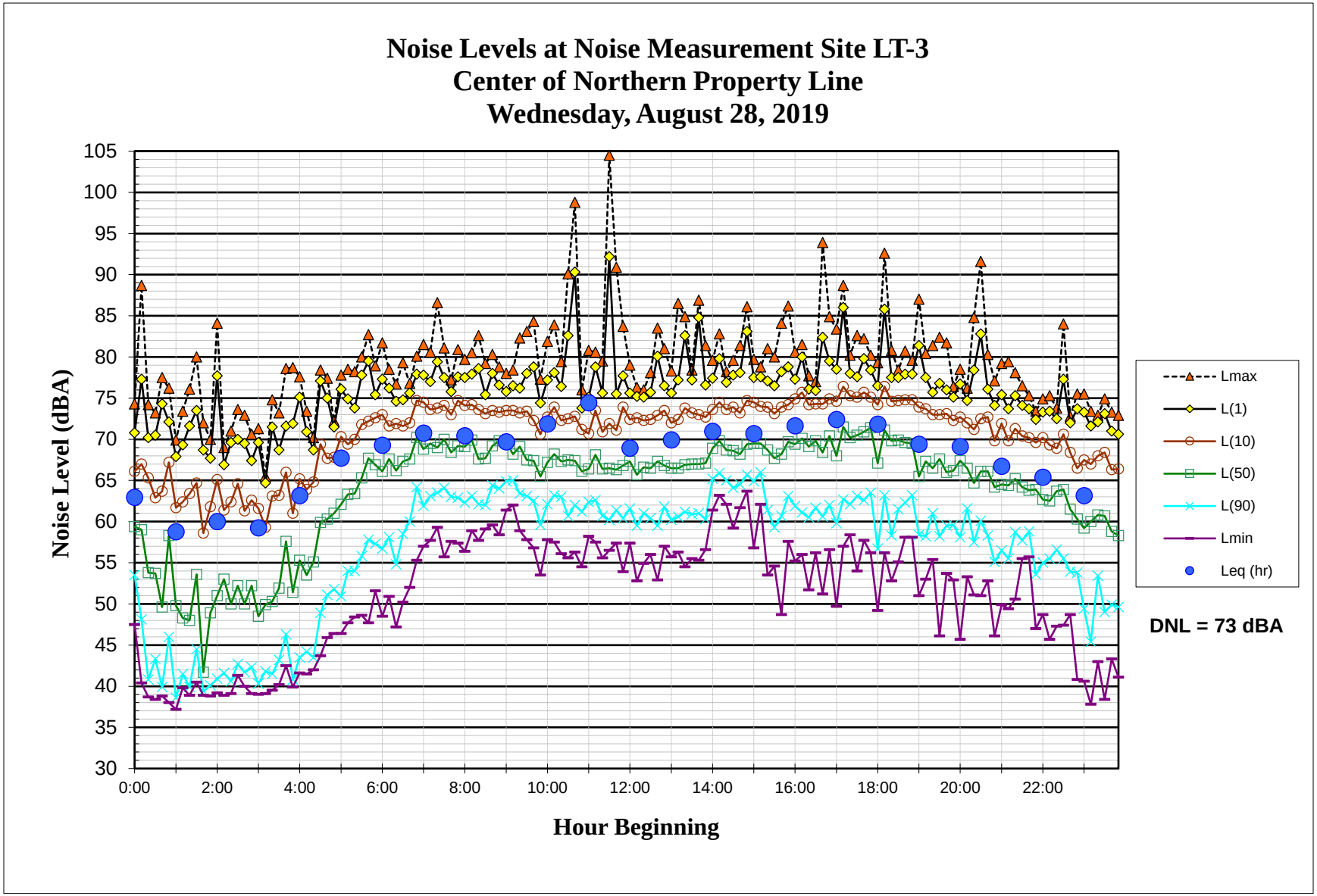


Figure A9 Noise Levels at Measurement site LT-3 on Thursday, August 29, 2019

