Appendix E

Noise Technical Memorandum

AECOM
300 Lakeside Drive, Suite 400
Oakland, CA 94612

(510) 893-3600 tel
(510) 8874-3268 fax

Memorandum

To	Reema Mahamood, Planning Department, City of San José
CC	
Subject	Gallup and Mesa Affordable Housing Project Noise Technical Memorandum
From	Michelle Dunn, AECOM
Date	March 27, 2020

Introduction

This air quality memorandum was prepared to address potential noise impacts consistent with the National Environmental Policy Act (NEPA) review.

Project Description

The project site for proposed affordable housing units comprises two adjacent parcels at the intersection of the west side of Gallup Drive and the north side of Mesa Drive in the City of San José, Santa Clara County, California. The street address for each parcel of the project site is 1171 Mesa Drive and 5647 Gallup Drive.

The project applicant proposes to construct a five-story, approximately 55-foot-tall (excluding parapet, stairs, elevator room, and other rooftop accessories), 41,888 square-foot mixed-use affordable housing development on approximately 0.38 acres (16,576 square feet). The existing property previously contained structures but is currently vacant with grasses and scattered, mature redwood trees onsite. The proposed project would include 46 affordable residential units and service areas. Services include a neighborhood room, podium courtyard, residential community room, bike room, property management, mechanical, maintenance, and electrical rooms, mail room, an elevator, and stairs. An enclosed ground-floor garage and parallel parking spaces along an alley to the north would provide parking for project residents.

Surrounding land uses include a four-unit apartment building to the west, a former movie theater that has been converted to a church to the north. Multi-family residential uses to the south, and commercial uses to the east. Directly across Gallup Drive is a shopping center that includes several stores and restaurants including an Office Max, Pet Food Express, and Whole Foods Market. Pioneer High School is located 0.06 mile to the west.

Project Construction

The proposed project would begin construction in November 2020. Construction is anticipated to take approximately 16 months. No demolition is proposed as there are no existing structures on-site. Construction staging and construction employee parking may be located in nearby parking lots and nearby streets.

Acoustic Concepts and Principles

Sound and Noise Fundamentals

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is typically characterized as unwanted sound. Because ambient and background sound are generally not considered adverse, they are not typically classified as noise. The natural background sound level is often considered the total of all sound sources excluding anthropogenic sources. The ambient sound level is a composite of sound from all sources, including the natural background and anthropogenic sources—it is, by way of example, the total sound received by the microphone of a sound level meter. The existing (pre-project) ambient sound level is often the starting point for analyzing noise impacts, since such environmental noise analysis typically compares project-attributed noise to existing or natural ambient sound based on applicable adverse effect or impact assessment criteria. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment.

Decibels and A-Weighting

The human ear is not equally sensitive to all frequencies within the audible sound spectrum. To accommodate this phenomenon, the A-weighting scale, which approximates the frequency response of the average young healthy ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-weighting scale for levels of those sounds. Therefore, the “A-weighted” noise scale is commonly used for measurements, standards and assessment involving the human perception of noise. The A-weighted scale begins at zero, which represents the faintest sound that humans with normal hearing can hear. Noise levels described with A weighted measurements or predictions are written as dBA, while the unweighted levels are distinguished by dB (and hence the lack of the added “A” suffix). Table 1 shows the relationship of various noise levels to commonly experienced noise events.

Decibel Addition

Decibels are measured on a logarithmic scale that quantifies sound intensity, similar to the Richter scale used for earthquake magnitudes. Therefore, decibels cannot be added or subtracted through ordinary arithmetic. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. For example, if an air conditioner produces a sound pressure level of 85 dB at 50 feet, two of the same air conditioners at the same distance from a detection point would produce 88 dB, not 170 dB.

Human Response to Changes in Noise Levels

As discussed above, doubling sound energy results in a 3 dB increase in sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Table 1

Noise Levels from Common Outdoor and Indoor Sources

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 1,000 feet	--100--	
Gas Lawn Mower at 3 feet	--90--	Food Blender at 3 feet
Diesel Truck at 50 feet, at 50 mph	--80--	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime	--70--	Vacuum Cleaner at 10 feet
Commercial Area Heavy Traffic at 300 feet	--60--	Normal Speech at 3 feet
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans 2009.

Under controlled conditions in a laboratory setting, the trained, healthy human ear is able to discern 1 dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency range (1,000 Hz–8,000 Hz). In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5 dB increase is generally perceived as a distinctly noticeable increase, and a 10 dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy that would result in a 3 dB increase in sound pressure level would generally be perceived as barely detectable. Please refer to Table 2.

