OMB No. 2506-0177
(exp.2/28/2025)

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, DC 20410-1000

This Worksheet was designed to be used by those "Partners" (including Public Housing Authorities, consultants, contractors, and nonprofits) who assist Responsible Entities and HUD in preparing environmental reviews, but legally cannot take full responsibilities for these reviews themselves. Responsible Entities and HUD should use the RE/HUD version of the Worksheet.

Noise (EA Level Reviews) – PARTNER

https://www.hudexchange.info/programs/environmental-review/noise-abatement-and-control

1. **What activities does your project involve? Check all that apply:**

☒ New construction for residential use

NOTE: HUD assistance to new construction projects is generally prohibited if they are located in an Unacceptable zone, and HUD discourages assistance for new construction projects in Normally Unacceptable zones. See 24 CFR 51.101(a)(3) for further details.

→ *Continue to Question 2.*

☐ Rehabilitation of an existing residential property

NOTE: For major or substantial rehabilitation in Normally Unacceptable zones, HUD encourages mitigation to reduce levels to acceptable compliance standards. For major rehabilitation in Unacceptable zones, HUD strongly encourages mitigation to reduce levels to acceptable compliance standards. See 24 CFR 51 Subpart B for further details.

→ *Continue to Question 2.*

☐ None of the above

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below.*

2. **Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).**
Indicate the findings of the Preliminary Screening below:

☐ There are no noise generators found within the threshold distances above.

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide a map showing the location of the project relative to any noise generators.*

☒ Noise generators were found within the threshold distances.

→ *Continue to Question 3.*

3. **Complete the Noise Assessment Guidelines to quantify the noise exposure. Indicate the findings of the Noise Assessment below:**

☒ Acceptable (65 decibels or less; the ceiling may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

Indicate noise level here: 61 dBA

→ *If the RE/HUD agrees with this recommendation, the review is in compliance with this section. Continue to the Worksheet Summary below. Provide noise analysis, including noise level and data used to complete the analysis.*

☐ Normally Unacceptable: (Above 65 decibels but not exceeding 75 decibels; the floor may be shifted to 70 decibels in circumstances described in 24 CFR 51.105(a))

Indicate noise level here: Click here to enter text.

<u>If project is rehabilitation:</u>

→ *Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis.*

<u>If project is new construction:</u>

Is the project in a largely undeveloped area[1]?

☒ No

☐ Yes → ***The project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i).***

→ *Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis.*

☐ Unacceptable: (Above 75 decibels)

Indicate noise level here: Click here to enter text.

<u>If project is rehabilitation:</u>

HUD strongly encourages conversion of noise-exposed sites to land uses compatible with high noise levels. Consider converting this property to a non-residential use compatible with high noise levels.

→ *Continue to Question 4. Provide noise analysis, including noise level and data used to complete the analysis, and any other relevant information.*

<u>If project is new construction:</u>

The project requires completion of an Environmental Impact Statement (EIS) pursuant to 51.104(b)(1)(i). *Work with HUD or the RE to either complete an EIS or obtain a waiver signed by the appropriate authority.*

→ *Continue to Question 4.*

4. **HUD strongly encourages mitigation be used to eliminate adverse noise impacts. Work with the RE/HUD on the development of the mitigation measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation.**

☐ Mitigation as follows will be implemented:

[1] A largely undeveloped area means the area within 2 miles of the project site is less than 50 percent developed with urban uses and does not have water and sewer capacity to serve the project.

Click here to enter text.
→ *Provide drawings, specifications, and other materials as needed to describe the project's noise mitigation measures.*
Continue to the Worksheet Summary.

☐ No mitigation is necessary.

Explain why mitigation will not be made here:

Click here to enter text.

→ *Continue to the Worksheet Summary.*

Worksheet Summary

Provide a full description of your determination and a synopsis of the information that it was based on, such as:

- Map panel numbers and dates
- Names of all consulted parties and relevant consultation dates
- Names of plans or reports and relevant page numbers
- Any additional requirements specific to your program or region

Include all documentation supporting your findings in your submission to HUD.

Noise levels in the project area are defined primarily by traffic on West Covell Boulevard. The average day/night sound levels are 61 dBA, which falls into the Acceptable range, according to HUD Noise Standards. A noise study concluded noise levels at the residential facades closest to West Covell Boulevard of up to 61 dBA Ldn. This is less than the HUD 65 dBA Ldn noise level standard. Therefore, no additional noise control measures would be required.

Please see Noise Study attached.

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Environmental Noise Assessment

Bretton Woods Senior Apartments

City of Davis, California

June 21, 2023

Project #230609

Prepared for:

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INTRODUCTION

The Bretton Woods Senior Apartments project includes the construction of 150 multi-family residential units in the City of Davis, California. The project will also include a community building and several outdoor activity areas. The project is located north of West Covell Boulevard, east of Denali Drive, and west of Shasta Drive. The project site is bordered on the south by existing residential uses.