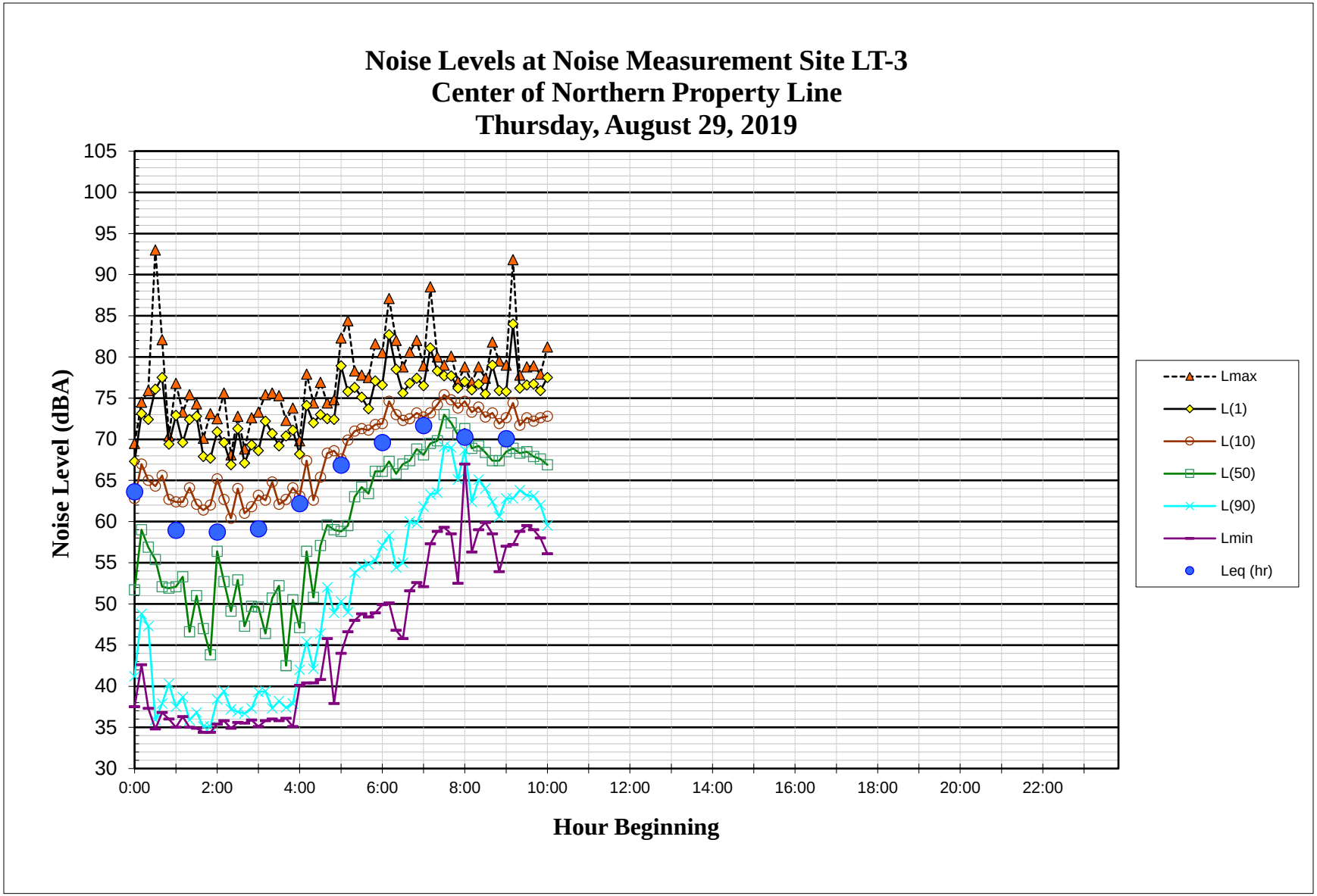


Figure A10 Noise Levels at Measurement site LT-4 on Tuesday, August 27, 2019