Table 2
Approximate Relationship Between Increases in Environmental Noise Level and Human Perception

Noise Level Increase, dB	Human Perception (Typical)
up to about 3	not perceptible
about 3	barely perceptible
about 5	distinctly noticeable
about 10	twice as loud
about 20	four times as loud

Source: Egan, 1988 (Egan, Architectural Acoustics, 1988, Page 21)

Perception of Noise at the Receiver

Noise in our daily environments fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in environmental noise analysis:

- **Equivalent Sound Level (L_{eq}):** The L_{eq} represents an average of the sound energy occurring over a specified time period. In effect, the L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour, A-weighted equivalent sound level (L_{eq}[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by Caltrans and the FHWA.
- **Percentile-Exceeded Sound Level (L_n):** The L_n represents the sound level exceeded "n" percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).
- **Maximum Sound Level (L_{max}):** The L_{max} is the highest instantaneous sound level measured during a specified period.
- **Day-Night Average Sound Level (L_{dn}):** The L_{dn} is the energy-average of A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during nighttime hours (10 p.m.-7 a.m.). The L_{dn} is often noted as the DNL.
- **Community Noise Equivalent Level (CNEL):** Similar to L_{dn}, CNEL is the energy-average of the A-weighted sound levels occurring over a 24-hour period, with a 10 dB penalty applied to A-weighted sound levels occurring during the nighttime hours (10 p.m.-7 a.m.), and a 5 dB penalty applied to the A-weighted sound levels occurring during evening hours (7 p.m.-10 p.m.). The CNEL is usually within 1 dB of the L_{dn}, and for all intents and purposes, the two are interchangeable. As it is easier to compute and of more common use, the L_{dn} is used as the long-term noise measure in this study.

Applicable Noise Compatibility Standards

HUD regulations (24 CFR 51B) codify 65 dB L_{dn} or less as an acceptable exterior noise level threshold. Projects with noise levels in excess of 65 dB L_{dn} are required to demonstrate at least 10 dB noise attenuation beyond standard construction techniques (HUD assumes standard construction achieves 20 dB attenuation) in order to be below the 45 dB L_{dn} interior noise threshold.

Similarly, the City of San José uses its noise land use compatibility guidelines/matrix to help illustrate the degree of acceptability of exposing specified land uses (including sensitive land uses) to a range of ambient-noise levels. For residential uses, 50 to 60 dB L_{dn} or CNEL is considered normally acceptable; 60 to 75 dB, conditionally acceptable; 75 to 90 dB, unacceptable.

The California noise insulation standards regulate the maximum allowable interior noise level in new multi-unit buildings (such as apartment buildings) by specifying the extent to which walls, doors and floor/ceiling assemblies must absorb sound. The standards establish a threshold of 45 A-weighted sound levels (dBA) (CNEL) for noise from exterior sources in any habitable room with doors and windows closed, and require preparation of an acoustical analysis for units proposed in areas with ambient-noise levels of 60 dBA or greater to ensure that the threshold is not exceeded.

Existing Noise Sensitive Uses

Nearby noise sensitive receptors include residential uses to the west and south (approximately 10 feet to the west and 75 feet to the south), religious uses to the north (approximately 35 feet), and a school to the west (approximately 420 feet).

Existing Noise Sources

Ambient noise levels in the vicinity of the project site are typical of noise levels experienced in neighborhoods – dominated by vehicular traffic noise (e.g., trucks, municipal vehicles, emergency vehicles) and land use activity noise (e.g., commercial operations). Noise generated by residential uses is common and generally accepted by those living in urban areas. Primary sources of noise in the project vicinity consist of traffic on Gallup Drive and Mesa Drive.

Exterior Noise Levels at the Project Site

The HUD day/night noise level (DNL) calculator is an electronic assessment tool administered by HUD that calculates the long-term noise level from roadway and railway traffic. The DNL calculator was used to predict the ambient noise level at the project site taking into consideration existing conditions plus the average daily vehicle trips in 2030 (10 years from the time this EA is prepared). Traffic noise from Gallup Drive and Mesa Drive, the primary roadways and noise sources in the project vicinity, were generated from 2019 traffic volumes.

Based on the HUD DNL Calculator, noise was determined to be loudest at the edge of the project site along Gallup Drive. Because the project would include residential units on the second level at this location, exterior noise was predicted for a future residential receptor at a height of 20 feet. At this location, predicted 2030 sound levels would be 68 dB L_{dn} before any noise attenuation attributable to off-site barriers or project design features.

