Noise Impact Study for Stonehouse Renovation and Hotel Project in Santa Rosa

Thompson Builders Corporation

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Novato, CA 94945

October 2024

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List of Acronyms and Abbreviations

APN	Assessor's Parcel Number
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-Weighted Decibel
DNL	Day Night Average Sound Level
DOT	United States Department of Transportation
FHWA	Federal Highway Administration
ft	Feet
FTA	Federal Transit Administration
HVAC	Heating Ventilation Air Conditioning
Hz	Hertz
in/sec	Inches per Second
L_{dn}	Day-Night Noise Level
L_{eq}	Equivalent Energy Level
L_{max}	Maximum Level of Noise
OPR	California Office of Planning and Research
PPV	Peak Particle Velocity
RMS	Root Mean Squared
TNM	Traffic Noise Model

1.0 INTRODUCTION

1.1 Purpose and Objectives

Yorke Engineering, LLC (Yorke) has been retained by Thompson Builders Corporation to complete a Noise and Vibration Impact Study for the proposed redevelopment of the existing Sonoma Stonehouse Hotel with 5-rooms and development of a 70-room hotel. Yorke has evaluated the potential for adverse noise and vibration impacts at the nearest noise sensitive residential receptors during construction and operation of the proposed project. This report contains:

- A review of the City of Santa Rosa's General Plan and Municipal Noise Ordinance;
- The results of ambient noise measurements taken on September 8-9, 2024;
- A noise and vibration impacts analysis for project construction; and
- Environmental noise impact analysis for the operational phase of the project.

1.2 Facility Description, Location, and Zoning

The existing Stonehouse building is a 14-room boutique hotel at 3555 Sonoma Highway in Santa Rosa, California. The project proposes to renovate the existing building to a 5-room hotel. Additionally, a 70-room hotel with a courtyard would be constructed on the central portion of the site. The existing building would eventually utilize its ground floor lobby, reception area, lounges, and kitchen to serve its guest rooms, and the new hotel building. Ancillary facilities include a pool and spa, exercise room, shower facilities, conference room, bocce ball court, restrooms, as well as a plaza and gardens.

The two project parcels, located on the northwest side of Sonoma Highway (Highway 12), approximately 0.6 miles northeast of the intersection of Farmers Lane and Fourth Street, are designated as Retail and Business Services in the General Plan. They have a Planned Development Zoning (PD 0441, approved in 1998 and revised in 2005), which permits, among other uses, "Hotels, Motels, and Related Uses" with a Conditional Use Permit.

The northern portion of the project site slopes relatively gently from east to west and is currently occupied by the historic Stonehouse building and the existing parking lot west of the building. The central part of the site features a large level pad, a remnant of a long-demolished warehouse building. The remaining southerly area of the site slopes steeply from east to west and includes a grove of primarily oak trees in the southwest corner. The adjacent properties to the south, west, and north are single-family residential homes on relatively large parcels. Figure 1-1 is satellite imagery showing the location of the proposed facility, the surrounding area, highways, and the nearest sensitive receptors.

Surface parking will be provided west of the new hotel, in addition to a single-level parking garage located below the upper two floors of the new hotel. Much of the parking garage will be below grade and tucked into the hillside. This will provide a total of 75 parking spaces for the 75 guest rooms. The parking areas will include standard, compact, accessible, and electric vehicle charging spaces. The primary site entrance will be the existing driveway location south of the existing Stonehouse building. A gated emergency vehicle access is proposed to connect to Sunridge Avenue at the southerly corner of the project site.

Figure 1-1: Proposed Project Location

2.0 NOISE AND VIBRATION FUNDAMENTALS

2.1 Definition and Measurement of Noise

Sound is a pressure wave created by a moving or vibrating source that travels through a fluid medium such as air or water. Noise is defined as a sound or aggregated sounds that are perceived as dissonant, irritating, objectionable, intrusive, and/or disruptive to the quality of daily life. Sound is measured on a logarithmic scale of sound pressure level known as the decibel (dB) scale. A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency sound sources by discriminating against very low and very high frequencies of the audible spectrum. The dBA scale is weighted to reflect only those frequencies which are audible to the human ear, generally defined as a range of 20 to 20,000 Hertz (Hz). Figure 2-1 presents a range of noise levels associated with common indoor and outdoor activities.

Figure 2-1: Typical Noise Levels and Effects on People

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

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

2.2 Noise Descriptors

Environmental noise descriptors are generally based on time weighted averages. Noise levels emitted by various sources are often expressed as equivalent energy level (L_{eq}). Maximum Level of Noise (L_{max}) is the root mean squared (RMS) maximum level of a noise source or environment measured on a sound level meter during a designated time interval (e.g., 15, 30, or 60 minutes).

Because sound levels at a particular location typically vary over the course of the day and because people tend to be more sensitive to noise in the evening and at night than during the morning and afternoon, sound levels are commonly averaged over a 24-hour period, weighted for night and evening sensitivity by adding a 5 dBA penalty for noise occurring in the evening (7 p.m.-10 p.m.) and a 10 dBA penalty for nighttime noise (10 p.m.-7 a.m.) for the Community Noise Equivalent Level (CNEL) and only a nighttime penalty for the Day-Night Noise Level (DNL, L_{dn}). These two expressions of average sound levels are nearly equivalent, and while this Noise Element usually refers to CNEL, standards cited from certain State and federal regulations may use L_{dn}.