The City of Davis General Plan outlines major transportation and stationary noise sources located within the boundaries of the City, such as Interstate 80, State Route 113, and the Union Pacific Railroad. The UC Davis airport is not considered to be a major noise source. According to the City of Davis General Plan, the proposed project lies outside of the 60 dBA L_{dn} noise contour for all stated major noise sources.[1]

Figure 1 shows the proposed project site plans. **Figure 2** shows an aerial of the proposed locations and project site boundaries. **Figure 3** shows the City of Davis General Plan noise contours.

ACOUSTIC FUNDAMENTALS AND TERMINOLOGY

BACKGROUND INFORMATION ON NOISE

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

[1] City of Davis General Plan, Chapter 21

Site Plan - Scale: 1" = 50'

Bretton Woods Senior Apartments

City of Davis, California

Figure 1

Project Site Plan

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Bretton Woods Senior Apartments

City of Davis, California

Figure 2

Noise Measurement Sites

Legend

- Project Site
- Noise Measurement - Long Term

0 m 125 m 250 m 375 m 500 m

Projection: UTM Zone 10 / WGS84 / meters
Rev. Date: 06/20/2023

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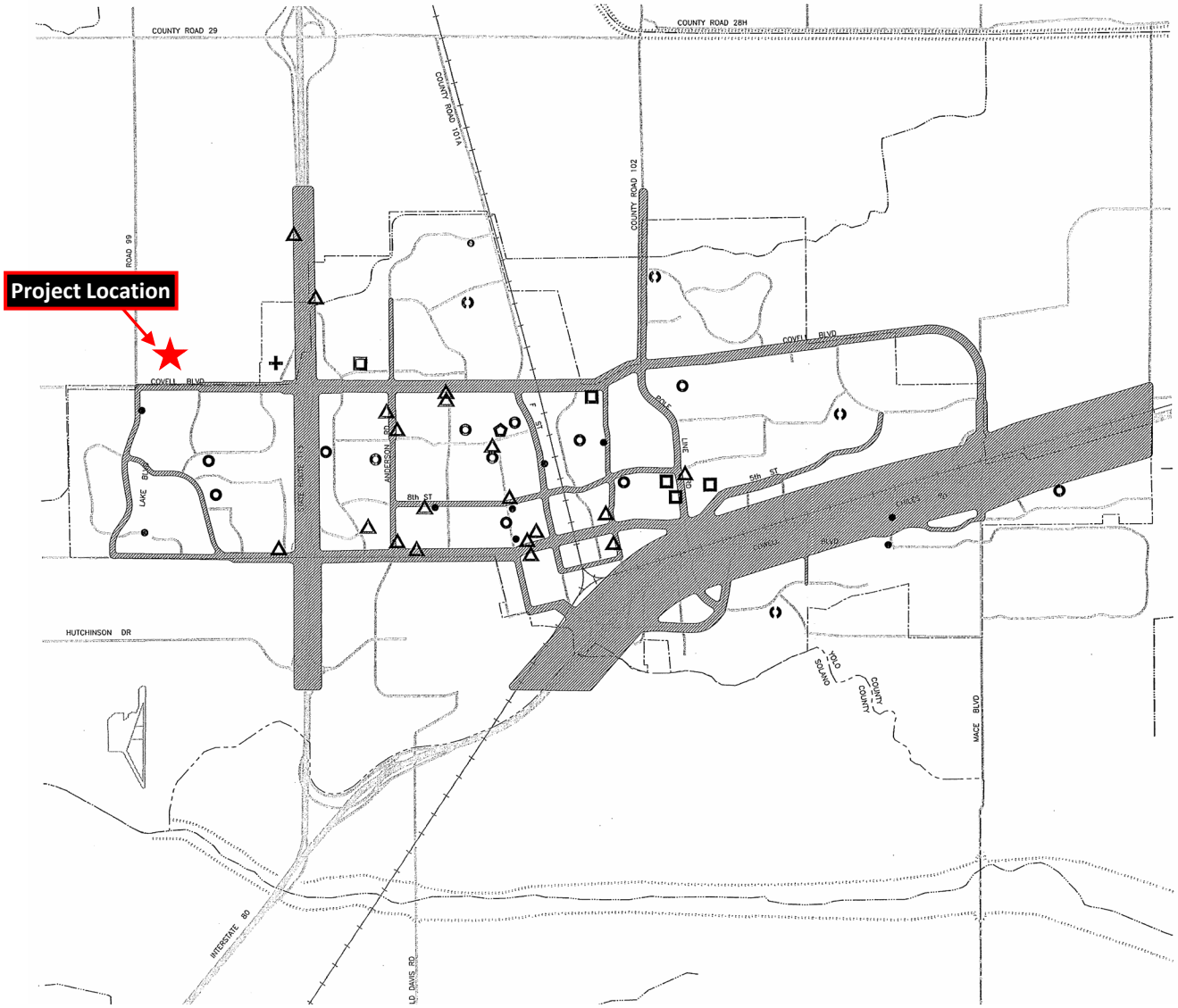

Figure 37
2010 Noise Contours

- School
- Church
- Nursing Home/Senior Housing
- Hospital
- Library
- Future School
- Day Care

NOTES

1. Contours shown on this map are an approximate representation of the 60 C.N.E.L. data contained in Appendix D of the Draft Program EIR for the City of Davis General Plan Update, January 2000.

Davis General Plan

100 acres
25

0 1000 3000 5000'

Bretton Woods Senior Apartments

City of Davis, California

Figure 3

General Plan Noise Contours

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The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. C-weighted (dBC) noise levels are also commonly used for monitoring noise from music as the C-weighting is more sensitive to low-frequency noise (a.k.a. bass).

The decibel scale is logarithmic, not linear. In other words, two sound levels 10-dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10-dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (DNL or L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Table 1 lists several examples of the noise levels associated with common situations. **Appendix A** provides a summary of acoustical terms used in this report.

TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft.)	--100--	
Gas Lawn Mower at 1 m (3 ft.)	--90--	
Diesel Truck at 15 m (50 ft.), at 80 km/hr. (50 mph)	--80--	Food Blender at 1 m (3 ft.) Garbage Disposal at 1 m (3 ft.)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft.)	--70--	Vacuum Cleaner at 3 m (10 ft.)
Commercial Area Heavy Traffic at 90 m (300 ft.)	--60--	Normal Speech at 1 m (3 ft.)
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, Technical Noise Supplement, Traffic Noise Analysis Protocol. September, 2013.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1-dBA cannot be perceived;
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- A change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6-dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING AMBIENT NOISE LEVELS

The existing noise environment in the project area is defined primarily by traffic on West Covell Boulevard. To quantify the existing ambient noise environment in the project vicinity, Saxelby Acoustics conducted continuous (24-hr.) noise level measurements at one location on the project site. Noise measurement locations are shown on **Figure 2**. A summary of the noise level measurement survey results is provided in **Table 2**. **Appendix B** contains the complete results of the noise monitoring.

The sound level meters were programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) model 820 and 831 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with a CAL 200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Major noise sources as defined in the City of Davis General Plan, such as Interstate 80, State Route 113, and the Union Pacific Railroad, were not observed while conducting noise level measurements on the project site. The project is located 2.5 miles away from I-80, 0.35 miles from SR-113, and 2.3 miles from UPRR. Therefore, the noise level contributions from these major noise sources were considered negligible to the existing ambient noise levels in this analysis.

TABLE 2: SUMMARY OF EXISTING BACKGROUND NOISE MEASUREMENT DATA

Location	Date	L_{dn}	Daytime L_{eq}	Daytime L_{50}	Daytime L_{max}	Nighttime L_{eq}	Nighttime L_{50}	Nighttime L_{max}
LT-1: 65 ft. to CL of W Covell Blvd.	6/16/23	66	64	62	77	59	50	75
	6/17/23	66	64	61	80	58	48	73
	6/18/23	64	63	60	78	57	45	76

Notes:

- *All values shown in dBA*
- *Daytime hours: 7:00 a.m. to 10:00 p.m.*
- *Nighttime Hours: 10:00 p.m. to 7:00 a.m.*
- *Source: Saxelby Acoustics 2023*

REGULATORY CONTEXT

FEDERAL

HUD Criteria

The U.S. Department of Housing and Urban Development (HUD) establishes an acceptable exterior noise environment of 65 dBA L_{dn} (also expressed as "DNL" or Day/Night Level) at exterior areas of residential uses. Noise levels in the 65-75 dBA DNL range are considered Normally Unacceptable. However, 65-75 dBA DNL may be allowed, but require special approvals and additional sound attenuation measures. Such measures include a 5 dBA improvement to the building facade noise level reduction (NLR) for exterior noise levels in the 65-70 dBA range, and an improvement of 10 dBA for exterior noise levels in the 70-75 dBA range. The improvement is required in addition to "attenuation provided by buildings as commonly constructed in the area and requiring open windows for ventilation."

Noise levels exceeding 75 dBA DNL are considered unacceptable and may only be allowed under special circumstances.

In addition, HUD established an interior noise level goal of 45 dBA DNL, while assuming a typical exterior-to-interior NLR of 20 dBA.

STATE

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations, establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses, and dwellings other than single-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room. Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

LOCAL

City of Davis General Plan

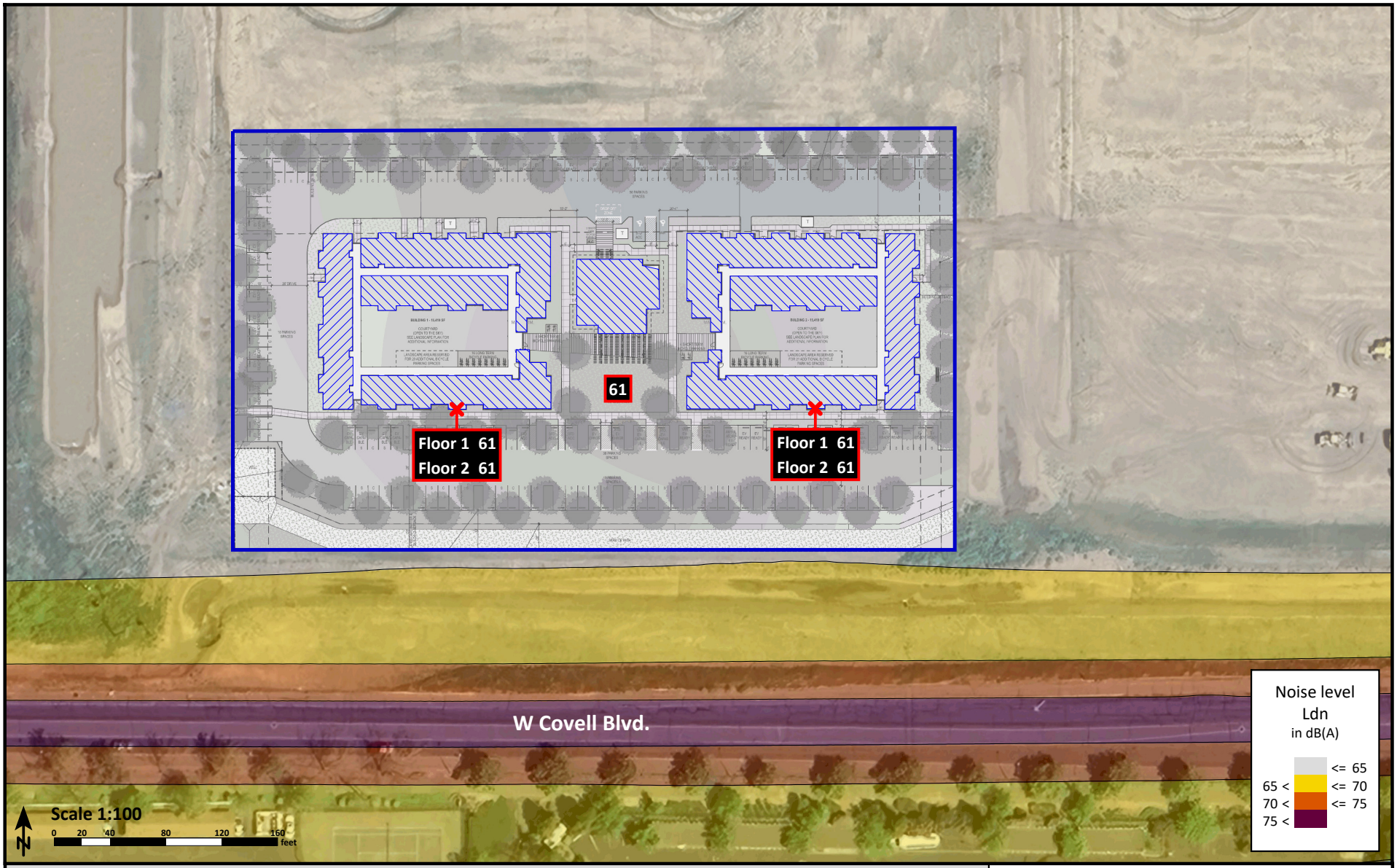
The City of Davis General Plan Noise Element Table 19 establishes an acceptable exterior noise level of 60 dBA L_{dn} at outdoor activity areas of residential uses. For interior spaces of residential uses, the allowable interior noise level standard is 45 dBA L_{dn} (General Plan Table 20).

EVALUATION OF TRANSPORTATION NOISE SOURCES ON THE PROJECT SITE

ON-SITE TRANSPORTATION NOISE PREDICTION METHODOLOGY

Saxelby Acoustics measured an exterior transportation noise level of 66 dBA L_{dn} at noise measurement site LT-1. This level was used to calibrate the SoundPLAN noise prediction model. The proposed project buildings and surrounding structures were input into the calibrated SoundPLAN model to determine the transportation noise exposure on the project site. It was estimated that existing noise levels would increase by +1 dBA based upon an assumed 1% per year increase in traffic volumes on West Covell Boulevard. The results of this analysis are shown on **Figure 4**.

The future transportation noise contours, shown on **Figure 4**, show noise levels at the residential facades closest to West Covell Boulevard of up to 61 dBA L_{dn}. This is less than the HUD 65 dBA L_{dn} noise level standard. Therefore, no additional noise control measures would be required.



Bretton Woods Senior Apartments

City of Davis, California

Figure 4
Future Transportation Noise Points (dB(A) Ldn)

Legend
- Project Site
- Project Building

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EVALUATION OF CONSTRUCTION NOISE SOURCES ON EXISTING RECEPTORS

During the construction of the proposed project, noise from construction activities would temporarily add to the noise environment in the project vicinity. As shown in **Table 3**, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet. Construction activities would also be temporary in nature and are anticipated to occur during normal daytime working hours.

TABLE 3: CONSTRUCTION EQUIPMENT NOISE

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Pneumatic Tools	85

Source: Roadway Construction Noise Model User's Guide. Federal Highway Administration. FHWA-HEP-05-054. January 2006.

The City of Davis Municipal Code makes exemptions for certain typical construction activities which may occur within the City. The exemptions are listed in Article 24.02.040, Special Provisions, and are summarized below:

b) Construction or landscape operations would be exempt during the hours of 7 AM to 7 PM Mondays through Fridays and between the hours of 8 AM to 8 PM Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carried out by employees or contractors of the city and one of the following conditions apply:

(1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.

(2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA.

(3) The provisions of subdivisions (1) and (2) of this subsection shall not be applicable to impact tools and equipment; provided, that such impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise

attenuation as he or she may determine to be in the public interest.

Construction projects located more than two hundred feet from existing homes may request a special use permit to begin work at 6:00 AM on weekdays from June 15th until September 1st. No percussion type tools (such as ramsets or jackhammers) can be used before 7:00 AM. The permit shall be revoked if any noise complaint is received by the police department.

The most restrictive standard would be the requirement that construction equipment does not exceed 83 dBA at a distance of 25-feet or 86 dBA at the property plane. Construction noise levels can comply with the City of Davis Municipal Code through the implementation of the strategies contained in the Noise Ordinance.

Specifically, as a means of complying with the requirement of 83 dBA at a distance of 25-feet, the project should employ sound control devices on equipment, muffled exhausts on equipment, and installation of acoustic barriers around stationary equipment which block line-of-sight to the equipment.

As a means of complying with the 86 dBA at the property line, the installation of 6-foot-tall barriers at the property line can be employed. These barriers can be constructed of plywood, prefabricated temporary acoustic barriers or tightly fitted straw or hay bales.

A comprehensive list of potential noise reduction strategies is as follows:

- Use of electric construction equipment as an alternative to diesel-powered equipment;
- Sound control devices on equipment;
- Muffled exhaust on construction equipment;
- Staging of construction equipment from nearby residences;
- Limits on idling time for construction equipment and vehicles;
- Installation of acoustic barriers around stationary construction noise sources;
- Installation of temporary barriers between the project site and adjacent sensitive receptors.

The nearest residential uses are located approximately 400 feet to the south, as measured from the center of construction. At this distance, maximum construction noise levels would be in the range of 58-72 dBA L_{max} in the backyards of the nearest residential uses.

Noise would also be generated during the construction phase by increased truck traffic on area roadways. A project-generated noise source would be truck traffic associated with transport of heavy materials and equipment to and from the construction site. This noise increase would be of short duration and would occur during daytime hours.

Although construction activities are temporary in nature and would occur during normal daytime working hours, construction-related noise could result in sleep interference at existing noise-sensitive land uses in the vicinity of the construction if construction activities were to occur outside the normal daytime hours. Construction activities may exceed the noise level restrictions set by the City of Davis Municipal Code. Therefore, additional construction noise control measures are required.

CONCLUSIONS

The proposed project is predicted to meet HUD exterior and interior noise level standards assuming the following construction noise control requirements are followed:

- The City shall establish the following as conditions of approval for any permit that results in the use of construction equipment:
  - Construction activities (excluding activities that would result in a safety concern to the public or construction workers) shall be limited to between the daytime hours of 7 AM to 7 PM Mondays through Fridays and between the hours of 8 AM to 8 PM Saturdays and Sundays.
  - Construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
  - When not in use, motorized construction equipment shall not be left idling for more than 5 minutes.
  - Stationary equipment (power generators, compressors, etc.) shall be located at the furthest practical distance from nearby noise-sensitive land uses or sufficiently shielded to reduce noise-related impacts.