Outdoor Sensitive Uses at the Project Site

The proposed project includes an outdoor podium courtyard on the second level of the building along Mesa Drive for residents. The pre-attenuated noise level at this outdoor area was calculated using the HUD DNL Calculator and is based on the 10-year traffic levels on the same two roadways described above. The pre-attenuated noise levels at the outdoor open space is 57.74 dB L_{dn} along Gallup Drive and 62.85 dB L_{dn} along Mesa Drive.

On-site Noise Attenuation Provided by Building Design

The project would include on-site noise attenuation features to reduce noise levels at indoor and outdoor noise levels within the project site. The on-site attenuation features include an assumed 4-foot wall on the second level where the podium courtyard is located. The podium courtyard on the 2nd level would be shielded by the upper levels of the proposed building to the north and east and would only be exposed to traffic noise from the south towards Mesa Drive. The wall that would cover the opening to the south on the second floor, combined with the shielding provided by the building to the north and east, would help screen the podium courtyard from vehicular traffic noise from the east. These features would attenuate noise at outdoor space resulting in noise levels at the outdoor area of 51 dB L_{dn}, below HUD's outdoor noise threshold of 65 dB L_{dn}.

Interior Noise Attenuation

In order to achieve interior noise levels of 45 dB L_{dn} or less, the applicant would design the building in a manner that would attenuate noise by a minimum of 23 dB L_{dn}. This would be achieved through a combination of noise-attenuating insulation, windows, doors, walls, and roofs. The ability of these features to attenuate noise is demonstrated using Sound Transmission Class (STC), which is a measure of how well a building partition attenuates sound. Standard building construction attenuates exterior noise by 20 dB. The walls and windows would be required to further attenuate interior noise to meet HUD's interior noise threshold of 45 dB L_{dn} by an additional 3 dB L_{dn}. Mitigation to reduce interior noise levels would ensure the project would meet HUD interio noise threshold.

Project-related Stationary Source Noise Assessment

Other than traffic noise, the residential use of the proposed project would involve noise attributable to vocalizations of residents, car doors shutting, and other typical urban residential noise that would not result in a noticeable increase in the ambient noise levels in the project vicinity. The proposed project does not propose air conditioning systems, exhaust systems, refrigeration units, or other mechanical equipment in locations that could expose noise-sensitive uses to operational noise in excess of the HUD exterior noise standards.

Construction-related Noise

The City has established construction noise reduction measures that apply to noise exposure and would serve to avoid or minimize impacts that could occur. Project construction would be completed in accordance with the provisions of the City of San José's General Plan and the Municipal Code, which limits construction work within 500 feet of residential land uses between the hours of 7:00 AM and 7:00 PM Monday through Friday and prohibits construction on the weekends. Further, the City of San José shall require the construction crew to adhere to the following construction BMPs to reduce construction noise levels from emanating from the site and minimize disruption and annoyance at existing noise-sensitive receptors in the project vicinity.

Mitigation Measures

Interior Noise Attenuation

The following measure shall be implemented by the project applicant to ensure interior noise levels are reduced.

The project applicant shall prepare final design plans that incorporate building design and acoustical treatments to ensure compliance with HUD's interior noise threshold of 45 dB Ldn. The City shall ensure that the design incorporates controls to reduce interior noise levels to 45 dB Ldn or lower within the residential units. The project applicant shall conform with special building construction techniques requested by the City, which may include sound-rated windows and doors, sound-rated wall constructions, and/or acoustical caulking.

Construction Noise

Consistent with the City of San José General Plan and Municipal Code, implementation of these construction measures would be required to reduce construction noise levels.

- Erect sound barriers around ground level construction sites adjacent to residences or other noise-sensitive land uses.
- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Prohibit unnecessary idling of internal combustion engines.
- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. If necessary, construct temporary noise barriers to screen stationary noise-generating equipment when located near adjoining sensitive land uses.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Control noise from construction workers' radios to a point where they are not audible at existing residences bordering the project site.
- Prior to the start of construction, notify all adjacent residences and other noise-sensitive land uses of the construction schedule, in writing, and provide a written schedule of "noisy" construction activities to the adjacent land uses and nearby residences.
- If complaints are received or excessive noise levels cannot be reduced using the measures above, erect a temporary noise barrier along surrounding building facades that face the construction sites.
- Designate a "disturbance coordinator" who shall be responsible for responding to any complaints about construction noise. The disturbance coordinator shall determine the cause of the noise complaint (e.g., bad muffler, etc.) and shall require that reasonable measures be implemented to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.
- Limit construction to the hours of 7:00 AM to 7:00 PM Monday through Friday for any onsite 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 City of San José Director of Planning, Building and Code Enforcement that the construction noise mitigation plan is adequate to prevent noise disturbance of affected residential uses.