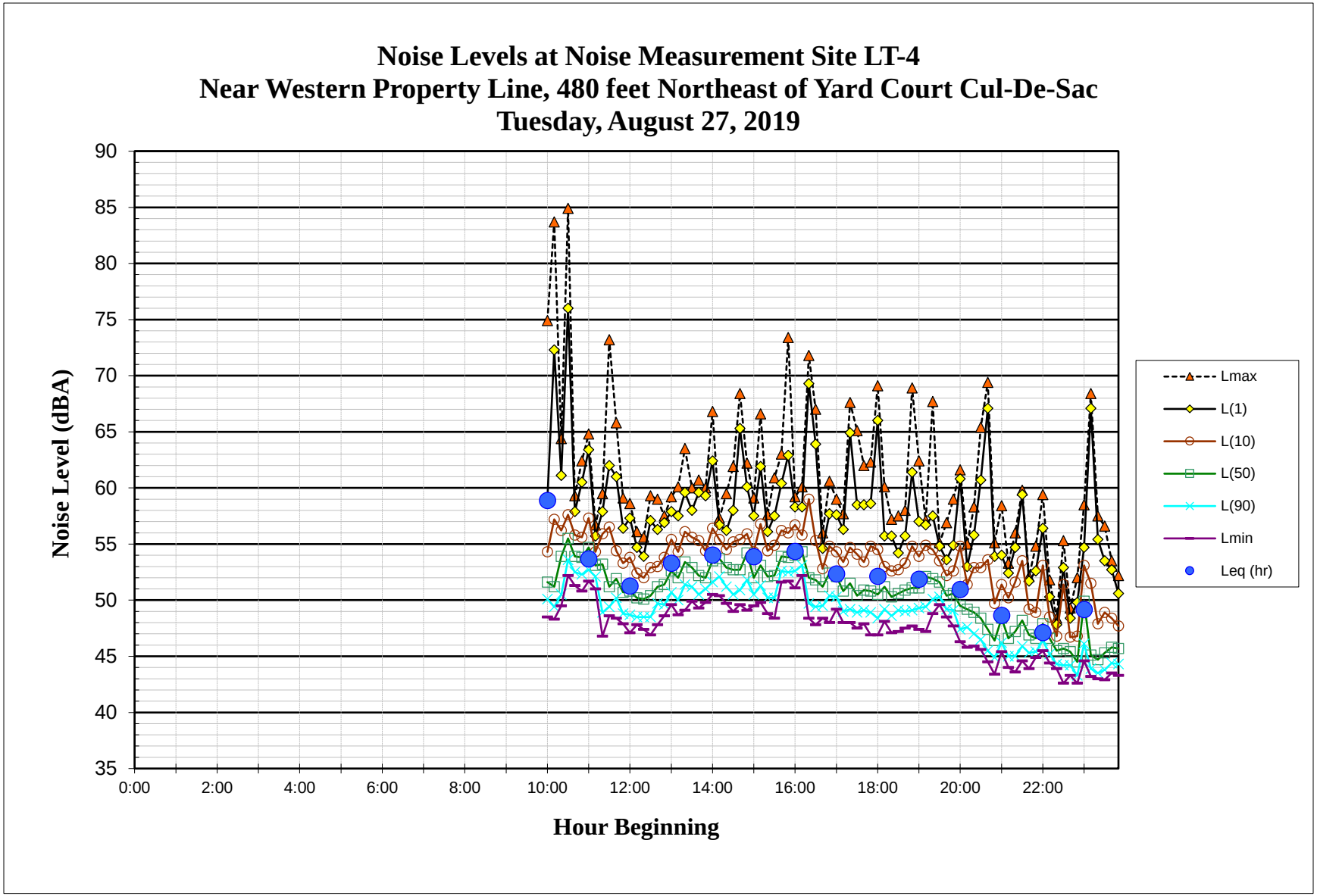


Figure A11 Noise Levels at Measurement site LT-4 on Wednesday, August 28, 2019