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SoundPLAN. SoundPLAN GmbH. Backnang, Germany. http://www.soundplan.eu/english/

Appendix A: Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
ASTC	Apparent Sound Transmission Class. Similar to STC but includes sound from flanking paths and correct for room reverberation. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by +5 dBA and nighttime hours weighted by +10 dBA.
DNL	See definition of Ldn.
IIC	Impact Insulation Class. An integer-number rating of how well a building floor attenuates impact sounds, such as footsteps. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
Ldn	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
Lmax	The highest root-mean-square (RMS) sound level measured over a given period of time.
L(n)	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L50 is the sound level exceeded 50% of the time during the one-hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
NIC	Noise Isolation Class. A rating of the noise reduction between two spaces. Similar to STC but includes sound from flanking paths and no correction for room reverberation.
NNIC	Normalized Noise Isolation Class. Similar to NIC but includes a correction for room reverberation.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
RT60	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is a rating, in decibels, of a discrete event, such as an aircraft flyover or train pass by, that compresses the total sound energy into a one-second event.
SPC	Speech Privacy Class. SPC is a method of rating speech privacy in buildings. It is designed to measure the degree of speech privacy provided by a closed room, indicating the degree to which conversations occurring within are kept private from listeners outside the room.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations. The STC rating is typically used to rate the sound transmission of a specific building element when tested in laboratory conditions where flanking paths around the assembly don't exist. A larger number means more attenuation. The scale, like the decibel scale for sound, is logarithmic.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

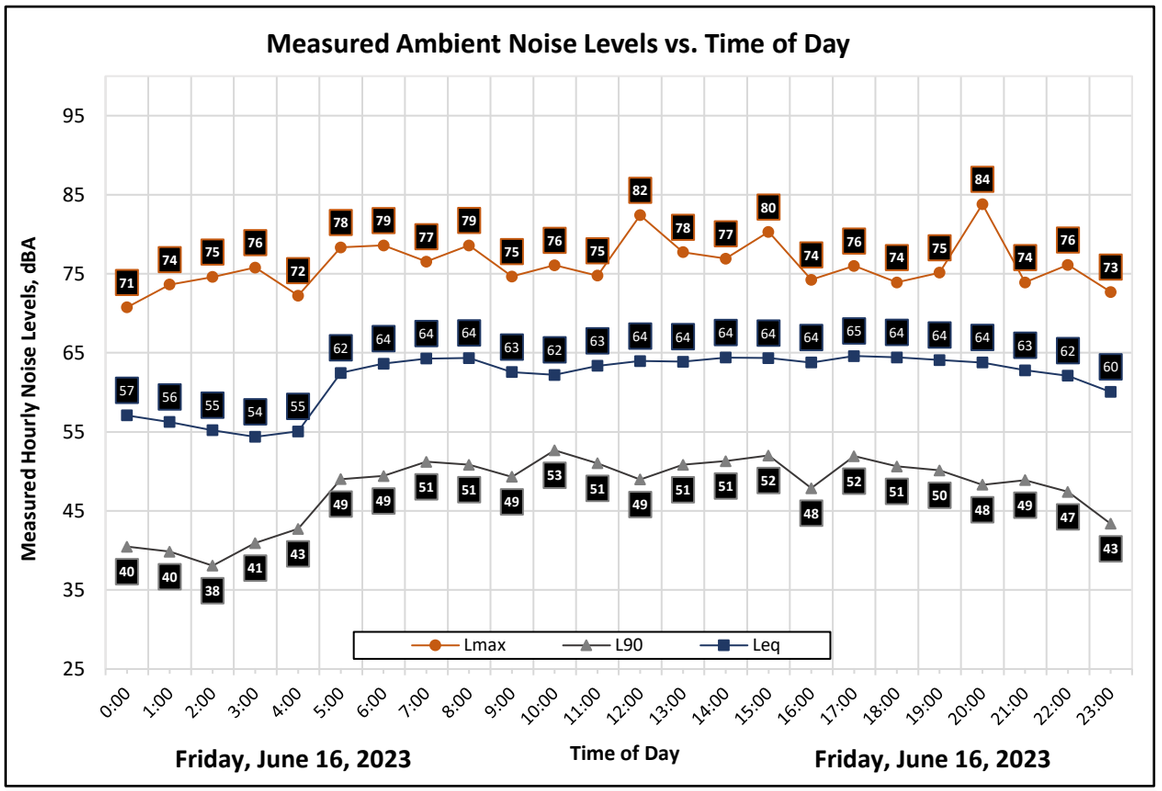
Appendix B: Continuous Ambient Noise Measurement Results