References

Federal Highway Administration (FHWA), 2006. Roadway Construction Noise Model User Guide, 2006.

U.S. Environmental Protection Agency (USEPA), 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March 1974.

Bolt, Baranek and Newman, 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, December 31, 1971.

City of San Jose. 2011. Envision San Jose 2040 General Plan Draft Program EIR. June 2011.

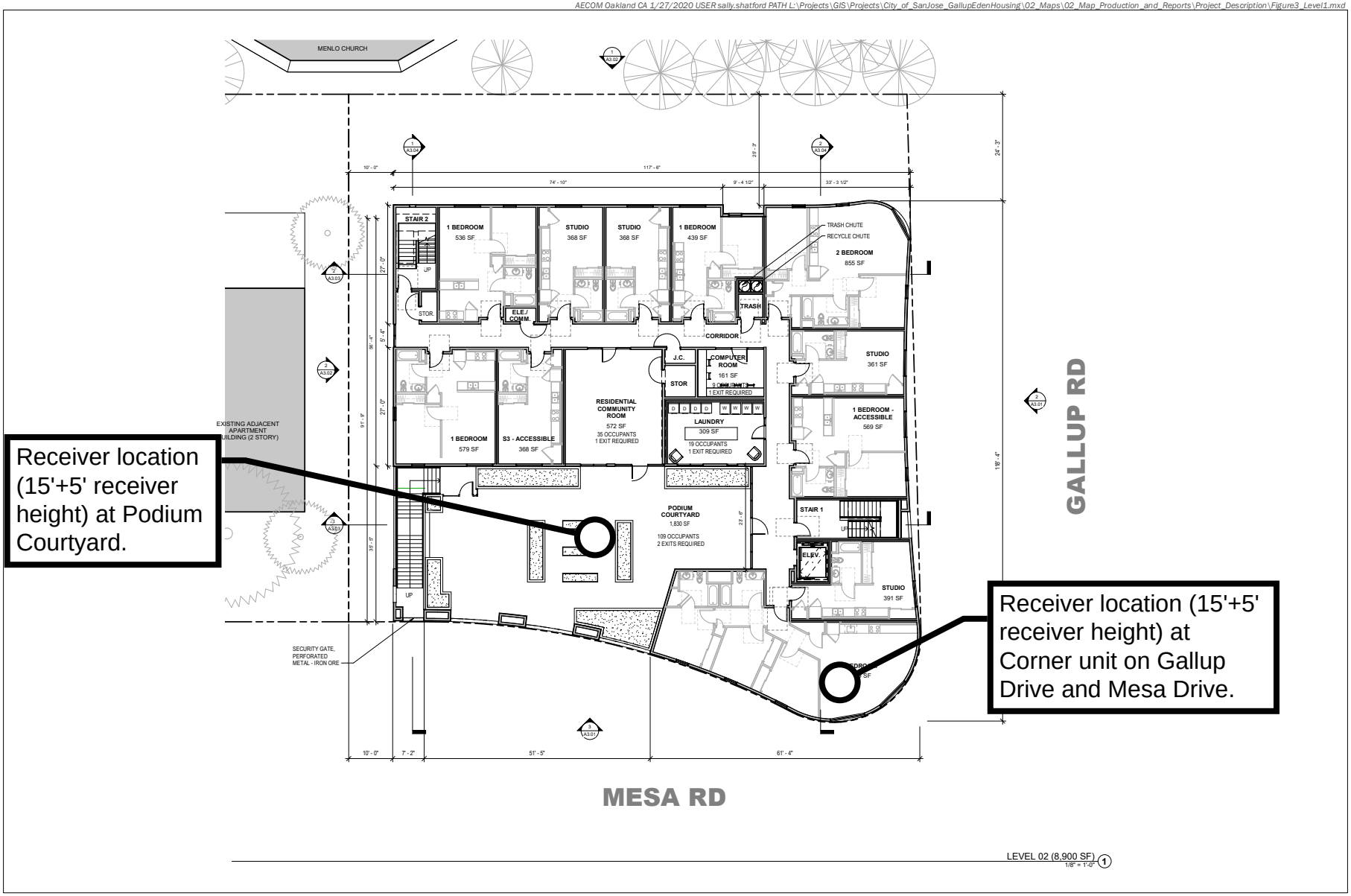
City of San Jose. 2011. Envision San Jose 2040 General Plan. Adopted November 2011 and amended on December 18, 2018. Available online at https://www.sanjoseca.gov/home/showdocument?id=22359. Accessed January 20, 2020.