2.3 Noise Range

Decibel scales are logarithmic, such that an increase from 30 to 40 dB represents a tenfold increase in sound level, while an increase from 30 to 50 dB represents a hundredfold increase. Human perception of sound loudness, however, is subjective. Everyday sounds normally range

from 30 dBA (very quiet, such as a soft whisper) to 100 dBA (very loud, such as the noise produced by a jet takeoff at a distance of 200 feet).

2.4 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, overall sound levels are determined by applying frequency weighted adjustments to spectral sound levels. The A-scale weighting scale is used to mimic human hearing response, therefore, sound is reported in terms of dBA. Typically, the human ear can barely perceive a change in noise level of 3 dBA. A change in noise level of 5 dBA is readily perceptible, and a change of 10 dBA is perceived as being twice or half as loud.

2.5 Sound Propagation

Sound is transmitted in the air by pressure variations from its source to the surroundings. While absorption by air is one of the factors attributing to the weakening of a sound during transmission, distance plays a more important role in noise reduction during transmission. Depending on the source of the sound, for every doubling of distance, the level will be reduced between 3 and 6 dB. The reduction of a sound is called attenuation. Other factors for noise attenuation are terrain absorption and shielding (insertion loss).

To attenuate the line-of-sight noise transmission, sound walls between a noise source and a receiver (receptor) are often used for noise control, e.g., along freeways. Additional barriers such as interceding buildings, rough terrain, hills, and heavy vegetation can also reduce noise levels. Typically, sound walls will reduce noise levels by 5 to 10 dB. The higher the wall is, the greater the noise reduction will be. Effective noise barriers can reduce noise levels by 10 to 15 dB. A sound barrier is most effective when placed close to the noise source or receiver.

2.6 Vibration

Vibration is a form of oscillatory motion within a solid medium, where the amplitude of the motion can be described by displacement, velocity, or acceleration. Typically associated with activities like railroads or vibration-heavy stationary sources such as industrial machinery, it also arises from certain types of construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Displacement refers to how far a point on a surface moves from its original position, velocity describes the speed at which this point moves, and acceleration measures the rate of change of velocity. These parameters are crucial for assessing human response, building damage, and acceptable vibration levels from equipment.

During construction, equipment operations can induce groundborne vibrations. In the operational phase, receptors may experience vibrations that can cause annoyance due to direct transmission or noise generated by structural vibrations or items within structures. Analysis of such vibrations typically involves measuring velocity and acceleration using test equipment.

Groundborne vibrations propagate in three main wave types: surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface, carrying energy along an expanding cylindrical wave front with particle motion perpendicular to the propagation direction;

- Compression or P-waves are body waves that propagate energy along an expanding spherical wave front with particle motion in a push-pull, longitudinal direction; and
- Shear or S-waves are also body waves, but with particle motion transverse to the direction of propagation along an expanding spherical wave front.

Peak particle velocity (PPV) or RMS velocity are commonly used to quantify vibration amplitudes. PPV measures the maximum instantaneous peak of the vibration signal, which is crucial for assessing potential building damage and human response. Units for PPV velocity are typically inches per second (in/sec), although vibrations are often discussed in vibration decibels (VdB) to simplify the range of values, relative to one microinch per second.

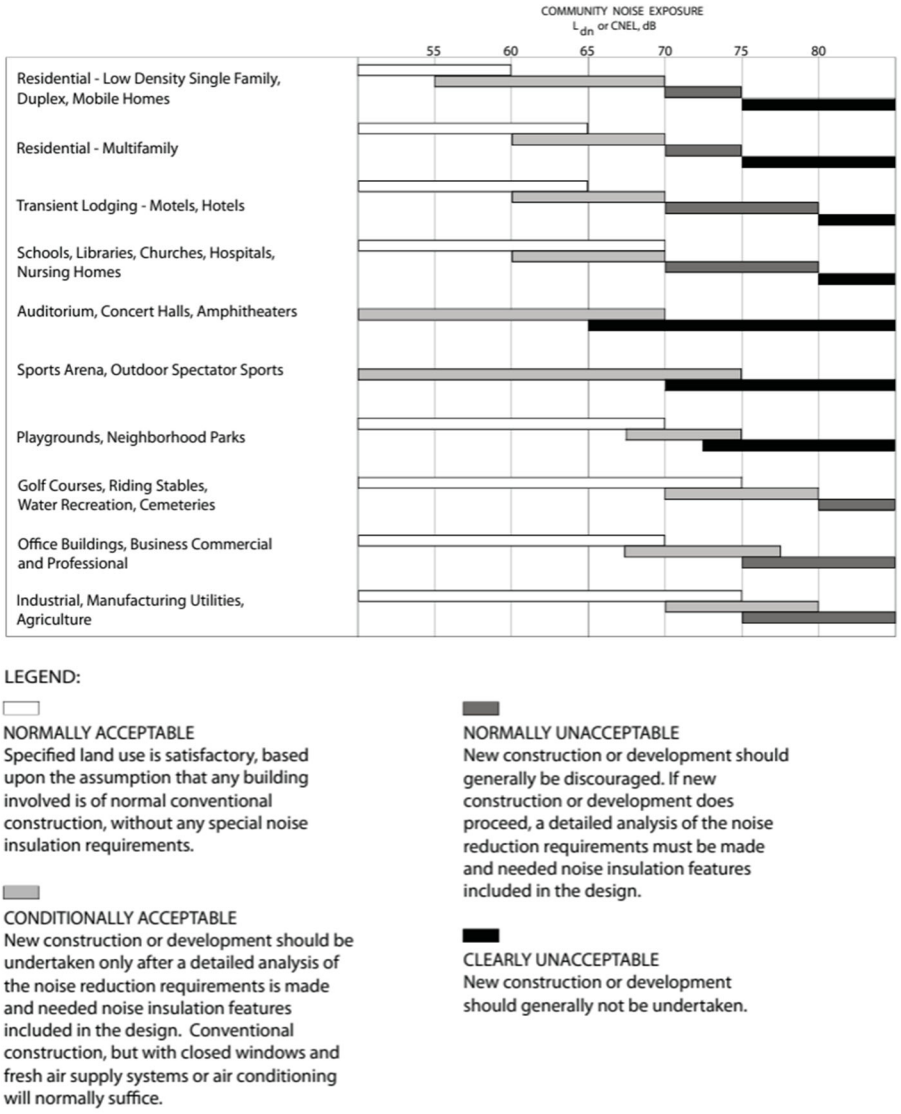
Construction activities, such as hydraulic hammer demolition, typically generate higher levels of groundborne vibrations, particularly in rocky soils. Heavy trucks also contribute, with vibration levels varying based on factors like vehicle type, weight, and pavement conditions. Anomalies such as potholes and pavement joints amplify vibration levels from vehicle traffic. Generally, construction-related vibrations are more concerning than those from normal traffic on well-maintained roads and freeways. Trains, due to their diesel locomotive engines, steel wheels, and heavy loads, generate substantial vibration.

3.0 NOISE AND VIBRATION STANDARDS

3.1 City of Santa Rosa General Plan, Noise and Safety Element

The City of Santa Rosa has included Chapter 12 Noise and Safety within the General Plan (Santa Rosa 2009) to address noise exposure within the City. Certain land uses are particularly sensitive to noise and vibration, including residential, hotel, school, and open space/recreation areas where quiet environments are necessary for enjoyment, public health, and safety. Excessive noise levels are not only a potential annoyance but can constitute a health threat resulting in temporary or permanent hearing loss and mental distress. The City of Santa Rosa Land Use Compatibility Criteria are shown in Figure 3-1. The Land Use Compatibility Standards specify normally acceptable levels for community noise in various land use areas.

Figure 3-1: Land Use Compatibility Standards



Source: City of Santa Rosa General Plan, Figure 12-1

Furthermore, the City requires noise levels below 45 dBA DNL in habitable rooms and 60 dBA DNL in private and shared recreational facilities (Noise Policy NS-B-4).

3.2 City of Santa Rosa Municipal Code

The City of Santa Rosa regulates noise nuisances under § 17-16.010, which addresses methods to determine whether a noise source would potentially result in a violation of the noise limits established within the Municipal Code (Santa Rosa 2024). The most relevant portions of the Municipal Code that address noise that may be generated by the Project are shown below:

§ 17-16.070. Radios, television sets and similar devices.

(A) Use Restricted. It is unlawful for any person within any residential zone of the City to use or operate any radio receiving set, musical instrument, phonograph, television set or other machine or device for the producing or reproducing of sound in such a manner as to

disturb the peace, quiet and comfort of neighboring residents or any reasonable person of normal sensitiveness residing in the area.

(B) Prima Facie Violation. Any noise level exceeding the ambient base level at the property line of any property (or, if a condominium or apartment house, within any adjoining apartment) by more than five decibels shall be deemed to be prima facie evidence of a violation of this section.

§ 17-16.090. Drums and other instruments.

(C) Use Restricted. It is unlawful for any person to use any drum or other instrument or device of any kind for the purpose of attracting attention by the creation of noise within the City. This section shall not apply to any person who is a participant in a school band or duly licensed parade who has been otherwise duly authorized to engage in such conduct.

§ 17-16.110. Animals.

No person shall keep or maintain, or permit the keeping of, upon any premises owned, occupied or controlled by such person any animal or fowl otherwise permitted to be kept which, by any sound, cry or behavior, causes annoyance or discomfort to a reasonable person of normal sensitiveness in any residential neighborhood.

§ 17-16.120. Machinery and equipment.

It is unlawful for any person to operate any machinery, equipment, pump, fan, air-conditioning apparatus or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property line of any property to exceed the ambient base noise level by more than five decibels.

§ 17-16.125. Leaf blowers.

(A) Offense. It is unlawful for any person to operate any gas-powered leaf blower or lawn broom in a residential district between the hours of eight p.m. and eight a.m. on weekdays or between the hours of eight p.m. and nine a.m. on Saturdays and Sundays.

(B) Penalty. A violation of this section shall constitute an infraction with a maximum penalty of a fine not to exceed $100.00.

§ 17-16.170. Regulations generally.

The commercial and noncommercial use of sound-amplifying equipment shall be subject to the following regulations.

§ 17-16.180. Registration—Required.

It is unlawful for any person, other than personnel of law enforcement or governmental agencies, to install, use or operate within the City a loudspeaker or sound-amplifying equipment in a fixed or movable position or mounted upon any sound truck for the purposes of giving instructions, directions, talks, addresses, lectures or transmitting music to any persons or assemblages of person in or upon any street, alley, sidewalk, park, place or public property without first filing a registration statement and obtaining approval thereof as set forth in this article.

(A) The only sounds permitted shall be either music or human speech, or both.

(B) The operation of sound-amplifying equipment shall only occur between the hours of nine a.m. and six p.m. each day except on Sundays and legal holidays. No operation of sound-amplifying equipment for commercial purposes shall be permitted on Sundays or legal holidays. The operation of sound-amplifying equipment for noncommercial purposes on Sundays and legal holidays shall only occur between the hours of 10 a.m. and six p.m. The City Manager or his or her designee may waive the provisions of this subsection upon a determination that a particular event will not cause an unreasonable disturbance to neighboring uses.

(C) Sound level emanating from sound-amplifying equipment shall not exceed 15 decibels above the ambient base noise level.

(D) Notwithstanding the provisions of subsection (C), sound-amplifying equipment shall not be operated within 200 feet of churches, schools or hospitals (see Section 17-16.100).

(E) In any event, the volume of sound shall be so controlled that it will not be unreasonably loud, raucous, jarring, disturbing or a nuisance to reasonable persons of normal sensitiveness within the area of audibility.

§ 20-30.090. Performance Standards.

(F) Ground vibration. No ground vibration shall be generated that is perceptible without instruments by a reasonable person at the property lines of the site, except for vibrations from temporary construction or demolition activities, and motor vehicle operations.

3.3 CEQA Checklist Questions

According to Appendix G of the California Environmental Quality Act (CEQA) Guidelines, a project will normally have a significant adverse environmental impact related to noise if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise level.

4.0 EXISTING LAND USES AND SENSITIVE RECEPTORS

4.1 Sensitive Receptors

Sensitive noise receptors (receivers) are defined as types of uses that are adversely affected by relatively low levels of noise. Such receptors include residential uses, schools, hospitals, places of worship, and similar uses. The proposed hotel is considered to be noise sensitive due to the nature of the use which includes quiet environments for sleeping and relaxation. The project site is located in an area of residential uses, which are considered to be noise sensitive uses.

5.0 EXISTING AMBIENT NOISE ENVIRONMENT

5.1 Background Noise Measurements

On September 8 and 9, 2024, Yorke conducted short and long-term noise measurements at four locations at the project site as indicated on Figure 5-1. A Casella CEL-633C1 Type 1 Sound Level Meter was used to document the noise levels. Noise measurement data are included in Appendix A. The long-term noise measurement resulted in a 24-hour noise level of 65 dBA DNL at the future façade of the proposed hotel use that faces Sonoma Highway. This level of noise exposure is within the 60-70 dBA DNL conditionally acceptable criteria shown previously in Figure 3-1. As such, exterior to interior noise attenuation of at least 20 dBA is necessary to meet the City's interior noise standard of 45 dBA DNL for all habitable rooms.

Figure 5-1: Noise Measurement Locations

Table 5-1: Summary of Noise Measurements

Sample Location	Time Start	Time End	Minimum (L_{min} dBA)	Average (L_{eq} dBA)	Maximum (L_{max} dBA)	Descriptions
24-Hour Measurement at Future Eastern Facade	9/8/2024 15:38	9/9/2024 15:38	33.9	61.1	95.2	The primary noise is traffic along Sonoma Highway especially from vehicles accelerating up the hill and from local intersections.
L1 – North Project Boundary	9/8/2024 15:06	9/8/2024 15:28	37.9	54.8	79.4	The primary noise is traffic along Sonoma Highway especially from vehicles accelerating up the hill and from local intersections. Secondary noise sources include a running fountain northeast of the courtyard, birds chirping, and light construction activities.
L2 – West Project Boundary	9/8/2024 14:43	9/8/2024 15:05	38	52.7	69.5	The primary noise is traffic along Sonoma Highway especially from vehicles accelerating up the hill and from local intersections. Secondary noise sources include a running fountain northeast of the courtyard, birds chirping, and light construction activities.
L3 – South Project Boundary	9/8/2024 14:19	9/8/2024 14:41	37.4	54.8	74.8	The primary noise is traffic along Sonoma Highway especially from vehicles accelerating up the hill and from local intersections. Secondary noise sources include a running fountain northeast of the courtyard, birds chirping, and light construction activities.
L4 – East Project Boundary	9/8/2024 13:55	9/8/2024 14:17	43.8	69.1	80.4	The primary noise is traffic along Sonoma Highway especially from vehicles accelerating up the hill and from local intersections.

6.0 METHODOLOGY

The project was analyzed for potential noise and vibration impacts from both construction and operations phase activities.

6.1 Construction Noise Analysis Methodology

The noise analysis for project construction was completed based on methodology developed by the U.S. Department of Transportation Federal Highway Administration (DOT FHWA) at the John A. Volpe National Transportation Systems Center. The DOT FHWA methodology uses actual noise measurement data collected during the Boston "Big Dig" project (1991-2006) as reference levels for a wide variety of construction equipment in common use, such as on the proposed project.

The FHWA noise model provides relatively conservative predictions because it does not account for site-specific geometry, dimensions of nearby structures, and local environmental conditions that can affect sound transmission, reflection, and attenuation. As a result, actual measured sound levels at receptors may vary somewhat from predictions, typically lower. Additionally, the impacts of noise upon receptors (persons) are subjective because of differences in individual sensitivities and perceptions. Noise exposure at offsite uses were assessed from the center of the project site to depict "average" conditions.

Noise impacts are evaluated against community noise standards contained in the City General Plan, Municipal Code, or other State or federal agency as applicable to the vicinity of the project site. Project-generated noise is evaluated in relation to established thresholds of significance. Additionally, the same methods are used to determine noise impacts on the nearest sensitive receptor. There is no numerical standard in the Municipal Code for construction activities; however, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment provides an 8-hour construction noise level threshold of 80 dBA L_{eq} during the daytime at residential (noise-sensitive) uses. Therefore, noise impacts for the proposed project are evaluated against the FTA noise standards.

6.2 Construction Vibration Analysis Methodology

During construction activities, the project would generate noise and vibration due to operation of off-road equipment, portable equipment, and vehicles at or near the project site. The City prohibits ground vibration that is perceptible without instruments by a reasonable person at the property lines of a project site. The City exempts vibrations from temporary construction or demolition activities, and motor vehicle operations. The FTA has published standard vibration velocities for construction equipment operations. Generally, a PPV vibration threshold of approximately 0.3 in/sec is sufficient to avoid physical damage to engineered structures and 0.2 for non-engineered timber and masonry buildings (FTA 2018). The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Table 6-1 presents average source levels in terms of velocity for different types of construction equipment. (Caltrans 2013). A vibration threshold of 0.2 PPV which corresponds to "annoying" was selected as the significance threshold. The vibration source level (PPV_{ref}) for each piece of equipment at a reference distance of 25 feet was determined per Table 6-1. Table 6-2 provides the construction vibration damage criteria for various types of buildings.

The following equation was then used to apply the propagation adjustment to the source reference level to account for the distance from the equipment to the receiver:

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5}$$

where:

PPV_{equip} = the peak particle velocity of the equipment adjusted for distance, in/sec
PPV_{ref} = the source reference vibration level at 25 ft, in/sec
D = distance from the equipment to the receiver, ft

Table 6-1: FTA Vibration Reference Levels for Construction Equipment

Equipment		PPV at 25 feet (in/sec)
Pile Driver (Impact)	Upper Range	1.518
	Typical	0.644
Pile Driver (Sonic)	Upper Range	0.734
	Typical	0.170
Clam Shovel Drop (slurry wall)		0.202
Hydromill (slurry wall)	In Soil	0.008
	In Rock	0.017
Vibratory Roller		0.210
Hoe Ram		0.089
Large Bulldozer		0.089
Caisson Drilling		0.089
Loaded Trucks		0.076
Jackhammer		0.035
Small Bulldozer		0.003

Source: FTA 2018

Table 6-2: FTA Construction Vibration Damage Criteria

Building/ Structural Category	Threshold PPV at 25 feet (in/sec)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: FTA 2018

6.3 Traffic Noise Analysis Methodology

The project's traffic noise analysis was completed based on methodology developed by DOT FHWA for the RD 77-108 Highway Traffic Noise Prediction Model. Traffic noise is dependent

on factors such as the volume of traffic, vehicle types, average vehicle speeds, and the distance the roadway is from a receptor.

6.4 On-Site Noise Analysis Methodology

On-site noise sources such as from Heating Ventilation Air Conditioning (HVAC) equipment, pool equipment and maintenance rooms, landscaping activities, exercise room, outdoor activity areas (gardens, swimming pool, bocce ball), and trash removal, and other activities are regulated by the City. Since there are no specifics related to these activities, these noise sources are evaluated qualitatively relative to compliance with the City's noise limits.

7.0 ANALYSIS OF NOISE IMPACTS

A project would normally have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the criteria in the City's General Plan Noise Element and its Municipal Code.

The following Appendix G CEQA checklist questions, previously discussed in Section 3.4, address whether project related noise and vibration impacts would exceed the limits identified within the adopted ordinances, General Plan, or adopted threshold used by other governmental agencies or industry accepted approaches. Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

7.1 Construction Noise Impacts

Temporary construction noise would be limited to the daylight hours and would permanently cease upon completion of construction. Most construction noise would occur during the demolition, site preparation, grading, building construction, and paving phases when heavy equipment would be operating.

During each of the construction phases there would be a different mix of equipment operating, and cumulative noise levels would vary based on the amount of equipment in operation and the location of each activity at the project site. In general, use of off-road equipment and portable equipment would generate noise due to engine mechanicals, engine exhaust, driveline mechanicals, shaft-driven devices and accessories, hydraulics operation, ground friction and displacement, and gravity drops (dumping, unloading).

The Project is expected to require up to approximately 1 year of planned work activities (i.e., from mobilization to substantial completion) comprising six construction phases:

1. Demolition
2. Site preparation;
3. Grading;
4. Building construction;
5. Paving; and

6. Architectural coating.

Table 7-1 shows a comparison of FHWA estimated daytime exterior noise impacts for peak project construction activities at the nearest receptors with respect to the FTA thresholds. If the thresholds are not exceeded, then a project should be considered to result in less than significant noise impacts.

Table 7-1: Estimated Peak Activity Construction Noise Impacts at the Nearest Sensitive Receptor

Construction Phase	Modeled Noise Level (L_{eq} dBA)	Significance Threshold[1] (L_{eq} dBA)	Exceeds Threshold? (Yes/No)
Demolition	79	80	No
Site Preparation	77	80	No
Grading	78	80	No
Building Construction	77	80	No
Paving	79	80	No
Architectural Coating	69	80	No

Sources: FHWA 2006, FTA 2018.

[1] FTA Noise Limits for Construction

The nearest noise sensitive residential uses are located adjacent to the project site to the north, west, and south with residential uses located to the east across Sonoma Highway. As shown in Table 7-1, the aggregated average construction noise would be below the 80 dBA FTA noise level threshold at nearby noise sensitive receptors. Therefore, temporary impacts on ambient noise levels in excess of applicable standards during construction would be less than significant.

PROJECTED IMPACT: Less than significant

7.2 Operational Noise Impacts

Project-related noise produced during the operations phase would occur from on-site sources as well as off-site from project related vehicle traffic. On-site noise sources attributable to the project would affect land uses proximate to the project site whereas project traffic would affect roadways taken to the project site.

7.2.1 On-Site Project Noise Sources

Operational noise sources associated with the proposed Project would include, but are not limited HVAC equipment, pool equipment and maintenance rooms, landscaping activities, exercise room, outdoor activity areas (gardens, swimming pool, bocce ball), and trash removal. All these uses would be subject to the noise nuisance regulations discussed under Chapter 17-16 Noise. § 17-16.120 - Machinery and equipment provides a limit of 5 dBA above ambient noise levels, which would regulate noise associated with HVAC and pool equipment. Landscaping activities are regulated under § 17-16.125 - Leaf blowers which restricts use of landscaping equipment from the hours of 8 p.m. and 8 a.m. on weekdays or between the hours of 8 p.m. and 9 a.m. on Saturdays and Sundays. Outdoor activity areas such as from the use of the swimming pool and bocce ball court would be restricted to guests and used intermittently. Noise associated with outdoor activity areas, whether it is from the proposed uses or from front/back yards of single-

family homes, is regulated under § 17-16.040. Standards for determining violations. Compliance with these noise regulations is required for the project and surrounding residential uses.

The Project would require periodic delivery and trash hauling services. However, noise associated with delivery and trash-hauling trucks would be an intermittent noise source and are already a common day-to-day occurrence in the Project area due to existing hotel and residential uses that make up the developed urban area. Therefore, such services associated with the Project would not result in a substantial permanent increase in ambient noise levels.

As such, noise impacts from on-site stationary sources would result in less than significant noise impacts and no mitigation is required.

7.2.2 Off-Site Noise Generated by Project Traffic

Project-related off-site noise sources (i.e., roadway traffic noise) have the potential to increase noise levels on local roadways proximate to the Project site. The determination of whether traffic related noise impacts would occur is based on whether project-related off-site noise sources (i.e. roadway traffic noise) cause the ambient noise levels proximate to the local roadways to result in an audible increase (3 dBA). Based on the trip generation calculated for the proposed Project by the Traffic Impact Assessment prepared by LLG Engineers, operation of the proposed Project would result in an additional 487 Average Daily Trips (ADT) and 29 morning peak hour trips and 36 evening peak hour trips. Traffic volumes provided within the City's traffic counts (Santa Rosa 2019) show that 4th Street (Sonoma Highway) has over 34,000 ADT. At these rates, the Project would represent a 1.4% increase in daily traffic over these traffic counts. Based on the FHWA's RD 77-108 Traffic Noise Prediction Model, the increase in vehicle traffic related to the Project would result in a fractional increase in traffic noise of less than 0.1 dBA along 4th Street. A 3 dBA change in noise levels is considered the minimum change in outdoor noise that is perceptible with human hearing. A 1 dBA change in noise levels is discernable in laboratory conditions. Consequently, Project related traffic noise increases would not be audible even under controlled laboratory conditions.

PROJECTED IMPACT: Less than significant

7.3 Vibration Impacts

b) Generation of excessive groundborne vibration or groundborne noise levels?

Potential vibration generated from the project would mainly occur during the construction phase when heavy equipment is used for demolition and construction activities. Vibration levels for project related construction activities assumes that equipment would operate at the closest accessible point on the property to the nearest offsite buildings in each cardinal direction. Vibration levels for the equipment shown in Table 7-2 were used in this assessment. At this point in the planning process, it is unknown whether certain types of equipment would be used and, as such, a conservative approach was taken that includes the most vibration intensive equipment that could be used at the site. Vibration exposure levels at the nearest off-site buildings from construction equipment are shown in Table 7-2. Because these off-site facilities are residential buildings, it is assumed that they are non-engineered timber and masonry buildings with a construction vibration damage criterion of 0.2 PPV (in/sec).

Table 7-2 also shows the vibration levels of construction equipment at the nearest sensitive receptor and compares the values to the human annoyance and building damage thresholds. Based on the information presented above and in Table 7-2, the nearest offsite structures would be exposed to a PPV below 0.2 in/sec when construction equipment operate at distances of 30 feet or greater. If construction equipment would need to be used within 30 feet of offsite buildings, Best Management Practice (BMP) NOI-1 would ensure vibration impacts remain at less than significant levels. This BMP is a project design feature and pursuant to CEQA, is not considered a mitigation.

BMP NOI-1: Vibration generated from construction equipment operating closer than 30 feet to offsite buildings would need to minimize the potential for vibration induced building damage. If vibratory rollers operate closer than 30 feet to offsite buildings, the vibratory mechanism should be turned off to avoid the potential for vibration-induced building damage. Large construction equipment (9+ tons) would also need to operate beyond 15 feet of offsite buildings. Smaller equipment could be used within 15 feet of offsite buildings.

Table 7-2: Estimated Peak Activity Daytime Vibration Damage Impacts

Equipment	Vibration Levels at Nearest Offsite Buildings (PPV)			
	Residential Structures to the North	**Residential Structures to the East**	**Residential Structures to the South**	**Residential Structures to the West**
	(PPV @ 21 ft)	**(PPV @ 215 ft)**	**(PPV @ 65 ft)**	**(PPV @ 30 ft)**
Vibratory Roller/Compactor	0.12[1]	0.01	0.05	0.07[1]
Large Bulldozer/Crawler Tractor	0.12	0.00	0.02	0.07
Small Bulldozer/Excavator/ Backhoe	0.00	0.00	0.00	0.00
Jackhammer (pneumatic)	0.05	0.00	0.01	0.03
Loaded Dump Trucks	0.10	0.00	0.02	0.06
Maximum Vibration Level	0.12	**0.01**	**0.05**	0.07
FTA's Vibration Criteria	**0.2**	**0.2**	**0.2**	**0.2**
Exceeds Criteria?	**No[1]**	**No**	**No**	**No[1]**

Note: [1] vibration from vibratory rollers assume implementation of BMP NOI-1 when operating within 30 feet of buildings.

The operations phase of the proposed hotel project is not anticipated to involve substantial sources of vibration due to the nature of the operation. As such, vibration associated with project's operations would result in less than significant impacts.

PROJECTED IMPACT: Less than significant

7.4 Aircraft Noise Exposure

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The Project site is not located within 2 miles of an airport. The nearest airport to the Sonoma Stonehouse is the Charles M. Schulz – Sonoma County Airport (STS), which is located approximately 7 miles northwest of the Project site. The project site is also located well outside the existing and projected 65-dBA CNEL noise contour of any airport. The project site is not located within the vicinity of a private airstrip. Aircraft overflights do not significantly contribute to the noise environment at the project site and the project is not considered to be a noise sensitive use. Therefore, there would be no impact.

PROJECTED IMPACT: No impact

7.5 Interior Noise Exposure

Because the 24-hour noise measurement shows that the façade of the proposed hotel facing Sonoma Highway would be exposed to noise levels of 65 dBA DNL, the exterior façade would need to reduce exterior noise levels by a minimum of 20 dBA to meet the City's interior noise standard for habitable rooms. Walls generally have a minimum Sound Transmission Class (STC) of 35 dBA while doors have an STC rating of at least 27 dBA and windows have a minimum of 22 dBA. As such, windows have the lowest STC rating and therefore, the focus should be placed on windows with a higher STC rating to minimize interior noise intrusion.

8.0 CONCLUSIONS

Noise and vibration attributable to the project was evaluated against applicable noise and vibration limits and those adopted for use by the City. Both the construction and operations phases of the project were evaluated at the nearest sensitive receptor for excessive noise and vibration exposure. Temporary construction noise would be limited to daylight hours and would permanently cease upon completion of construction. Aggregated average construction noise will be below the FTA noise level threshold. Therefore, Construction-related noise was found to result in less than significant noise exposure at the nearest noise sensitive uses.

The operations phase of the project would entail typical on-site equipment consistent with surrounding residential uses. These uses would comply with the City's noise limits identified for nuisance noise. Compliance with these requirements would result in less than significant noise impacts from on-site equipment use at the project site. Off-site noise from project related vehicle trips was also evaluated. The increase in traffic noise levels would not result in an audible change, which generally requires a minimum of 3 dBA. As such, off-site traffic noise increases were found to result in less than significant traffic noise increases.

Vibration was also assessed for construction of the project and found to not result in excessive exposure to vibration related to building damage or human annoyance at the nearest off-site buildings. The operations phase of the proposed hotel would not involve activities that generate substantive levels of vibration that would affect off-site uses.

In conclusion, the project would not result in excessive levels of noise or vibration at off-site receptors and no mitigation measures are necessary nor recommended. Noise measurements

indicate that the Project site would be exposed to noise levels of 65 dBA DNL and would require the use of walls, doors, and windows which have sufficient STC ratings to meet the City's interior noise standard. With the use of building assemblies that meet the necessary STC ratings, the Project will comply with the City's interior noise standard.