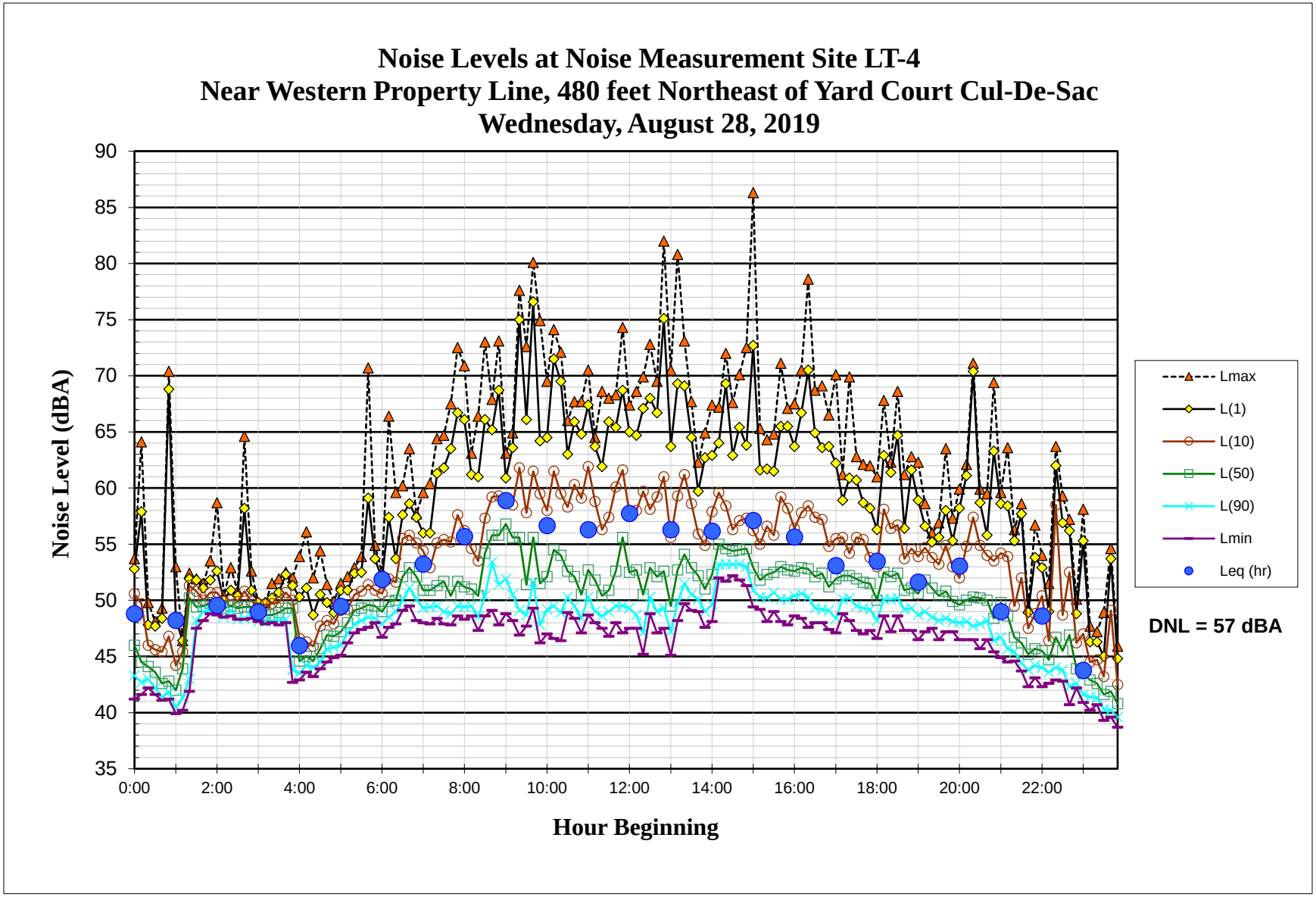


Figure A12 Noise Levels at Measurement site LT-4 on Thursday, August 29, 2019