Appendix A

Noise Supporting Information

1) Noise Receiver Locations
2) HUD DNL Calclulator Results
3) Barrier Performance Module Worksheets

Noise Receiver Locations



0 32
Feet

Source: AECOM, 2019

AECOM

Gallup & Mesa, LLC

Gallup and Mesa Apartments Project

Level 2 Floor Plan

HUD DNL Calclulator Results

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the 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	2nd Floor Podium Courtyard
Record Date	2/12/2020
User's Name	M. Dunn

Road # 1 Name:	**Gallup Drive**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☐	**Heavy Trucks** ☑
Effective Distance	100		100
Distance to Stop Sign	85		85
Average Speed	25		15
Average Daily Trips (ADT)	938		39
Night Fraction of ADT	18		18
Road Gradient (%)			0
Vehicle DNL	40.6337		57.7464
Calculate Road #1 DNL	57.7464	Reset	

Road # 2 Name:	**Mesa Drive**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☐	**Heavy Trucks** ☑

Effective Distance	40		40
Distance to Stop Sign	100		100
Average Speed	25		15
Average Daily Trips (ADT)	758		32
Night Fraction of ADT	18		18
Road Gradient (%)			0
Vehicle DNL	46.087		62.8563
Calculate Road #2 DNL	62.8563	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○Yes ◉No

Combined DNL for all Road and Rail sources	**64.0343**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

DNL Calculator

WARNING: HUD recommends the use of Microsoft Internet Explorer for performing noise calculations. The HUD Noise Calculator has an error when using Google Chrome unless the cache is cleared before each use of the calculator. HUD is aware of the problem and working to fix it in the programming of the 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/)**.

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- 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	2nd Floor Corner Unit
Record Date	2/12/2020
User's Name	M. Dunn

Road # 1 Name:	**Gallup Dirve**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☐	**Heavy Trucks** ☑
Effective Distance	30		30
Distance to Stop Sign	30		30
Average Speed	25		15
Average Daily Trips (ADT)	938		39
Night Fraction of ADT	18		18
Road Gradient (%)			0
Vehicle DNL	46.5207		65.5896
Calculate Road #1 DNL	65.5896	Reset	

Road # 2 Name:	**Mesa Drive**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☐	**Heavy Trucks** ☑

Effective Distance	50		50
Distance to Stop Sign	65		65
Average Speed	25		15
Average Daily Trips (ADT)	758		32
Night Fraction of ADT	18		18
Road Gradient (%)			0
Vehicle DNL	46.9374		64.7304
Calculate Road #2 DNL	64.7304	Reset	

Add Road Source | Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○Yes ◉No

Combined DNL for all Road and Rail sources	**68.16**
Combined DNL including Airport	**N/A**
Site DNL with Loud Impulse Sound	

Calculate

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/)

Barrier Performance Module Worksheets

2nd Floor Podium Courtyard
Noise Source: Gallup Drive

Barrier Performance Module

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	61	**R[1]**	60
S	0	**D[1]**	25
O	20	**α**	180

Calculate Output

Output Data

h	46	**R**	72
D	15	**FS**	19.9899

New Site DNL:

-19.9899

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL:

2nd Floor Podium Courtyard
Noise Source: Mesa Drive

Barrier Performance Module

This module provides to the user a measure on the barrier's effectiveness on noise reduction. A list of the input/output variables and their definitions, as well as illustrations of different scenarios are provided.

Calculator

View Day/Night Noise Level Calculator (/programs/environmental-review/dnl-calculator/)

View Descriptions of the Input/Output variables.

Note: Tool tips, containing field specific information, have been added in this tool and may be accessed by hovering over the Input and Output variables with the mouse.

WARNING: If there is direct line-of-sight between the Source and the Observer, the module will report erroneous attenuation. "Direct line-of-sight" means if the 5' tall Observer can see the noise Source (cars, trucks, trains, etc.) over the Barrier (wall, hill/excavation, building, etc.), the current version of Barrier Performance Module will not accurately calculate the attenuation provided. In this instance, there is unlikely to be any appreciable attenuation.

Road/Rail Site DNL:

Note: Barrier height must block the line of sight

Input Data

H	17	**R[1]**	25
S	0	**D[1]**	15
O	20	**α**	180

Calculate Output

Output Data

h	4	**R**	30
D	14	**FS**	11.6339

New Site DNL:

-11.6339

Refresh

Note: If you have separate Road and Rail DNL values, please enter the values below to calculate the new site DNL:

Road DNL: