# *BLOSSOM HILL STATION TOD AFFORDABLE HOUSING PROJECT NEPA NOISE ASSESSMENT*

## *San José, California*

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## INTRODUCTION

This report presents the results of the noise assessment completed for the affordable housing project (Building B) proposed as part of the VTA Blossom Hill Station TOD project in San José, California. Building B would be six stories tall, with a maximum height of 72 feet, including mechanical screening, and would include 89 affordable housing units.

The project's potential to result in adverse effects with respect to applicable National Environmental Policy Act (NEPA) guidelines is assessed in this report. The report is divided into two sections. 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. The NEPA Noise Assessment Section evaluates noise effects resulting from the project. Noise insulation is recommended to avoid the potential for adverse effects on the interiors of proposed residential units.

## 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.

**TABLE 1 Definition of Acoustical Terms Used in this Report**

| Term | Definition |
|---|---|
| Decibel, dB | A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals. |
| Sound Pressure Level | Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter. |
| Frequency, Hz | The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz. |
| A-Weighted Sound Level, dBA | The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. |
| Equivalent Noise Level, $L_{eq}$ | The average A-weighted noise level during the measurement period. |
| $L_{max}$, $L_{min}$ | The maximum and minimum A-weighted noise level during the measurement period. |
| $L_{01}$, $L_{10}$, $L_{50}$, $L_{90}$ | The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period. |
| Day/Night Noise Level, $L_{dn}$ or DNL | The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 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.

## Regulatory Background

The U.S. Department of Housing and Urban Development (HUD) environmental noise regulations are set forth in 24CFR Part 51B (Code of Federal Regulations). The following exterior noise standards for new housing construction would be applicable to this project:

- 65 dBA DNL or less – acceptable.

- Exceeding 65 dBA DNL but not exceeding 75 dBA DNL – normally unacceptable (appropriate sound attenuation measures must provide an additional 5 decibels of attenuation over that typically provided by standard construction in the 65 dBA DNL to 70 dBA DNL zone; 10 decibels additional attenuation in the 70 dBA DNL to 75 dBA DNL zone).

- Exceeding 75 dBA DNL – unacceptable.

These noise standards also apply, "… at a location 2 meters from the building housing noise sensitive activities in the direction of the predominant noise source…" and "…at other locations where it is determined that quiet outdoor space is required in an area ancillary to the principal use on the site."

A goal of 45 dBA DNL is set forth for interior noise levels and attenuation requirements are geared toward achieving that goal. It is assumed that with standard construction any building will provide sufficient attenuation to achieve an interior level of 45 dBA DNL or less if the exterior level is 65 dBA DNL or less. Where exterior noise levels range from 65 dBA DNL to 70 dBA DNL, the project must provide a minimum of 25 decibels of attenuation, and a minimum of 30 decibels of attenuation is required in the 70 dBA DNL to 75 dBA DNL zone. Where exterior noise levels range from 75 dBA DNL to 80 dBA DNL, the project must provide a minimum of 35 decibels of attenuation to achieve an interior level of 45 dBA DNL or less.

## Existing Noise Environment

The project site is located northwest of the SR 85/Blossom Hill Road interchange in San José, California. To the west, the project site is bound by Canoas Creek. Opposite SR 85 to the northeast are existing multi-family residences. To the south, opposite Blossom Hill Road, are single-family residences and a Samaritan Medical Care Center. Additional single-family residences and a 7-Eleven convenience store is west of the project site, opposite Canoas Creek.

The existing noise environment at the project site and in the surrounding area results primarily from vehicular traffic along SR 85 and Blossom Hill Road. Aircraft flyovers associated with Mineta San José International Airport operations also contribute to the noise environment at the site.

Due to the Shelter-in-Place restrictions in the Bay Area at the time of this study, traffic volumes along the surrounding roadways were reduced as compared to typical, pre-pandemic conditions. A noise monitoring survey was not completed to document ambient noise levels during this unique time period because resultant noise levels would be less.

In order to establish the environmental baseline for the project, noise data contained in the City's General Plan Update EIR[1] and noise data from prior projects, including previous projects at the site, were reviewed. The City's General Plan Update EIR includes noise contour data for 2008 (see Figure 1), which show noise levels of 77 dBA DNL at a distance of 75 feet from the centerline of the near lane along SR 85 and 70 dBA DNL at a distance of 75 feet from the centerline of Blossom Hill Road.

A noise monitoring survey was completed at the project site between October 18, 2003 and October 22, 2003 for the Housing Element Update Third Phase Housing Opportunity General Plan Amendments EIR Project.[2] The survey included one long-term (LT-1), which was made approximately 170 feet from the centerline of the nearest southbound lane along SR 85. Hourly average noise levels at this location typically ranged from 63 to 68 dBA $L_{eq}$ during the day and from 55 to 66 dBA $L_{eq}$ at night. The day-night average noise level calculated in 2003 ranged from 68 to 69 dBA DNL at LT-1. When propagated to 75 feet, the day-night average noise levels would range from 73 to 74 dBA DNL. Figure A1 of the Appendix show the daily trend in noise levels at LT-1.

Additionally, a noise monitoring survey was completed for a project at 397 Blossom Hill Road between October 5, 2018 and October 10, 2018.[3] The noise environment at this site, which is about 0.6 miles east of the project site, was dominated by Blossom Hill Road, and the monitoring survey included a long-term noise measurement approximately 65 feet from the centerline of the roadway (LT-2). Hourly average noise levels ranged from 63 to 72 dBA $L_{eq}$ during daytime hours, and from 58 to 70 dBA $L_{eq}$ at night. The day-night average noise level at LT-2 ranged from 72 to 73 dBA DNL. Figures A2 through A5 of the Appendix show the daily trend in noise levels at LT-2.