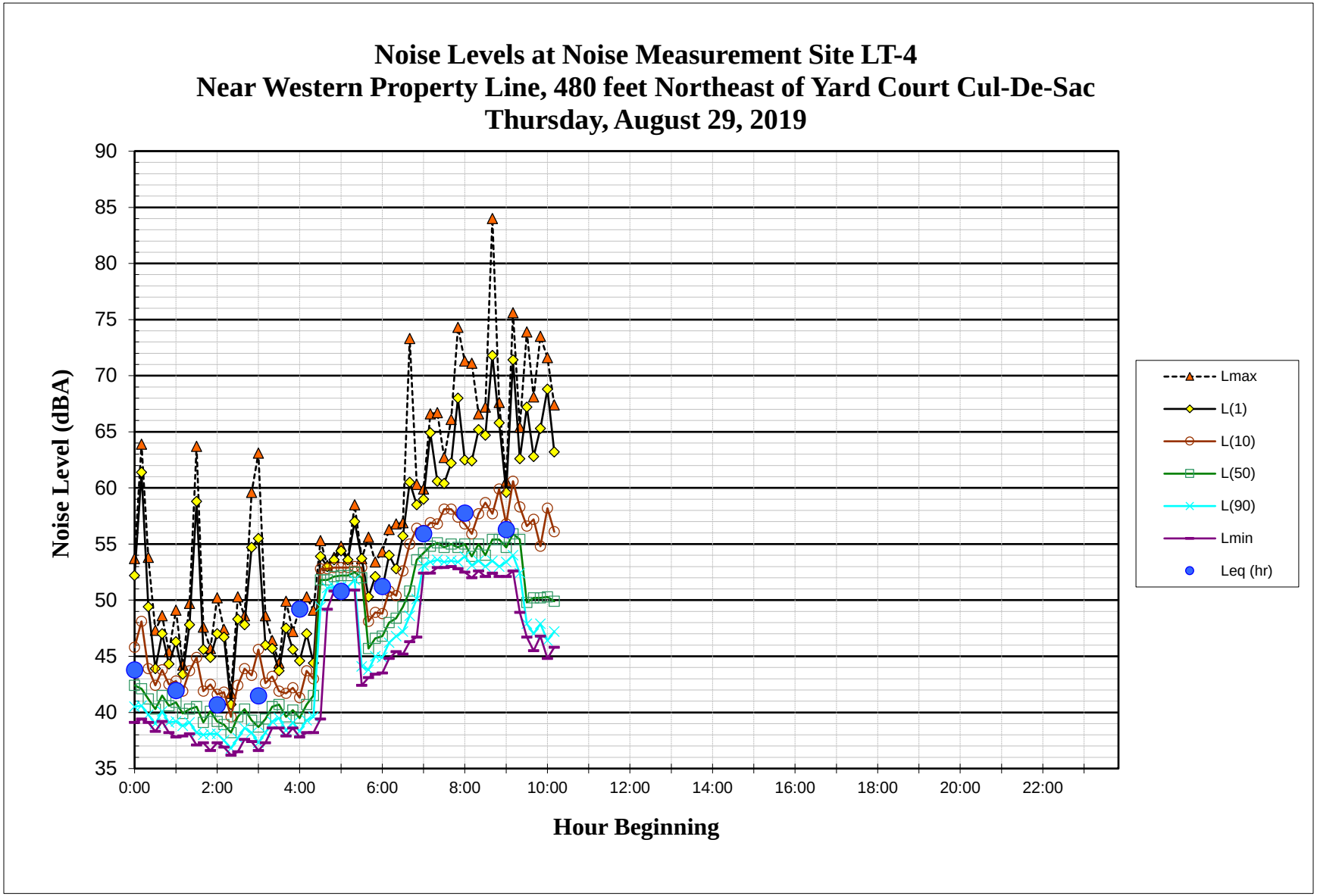


Figure A13 Noise Levels at Measurement site LT-5 on Tuesday, August 27, 2019