Appendix B1a: Continuous Noise Monitoring Results

Site: LT-1
Project: Bretton Woods Senior Apartments
Meter: LDL 820-6
Location: Southwestern Project Boundary
Calibrator: CAL200
Coordinates: (38.5611326, -121.7766036)

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Friday, June 16, 2023	0:00	57	71	48	40
Friday, June 16, 2023	1:00	56	74	46	40
Friday, June 16, 2023	2:00	55	75	44	38
Friday, June 16, 2023	3:00	54	76	45	41
Friday, June 16, 2023	4:00	55	72	47	43
Friday, June 16, 2023	5:00	62	78	55	49
Friday, June 16, 2023	6:00	64	79	58	49
Friday, June 16, 2023	7:00	64	77	62	51
Friday, June 16, 2023	8:00	64	79	62	51
Friday, June 16, 2023	9:00	63	75	60	49
Friday, June 16, 2023	10:00	62	76	61	53
Friday, June 16, 2023	11:00	63	75	61	51
Friday, June 16, 2023	12:00	64	82	62	49
Friday, June 16, 2023	13:00	64	78	62	51
Friday, June 16, 2023	14:00	64	77	63	51
Friday, June 16, 2023	15:00	64	80	63	52
Friday, June 16, 2023	16:00	64	74	62	48
Friday, June 16, 2023	17:00	65	76	63	52
Friday, June 16, 2023	18:00	64	74	63	51
Friday, June 16, 2023	19:00	64	75	62	50
Friday, June 16, 2023	20:00	64	84	61	48
Friday, June 16, 2023	21:00	63	74	60	49
Friday, June 16, 2023	22:00	62	76	58	47
Friday, June 16, 2023	23:00	60	73	54	43

Statistics	Leq	Lmax	L50	L90
Day Average	64	77	62	50
Night Average	59	75	50	43
Day Low	62	74	60	48
Day High	65	84	63	53
Night Low	54	71	44	38
Night High	64	79	58	49
Ldn	66	Day %		84
CNEL	67	Night %		16

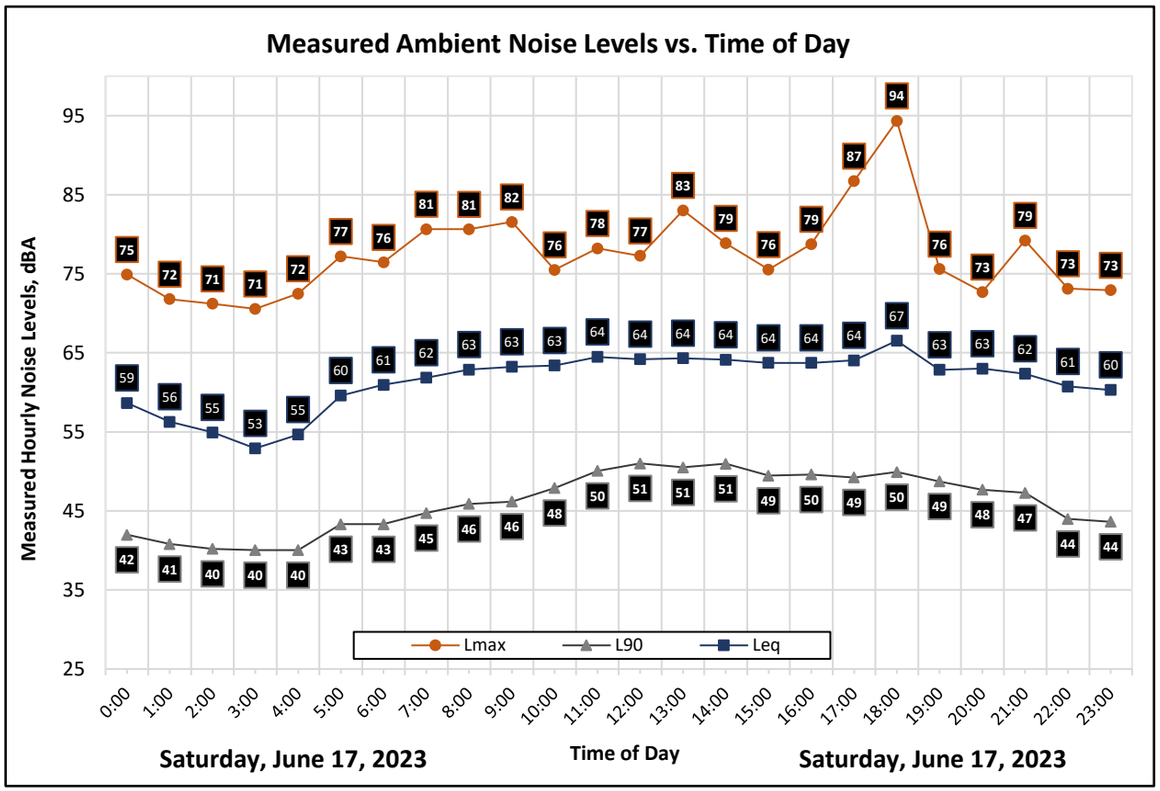


Appendix B1b: Continuous Noise Monitoring Results

Site: LT-1
Project: Bretton Woods Senior Apartments
Meter: LDL 820-6
Location: Southwestern Project Boundary
Calibrator: CAL200
Coordinates: (38.5611326, -121.7766036)

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Saturday, June 17, 2023	0:00	59	75	49	42
Saturday, June 17, 2023	1:00	56	72	46	41
Saturday, June 17, 2023	2:00	55	71	44	40
Saturday, June 17, 2023	3:00	53	71	43	40
Saturday, June 17, 2023	4:00	55	72	43	40
Saturday, June 17, 2023	5:00	60	77	50	43
Saturday, June 17, 2023	6:00	61	76	52	43
Saturday, June 17, 2023	7:00	62	81	56	45
Saturday, June 17, 2023	8:00	63	81	59	46
Saturday, June 17, 2023	9:00	63	82	60	46
Saturday, June 17, 2023	10:00	63	76	61	48
Saturday, June 17, 2023	11:00	64	78	63	50
Saturday, June 17, 2023	12:00	64	77	63	51
Saturday, June 17, 2023	13:00	64	83	63	51
Saturday, June 17, 2023	14:00	64	79	63	51
Saturday, June 17, 2023	15:00	64	76	62	49
Saturday, June 17, 2023	16:00	64	79	62	50
Saturday, June 17, 2023	17:00	64	87	62	49
Saturday, June 17, 2023	18:00	67	94	62	50
Saturday, June 17, 2023	19:00	63	76	60	49
Saturday, June 17, 2023	20:00	63	73	60	48
Saturday, June 17, 2023	21:00	62	79	59	47
Saturday, June 17, 2023	22:00	61	73	56	44
Saturday, June 17, 2023	23:00	60	73	53	44

Statistics	Leq	Lmax	L50	L90
Day Average	64	80	61	49
Night Average	58	73	48	42
Day Low	62	73	56	45
Day High	67	94	63	51
Night Low	53	71	43	40
Night High	61	77	56	44
Ldn	66	Day %		87
CNEL	66	Night %		13



Appendix B1c: Continuous Noise Monitoring Results

Site: LT-1
Project: Bretton Woods Senior Apartments
Meter: LDL 820-6
Location: Southwestern Project Boundary
Calibrator: CAL200
Coordinates: (38.5611326, -121.7766036)

Date	Time	Measured Level, dBA			
		L_{eq}	L_{max}	L_{50}	L_{90}
Sunday, June 18, 2023	0:00	58	75	46	41
Sunday, June 18, 2023	1:00	56	73	43	39
Sunday, June 18, 2023	2:00	55	74	40	36
Sunday, June 18, 2023	3:00	53	79	38	35
Sunday, June 18, 2023	4:00	54	76	40	36
Sunday, June 18, 2023	5:00	56	72	48	38
Sunday, June 18, 2023	6:00	59	75	49	42
Sunday, June 18, 2023	7:00	60	78	53	43
Sunday, June 18, 2023	8:00	61	76	56	44
Sunday, June 18, 2023	9:00	62	75	59	44
Sunday, June 18, 2023	10:00	64	89	60	47
Sunday, June 18, 2023	11:00	63	82	61	47
Sunday, June 18, 2023	12:00	63	80	62	48
Sunday, June 18, 2023	13:00	64	79	62	48
Sunday, June 18, 2023	14:00	64	79	62	51
Sunday, June 18, 2023	15:00	64	81	62	51
Sunday, June 18, 2023	16:00	64	75	62	51
Sunday, June 18, 2023	17:00	65	84	62	52
Sunday, June 18, 2023	18:00	64	74	62	51
Sunday, June 18, 2023	19:00	64	74	61	50
Sunday, June 18, 2023	20:00	63	74	60	49
Sunday, June 18, 2023	21:00	63	76	60	51
Sunday, June 18, 2023	22:00	62	87	54	45
Sunday, June 18, 2023	23:00	58	73	49	41

Statistics	Leq	Lmax	L50	L90
Day Average	63	78	60	48
Night Average	57	76	45	39
Day Low	60	74	53	43
Day High	65	89	62	52
Night Low	53	72	38	35
Night High	59	87	54	45
Ldn	64	Day %		90
CNEL	65	Night %		10