Using existing traffic volumes included in the project traffic report completed by *Hexagon Transportation Consultants, Inc.* in 2020 and in the Caltrans Traffic Census Program,[4] the Federal Highway Administration's Traffic Noise Model (FHWA's TNM), version 2.5, was used to model the existing noise environment at the project site. The vehicle distribution along SR 85 is 98% autos, 1% medium trucks, and 1% heavy trucks, according to the Caltrans census site.[3] Using the same distribution along Blossom Hill Road, the existing noise levels at distances of 75 feet from the centerline of the nearest through lane along southbound SR 85 and 75 feet from the centerline of Blossom Hill Road would be 78 and 72 dBA DNL, respectively. The modeled data correlated well with data and credibly represented worst-case noise levels experienced at the site.

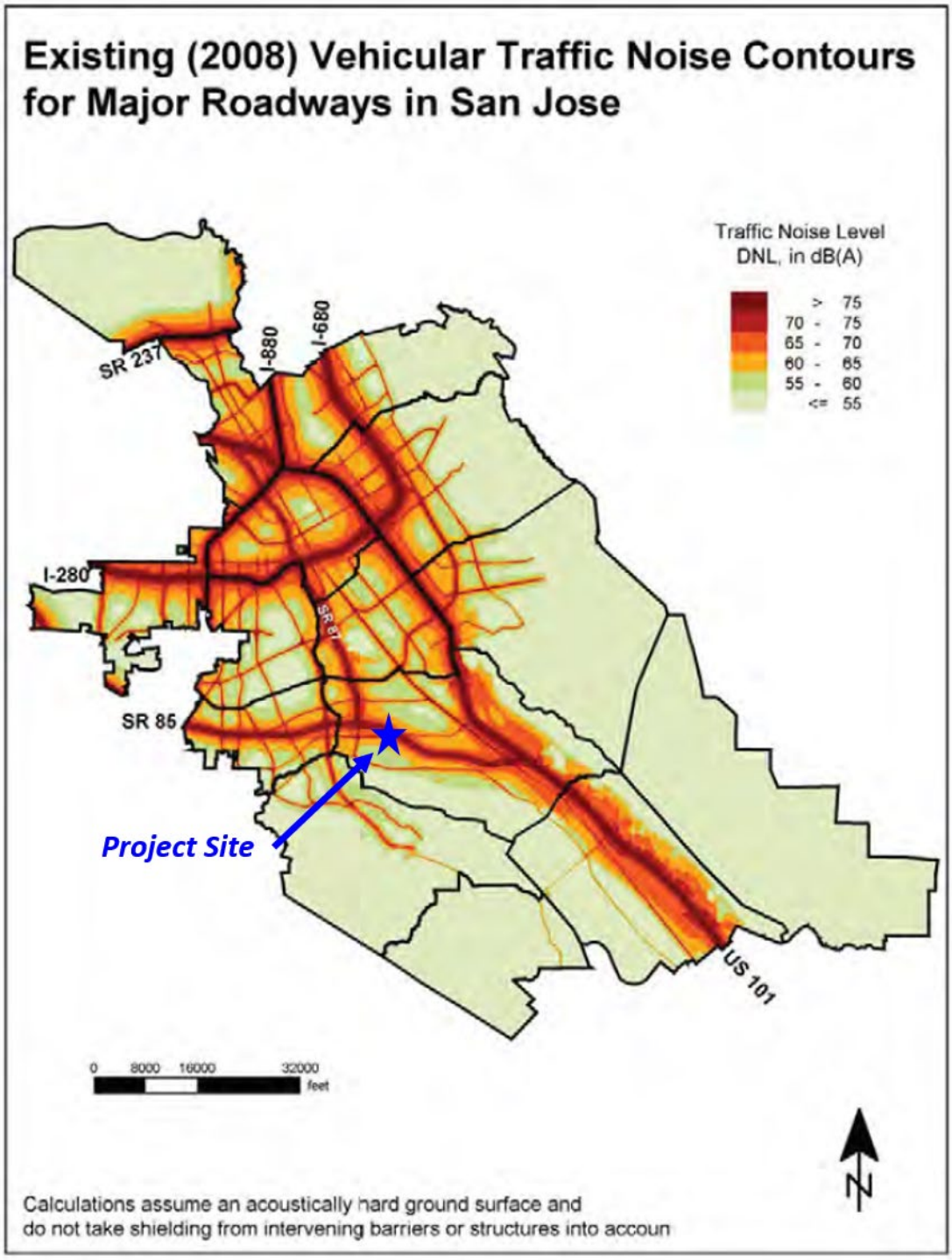
1 Illingworth & Rodkin, Inc., "Envision San José 2040 General Plan Comprehensive Update Environmental Noise Assessment," December 2010.

2 Illingworth & Rodkin, Inc., "Environmental Noise Assessment Housing Element Update Third Phase Housing Opportunity General Plan Amendments EIR," January 5, 2004.

3 Illingworth & Rodkin, Inc., "397 Blossom Hill Road Environmental Noise and Vibration Assessment," February 27, 2019.

4 https://dot.ca.gov/programs/traffic-operations/census

**FIGURE 1 Existing Noise Contours from the City's General Plan Update EIR**



## NEPA NOISE ASSESSMENT

Significance Criteria

An adverse effect would result if noise levels at the project site would exceed HUD Guidelines for acceptability. Exterior noise levels exceeding 65 dBA DNL or interior noise levels exceeding 45 dBA DNL would exceed HUD's noise compatibility criteria.

*Future Exterior Noise Environment*

Pursuant to the HUD Guidelines, the noise exposure at least 10 years in the future must be considered, in addition to the existing noise exposure. The future noise environment at the project site would continue to result primarily from vehicular traffic along SR 85 and Blossom Hill Road. A traffic report was completed for the proposed project in September 2020 by *Hexagon Transportation Consultants, Inc*. While the traffic study indicated that the proposed project would not substantially increase existing traffic volumes, the traffic study did not provide information related to future traffic volumes. Therefore, to estimate future traffic noise levels, a review of the traffic volumes contained in the *Draft Program EIR for the Envision San José 2040 General Plan*, was made. By the year 2035, a noise level increase of 1 dBA DNL would occur along SR 85, while no measurable increase was calculated along Blossom Hill Road in the General Plan Update EIR. For purposes of assessing the worst-case scenario, a conservative 1% to 2% increase in traffic volumes along Blossom Hill Road was assumed to occur for the next 15 years. This would result in a 1 dBA DNL increase in Blossom Hill Road traffic noise levels by the year 2035. Therefore, the future noise levels estimated at distances of 75 feet from the centerline of the nearest through lane along southbound SR 85 and 75 feet from the centerline of Blossom Hill Road would be 79 and 73 dBA DNL, respectively.

Residential Outdoor Use Area – Affordable Building Amenity Space (C)

The outdoor amenity space at Building B would be located along the western building façade and would have direct line-of-sight to portions of Blossom Hill Road and SR 85. Intervening buildings would reduce the views of these roadways to 70 degrees or less, which would result in a 4 dBA reduction in noise levels as compared to full view of the roadway (see Figure 2). With the center of the amenity space set back approximately 225 feet from the centerline of Blossom Hill Road, the future exterior noise levels would be 65 dBA DNL or less, which would not exceed the HUD exterior noise threshold. Exterior noise levels at outdoor activity areas proposed by the project would be considered "normally acceptable" by HUD.

*Future Interior Noise Environment*

Floor plans and elevations prepared by *Wallace Roberts & Todd, LLC* (dated April 13, 2020) were reviewed, and calculations were made to quantify the transmission loss provided by the proposed building elements and to estimate interior noise levels resulting from exterior noise sources. The relative areas of the building elements (walls, windows, and doors) were then input into an acoustical model to calculate interior noise levels within individual rooms.

Southern Building Façade of Building B

The residential units located along the southern building façade of Building B would be set back approximately 75 feet from the centerline of Blossom Hill Road. These units would be mostly

shielded from SR 85. The exterior-facing units along this façade would be exposed to future exterior noise levels ranging from 72 to 73 dBA DNL on floors 2 through 6. Assuming windows to be partially open for ventilation, the future interior noise levels would range from 57 to 58 dBA DNL, which would exceed the 45 dBA DNL interior noise threshold.

Western Building Façade of Building B

The residential units located along the western building façade of Building B would be set back approximately 75 to 345 feet from the centerline of the Blossom Hill Road and would be partially shielded from SR 85. The exterior-facing units along this façade, which would be located on floors 1 through 5, would be exposed to future exterior noise levels ranging from 65 to 72 dBA DNL. Assuming windows to be partially open for ventilation, the future interior noise levels would range from 50 to 57 dBA DNL, which would exceed the 45 dBA DNL interior noise threshold.

Northern Building Façade of Building B

The residential units located along the northern building façade of Building B would be set back approximately 345 to 390 feet from the centerline of the nearest through lane of southbound SR 85. The exterior-facing units along this façade, which would be located on floors 1 through 5, would be exposed to future exterior noise levels ranging from 65 to 68 dBA DNL. Assuming windows to be partially open for ventilation, the future interior noise levels would range from 50 to 53 dBA DNL, which would exceed the 45 dBA DNL interior noise threshold.

Eastern Building Façade of Building B

Units located along the eastern façade of Building B, which would be facing the entrance driveway of the project site, would be partially shielded from both Blossom Hill Road and SR 85. With setbacks from the centerline of Blossom Hill Road ranging from 75 to 345 feet at Building B, these units would be exposed to future exterior noise levels ranging from 66 to 71 dBA DNL. Assuming windows to be partially open for ventilation, the future interior noise levels would range from 51 to 56 dBA DNL, which would exceed the 45 dBA DNL interior noise threshold.

Residential units proposed by the project would be exposed to future exterior noise levels up to 73 dBA DNL. The predicted exterior noise level would exceed HUD's "normally acceptable" threshold of 65 dBA DNL by up to 8 dBA DNL. Thirty (30) decibels of attenuation would be required to achieve acceptable levels. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA DNL with proper wall construction techniques, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

Table 3 summarizes the future noise levels at the exterior façades, as well as within the residential interiors along each building façade, assuming windows to be partially open for ventilation. Under this assumption, the future interior noise levels for the proposed project would exceed the HUD's interior noise threshold of 45 dBA DNL within residential units along the building exterior. Noise insulation features would be required to reduce interior noise levels to at or below 45 dBA DNL.

**TABLE 3 Summary of Future Exterior and Interior Noise Levels Along Each Building Façade**

| Building Façade | Future Exterior Noise Levels, DNL (dBA) | Future Interior Noise Levels, DNL (dBA) | Minimum STC Ratings |
|---|---|---|---|
| Southern Façade of Building B | 72 to 73 | 57 to 58 | 32 STC |
| Western Façade of Building B | 65 to 72 | 50 to 57 | 28 to 32 STC |
| Northern Façade of Building B | 65 to 68 | 50 to 53 | 28 STC |
| Eastern Façade of Building B | 65 to 71 | 50 to 56 | 28 to 32 STC |

To maintain a habitable interior environment, all units should be mechanically ventilated so that windows and doors can be kept closed at the occupant's discretion to control noise intrusion indoors. With the incorporation of the above noise insultation features, interior noise levels would be maintained below 45 dBA DNL with an adequate margin of safety.