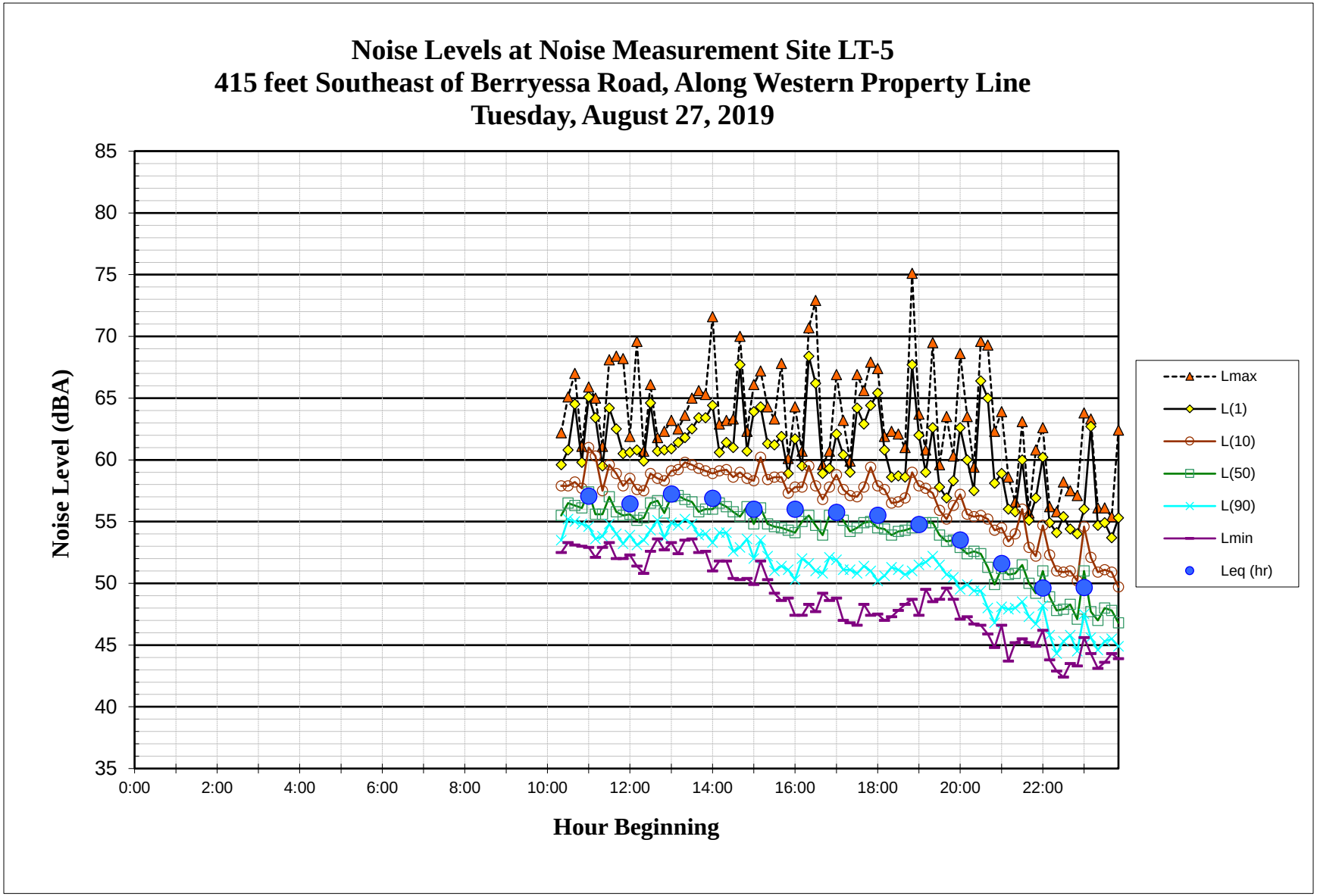


Figure A14 Noise Levels at Measurement site LT-5 on Wednesday, August 28, 2019

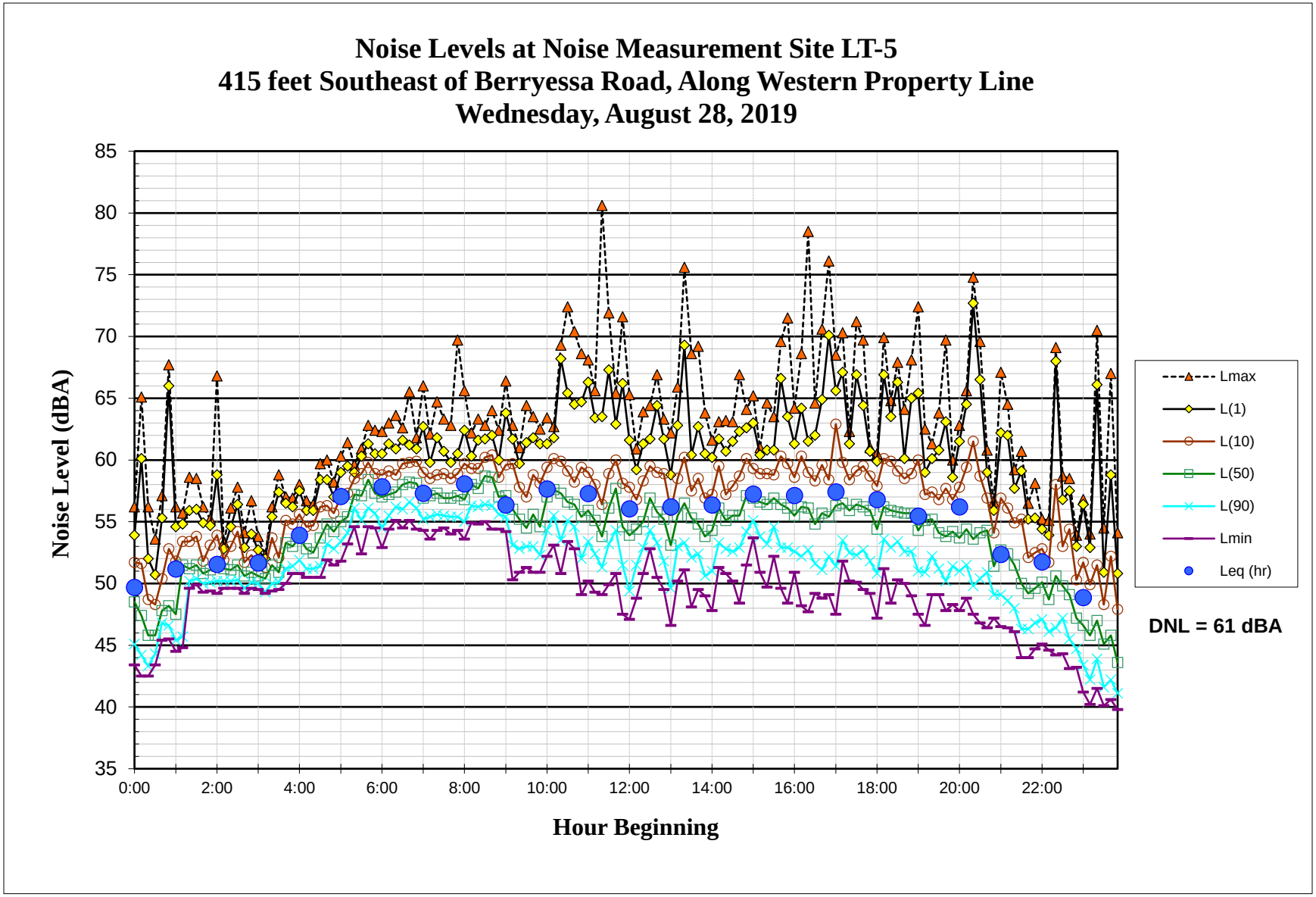


Figure A15 Noise Levels at Measurement site LT-5 on Thursday, August 29, 2019