Figures 3 and 4 summarize the above noise control recommendations. HUD Figure 19 (Figures 5 and 6 of this report) provide summary examples of the inputs used to complete the calculations of interior noise levels at residential units with the future worst-case noise exposure.

**FIGURE 2 Landscape Canoas Creek Plan**


Source: Wallace Roberts & Todd, LLC, April 15, 2020

**FIGURE 3 Recommendations for Noise Insulation – East and North Elevations**

**FIGURE 4 Recommendations for Noise Insulation – West and South Elevations**

## FIGURE 5 HUD Figure 19

Figure 19
Description of Noise Attenuation Measures
(Acoustical Construction)

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Part I

Project Name: VTA Blossom Hill Station TOD - Unit 514, Corner Bedroom (Worst-Case Noise Exposure)

Location: San Jose, California

Sponsor/Developer: Green Republic LLC

Noise Level (From NAG): 73 dBA DNL Attenuation Required: 30 dBA
Primary Noise Source(s): Blossom Hill Road and SR 85

Part II

1. For wall(s) facing and parallel to the noise source(s) (or closest to parallel:
   a. Description of wall construction*: Stucco exterior siding, insulated wood stud, and gypsum board interior
   b. STC rating for wall (rated for no windows or doors): STC 46
   c. Description of windows: Vinyl, Dual Insulating Thermal pane
   d. STC rating for window type: STC 32
   e. Description of doors: NA
   f. STC rating for doors: NA
   g. Percentage of wall (per wall, per dwelling unit) composed of windows: 34% and doors: 0%
   h. Combined STC rating for wall component: 36 dBA

2. For walls perpendicular to noise source(s):
   a. Description of wall construction*: Stucco exterior siding, insulated wood stud, and gypsum board interior
   b. STC rating for wall (rated for no windows or doors): STC 46
   c. Description of windows: Vinyl, Dual Insulating Thermal pane
   d. STC rating for window type: STC 32
   e. Description of doors: NA
   f. STC rating for doors: NA
   g. Percentage of wall (per wall, per dwelling unit) composed of windows: 36% and doors: 0%
   h. Combined STC rating for wall component: 35 dBA

3. Roofing component (if overhead attenuation is required to aircraft noise):
   a. Description of roof construction: N/A
   b. STC rating (rated as if no skylights or other openings): N/A
   c. Description of skylights or overhead windows: N/A
   d. STC rating for skylights or overhead windows: N/A
   e. Percentage of roof composed of skylights or windows (per dwelling unit): N/A
   f. Percentage of roof composed of large uncapped openings such as chimneys: N/A
   g. Combined STC rating for roof component: N/A

4. Description of type of mechanical ventilation provided: Satisfactory forced air mechanical ventilation system.

## FIGURE 6 HUD Figure 19

Figure 19
Description of Noise Attenuation Measures
(Acoustical Construction)

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Part I

Project Name: VTA Blossom Hill Station TOD - Unit 515, Corner Bedroom (Worst-Case Noise Exposure)

Location: San Jose, California

Sponsor/Developer: Green Republic LLC

Noise Level (From NAG): 73 dBA DNL Attenuation Required: 30 dBA
Primary Noise Source(s): Blossom Hill Road and SR 85

Part II

1. For wall(s) facing and parallel to the noise source(s) (or closest to parallel:
   a. Description of wall construction*: Stucco exterior siding, insulated wood stud, and gypsum board interior
   b. STC rating for wall (rated for no windows or doors): STC 46
   c. Description of windows: Vinyl, Dual Insulating Thermal pane
   d. STC rating for window type: STC 32
   e. Description of doors: NA
   f. STC rating for doors: NA
   g. Percentage of wall (per wall, per dwelling unit) composed of windows: 37% and doors: 0%
   h. Combined STC rating for wall component: 35 dBA

2. For walls perpendicular to noise source(s):
   a. Description of wall construction*: Stucco exterior siding, insulated wood stud, and gypsum board interior
   b. STC rating for wall (rated for no windows or doors): STC 46
   c. Description of windows: Vinyl, Dual Insulating Thermal pane
   d. STC rating for window type: STC 32
   e. Description of doors: NA
   f. STC rating for doors: NA
   g. Percentage of wall (per wall, per dwelling unit) composed of windows: 53% and doors: 0%
   h. Combined STC rating for wall component: 34 dBA

3. Roofing component (if overhead attenuation is required to aircraft noise):
   a. Description of roof construction: N/A
   b. STC rating (rated as if no skylights or other openings): N/A
   c. Description of skylights or overhead windows: N/A
   d. STC rating for skylights or overhead windows: N/A
   e. Percentage of roof composed of skylights or windows (per dwelling unit): N/A
   f. Percentage of roof composed of large uncapped openings such as chimneys: N/A
   g. Combined STC rating for roof component: N/A

4. Description of type of mechanical ventilation provided: Satisfactory forced air mechanical ventilation system.

# Appendix A

**FIGURE A1 Daily Trend in Noise Levels at LT-1, Sunday October 19, 2003 through Tuesday October 21, 2003**

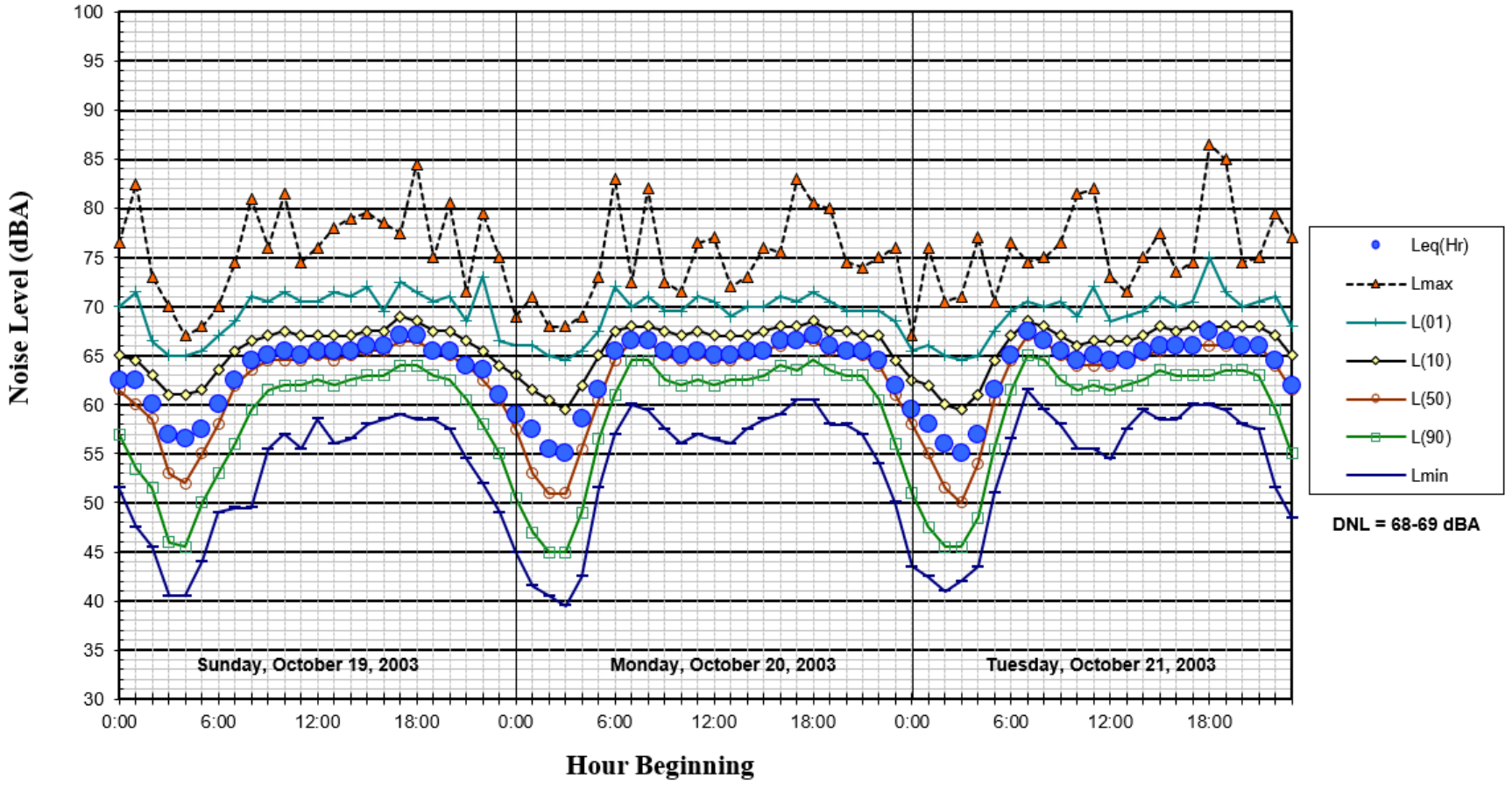


**FIGURE A2 Daily Trend in Noise Levels at LT-2, Saturday October 6, 2018**

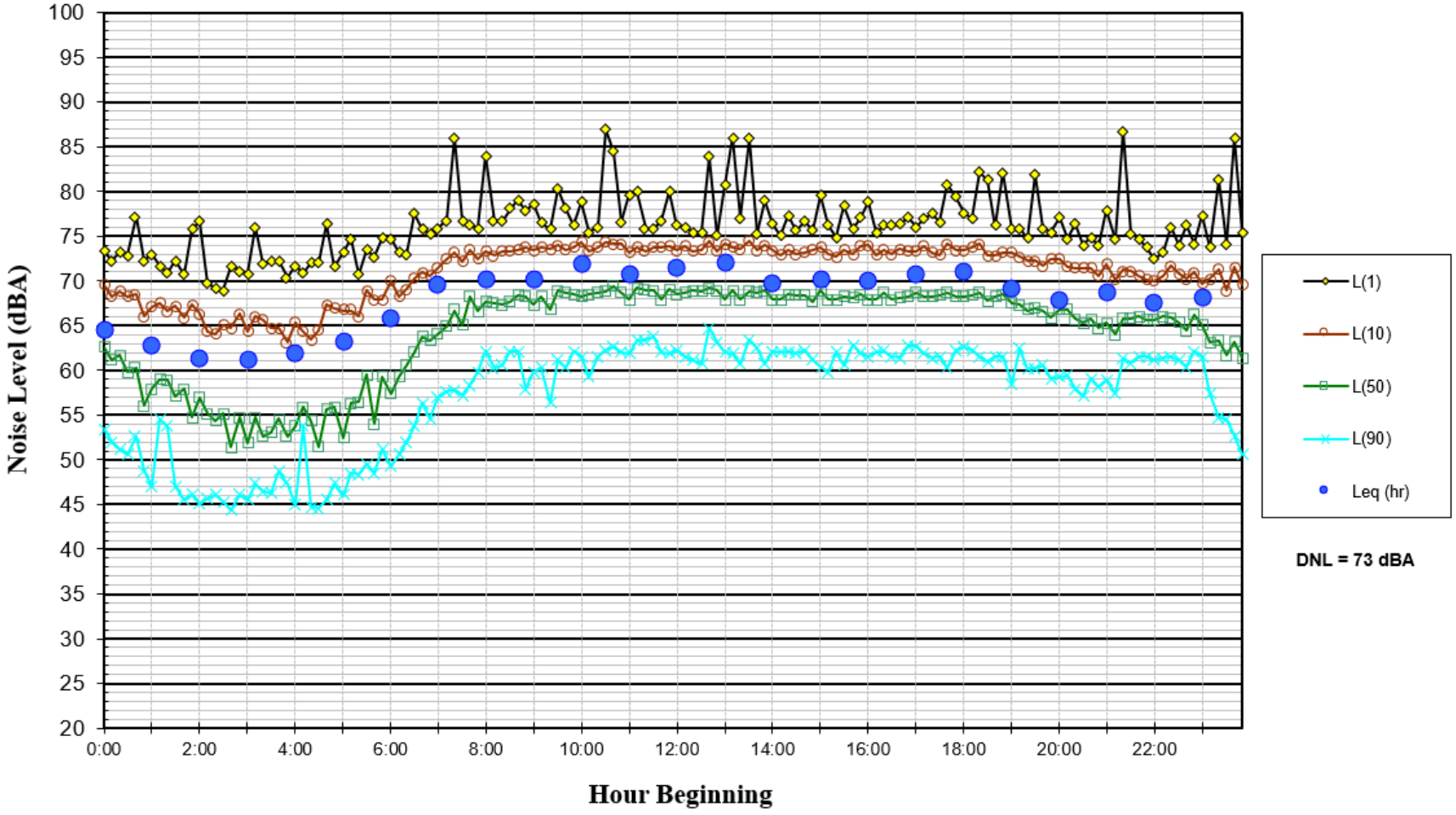


**FIGURE A3 Daily Trend in Noise Levels at LT-2, Sunday October 7, 2018**

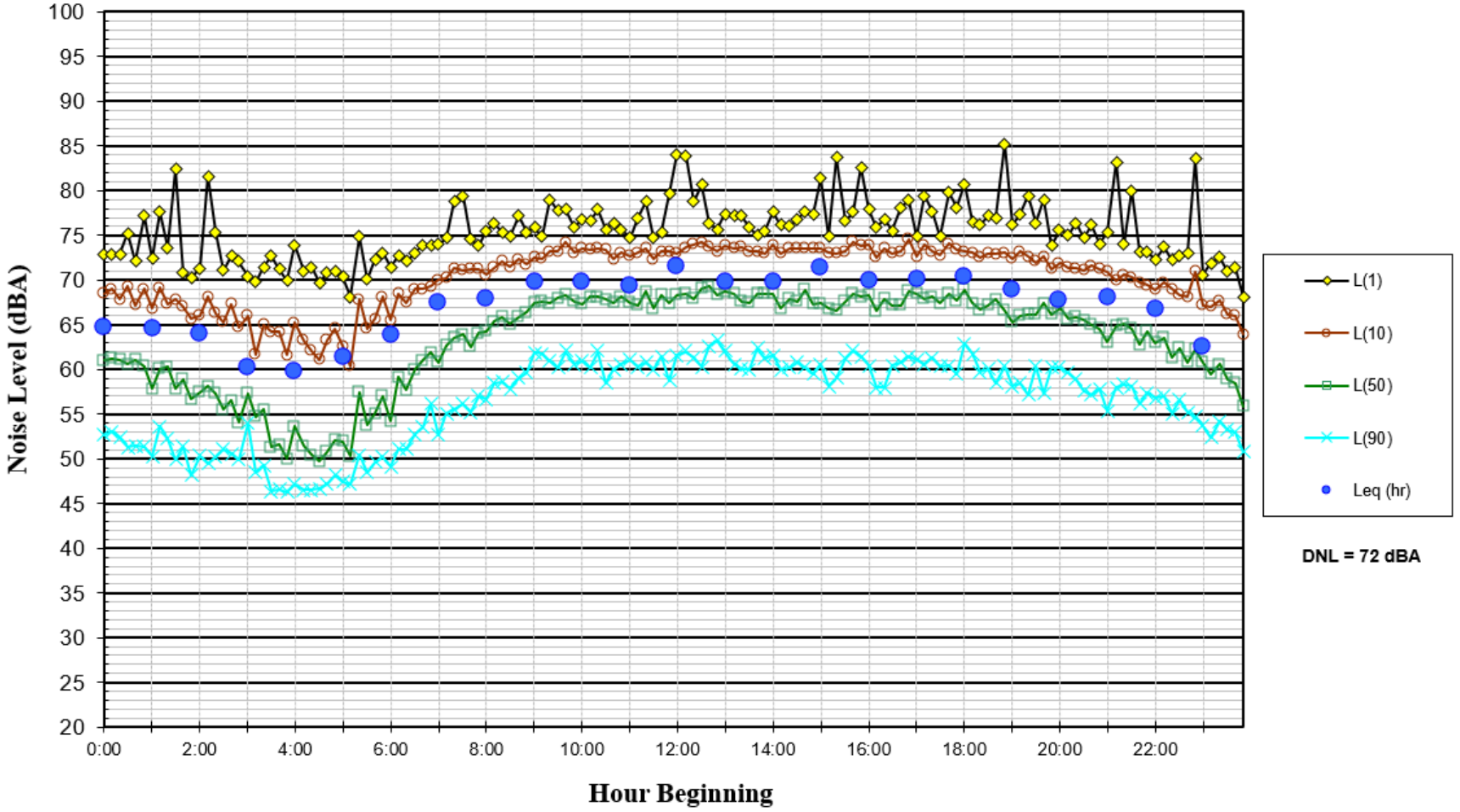


**FIGURE A4 Daily Trend in Noise Levels at LT-2, Monday October 8, 2018**

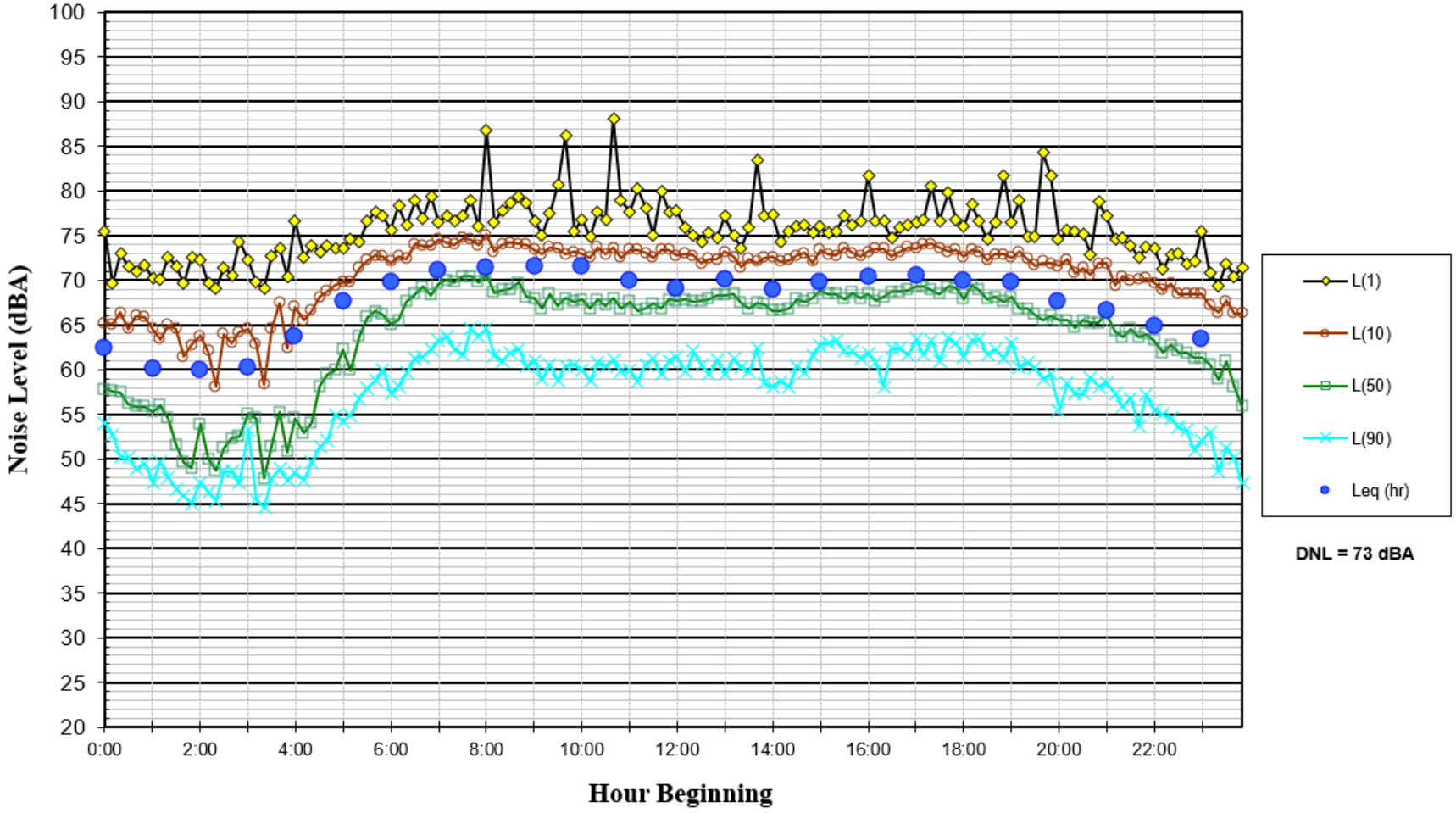
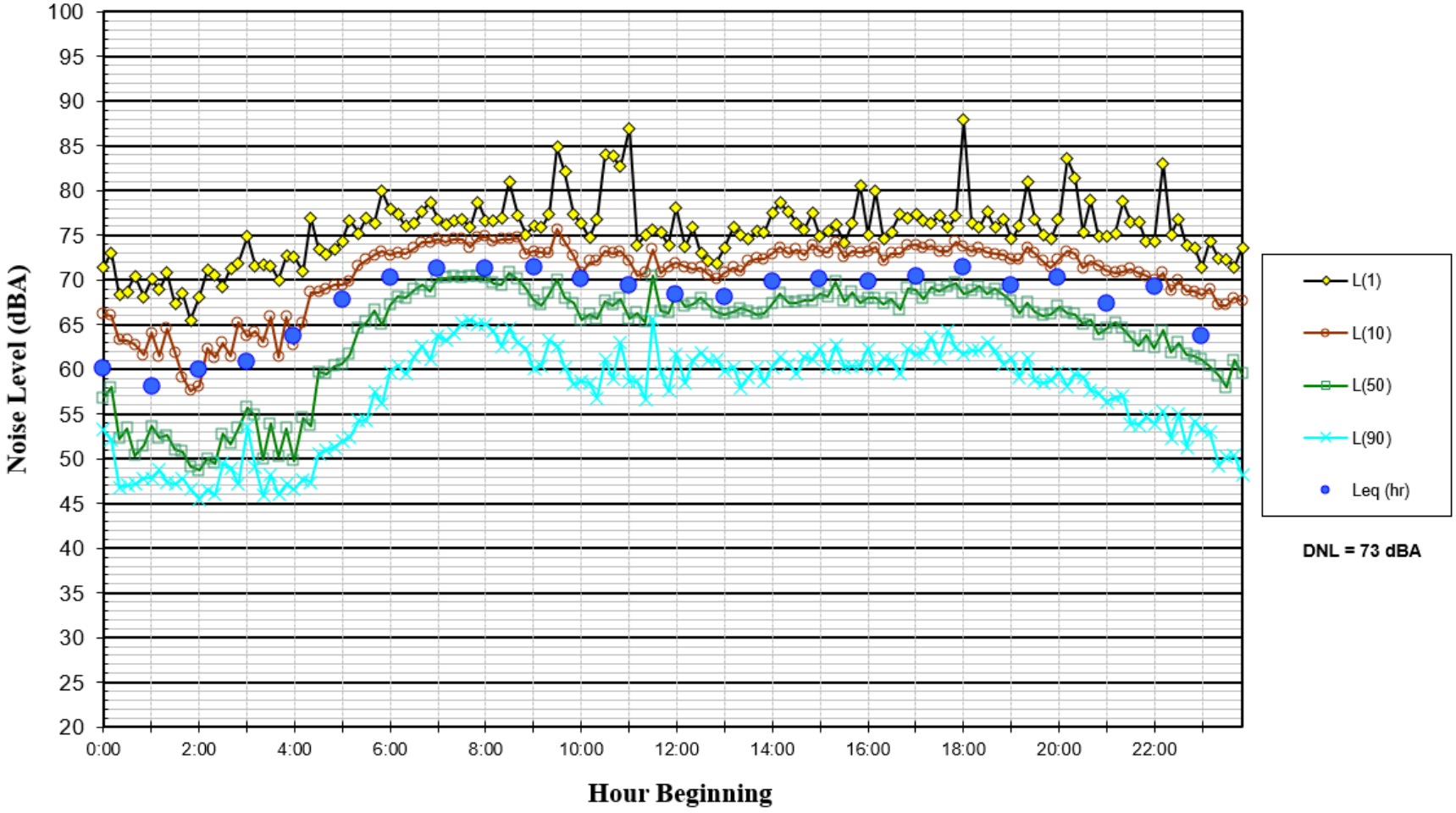


**FIGURE A5 Daily Trend in Noise Levels at LT-2, Tuesday October 9, 2018**



# Appendix B HUD DNL Calculator Results

# DNL Calculator

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

# Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

# DNL Calculator

| | |
|---|---|
| **Site ID** | Blossom Hill Station TOD - Outdoor Use Area |
| **Record Date** | 12/03/2020 |
| **User's Name** | MST |

| | |
|---|---|
| **Road # 1 Name:** | **Blossom Hill Road** |

**Road #1**

| **Vehicle Type** | **Cars** ☑ | **Medium Trucks** ☑ | **Heavy Trucks** ☑ |
|---|---|---|---|
| Effective Distance | 225 | 225 | 225 |
| Distance to Stop Sign | | | |
| Average Speed | 40 | 40 | 40 |
| Average Daily Trips (ADT) | 63433 | 647 | 647 |
| Night Fraction of ADT | 15 | 15 | 15 |
| Road Gradient (%) | | | 0 |
| Vehicle DNL | 63 | 53 | 61 |
| Calculate Road #1 DNL | 66 | Reset | |

| | |
|---|---|
| **Road # 2 Name:** | **SR 85** |

| Road # 2 Name: | SR 85 |
|---|---|

**Road #2**

| Vehicle Type | Cars ☑ | Medium Trucks ☑ | Heavy Trucks ☑ |
|---|---|---|---|
| Effective Distance | 600 | 600 | 600 |
| Distance to Stop Sign | | | |
| Average Speed | 65 | 60 | 55 |
| Average Daily Trips (ADT) | 160162 | 1634 | 1634 |
| Night Fraction of ADT | 15 | 15 | 15 |
| Road Gradient (%) | | | 0 |
| Vehicle DNL | 65 | 54 | 60 |
| Calculate Road #2 DNL | 66 | Reset | |

Add Road Source | Add Rail Source

| | |
|---|---|
| Airport Noise Level | 50 |
| Loud Impulse Sounds? | ○ **Yes** ◉ **No** |
| Combined DNL for all Road and Rail sources | **69** |
| Combined DNL including Airport | **69** |
| Site DNL with Loud Impulse Sound | |

Calculate | Reset

## Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location

- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
    - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
    - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
    - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
    - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
    - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

## Tools and Guidance

**Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)**

**Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)**

# DNL Calculator

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

# Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

# DNL Calculator

| | |
|---|---|
| **Site ID** | Blossom Hill Station TOD - South Facade |
| **Record Date** | 12/03/2020 |
| **User's Name** | MST |

| | |
|---|---|
| **Road # 1 Name:** | **Blossom Hill Road** |

**Road #1**

| **Vehicle Type** | **Cars** ☑ | **Medium Trucks** ☑ | **Heavy Trucks** ☑ |
|---|---|---|---|
| Effective Distance | 75 | 75 | 75 |
| Distance to Stop Sign | | | |
| Average Speed | 40 | 40 | 40 |
| Average Daily Trips (ADT) | 63433 | 647 | 647 |
| Night Fraction of ADT | 15 | 15 | 15 |
| Road Gradient (%) | | | 0 |
| Vehicle DNL | 70 | 60 | 68 |
| Calculate Road #1 DNL | 73 | Reset | |

Add Road Source | Add Rail Source

Add Road Source | Add Rail Source

| | |
|---|---|
| Airport Noise Level | 50 |
| Loud Impulse Sounds? | ○ **Yes** ◉ **No** |
| Combined DNL for all Road and Rail sources | **73** |
| Combined DNL including Airport | **73** |
| Site DNL with Loud Impulse Sound | |

Calculate | Reset

## Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

## Tools and Guidance

**Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)**

**Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)**