9.0 REFERENCES

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APPENDIX A – NOISE MEASUREMENTS AND FIELD NOTES

Noise Meter Raw Data

ID	ENDDATETIME	STARTDATETIME	LASMAX	LASMIN	LAEQ	LDN	LDEN	CNEL
24 Hour Sample	9/9/2024 15:38	9/8/2024 15:38	95.2	33.9	61.1	65	65.3	65.4
North Property Line	9/8/2024 15:28	9/8/2024 15:06	79.4	37.9	54.8	0	0	0
West Propert Line	9/8/2024 15:05	9/8/2024 14:43	69.5	38	52.7	0	0	0
South Property Line	9/8/2024 14:41	9/8/2024 14:19	74.8	37.4	54.8	0	0	0
East Property Line	9/8/2024 14:17	9/8/2024 13:55	80.4	43.8	69.1	0	0	0
Long Test	9/8/2024 13:54	9/8/2024 12:54	73.5	34.1	60.2	0	0	0
Short Test	9/8/2024 12:35	9/8/2024 12:35	49.4	48.2	49	0	0	0

	LASMIN	LAEQ	LASMAX
24 Hour Sample	33.9	61.1	95.2
North Property Line	37.9	54.8	79.4
West Propert Line	38	52.7	69.5
South Property Line	37.4	54.8	74.8
East Property Line	43.8	69.1	80.4

Yorke ENGINEERING, LLC
www.YorkeEngr.com

Noise Measurement Data Form

Client:	Sonoma Stonehouse	Sampled by:	Stephanie Vogt	Date:	Sept 8-9, 2024				
Contact/PM:	Shannon Miller								
Site:	3555 Sonoma Hwy, Santa Rosa								
Client No.:	1987	Calibrator Make/Model:	CEL 110/1 Calibrator			Calibrator Cal Exp Date:	Jan-25		
Sound Level Meter Make/Model:	Casella CEL-633C1 Type 1 Sound Level Meter	Sound Level Meter Serial Number:	2511397/1713/3058/301160	Calibrator Serial Number:	N/A				
Sample Location Name:	Sonoma Stonehouse Inn	Sample Location Description:	Sonoma Stonehouse Inn						
Microphone Height (ft):	5								
Weighting:	A-weighted	Calibrated?:	Yes	Weather					
				Temperature (˚F):	Wind (MPH):	Sky:	Barometric Pressure:	Humidity:	
Response Time:	1-min	Calibration value:	114.0 dB	84	12	Clear	29.78 inHg	60%	

Sample No.	Time On	Time Off	Range (in dBA)	Notes
East Property Line	9/8/2024 13:55	9/8/2024 14:17	43.8 - 80.4	
South Property Line	9/8/2024 14:19	9/8/2024 14:41	37.4 - 74.8	
West Property Line	9/8/2024 14:43	9/8/2024 15:05	38.0 - 69.5	
North Property Line	9/8/2024 15:06	9/8/2024 15:28	37.9 - 79.4	
Long Term	9/8/2024 15:38	9/9/2024 15:38	33.9 - 95.2	

APPENDIX B – CONSTRUCTION NOISE AND VIBRATION CALCULATIONS

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Estimated Construction Attenuated Sound Levels at Nearest Receptor (dBA)														
Construction Phase	**CalEEMod Construction Equipment and Vehicles**	**FHWA Construction Equipment and Vehicles**	**Ref.**	**Usage**	**L_{REF}**	**Quantity**	**D**	**TC**	**IL**	**WL**	**RMS**		**SPL**	
				Factor	**dBA**		**ft**	**dBA/m**	**dBA**	**dBA**	**L_{MAX}**	**L_{EQ}**	**L_{MAX}**	**L_{EQ}**
Demolition	Concrete/Industrial Saws	Concrete Saw	1	20%	90	1	115	0	0	0	1.9E+08	3.8E+07	82.8	75.8
Demolition	Rubber Tired Dozers	Tractor (rubber tire) 2	1	40%	84	1	115	0	0	0	4.7E+07	1.9E+07	76.8	72.8
Demolition	Tractors/Loaders/Backhoes	Backhoe (with loader) 1	1	40%	80	3	115	0	0	0	1.9E+07	2.3E+07	72.8	73.6
Site Preparation	Graders	Grader	1	40%	85	1	115	0	0	0	6.0E+07	2.4E+07	77.8	73.8
Site Preparation	Scrapers	Scraper	1	40%	85	1	115	0	0	0	6.0E+07	2.4E+07	77.8	73.8
Site Preparation	Tractors/Loaders/Backhoes	Backhoe (with loader) 1	1	40%	80	1	115	0	0	0	1.9E+07	7.6E+06	72.8	68.8
Grading	Graders	Grader	1	40%	85	1	115	0	0	0	6.0E+07	2.4E+07	77.8	73.8
Grading	Rubber Tired Dozers	Tractor (rubber tire) 2	1	40%	84	1	115	0	0	0	4.7E+07	1.9E+07	76.8	72.8
Grading	Tractors/Loaders/Backhoes	Backhoe (with loader) 1	1	40%	80	2	115	0	0	0	1.9E+07	1.5E+07	72.8	71.8
Building Construction	Cranes	Crane	1	16%	85	1	115	0	0	0	6.0E+07	9.6E+06	77.8	69.8
Building Construction	Forklifts	Forklift	1	40%	80	2	115	0	0	0	1.9E+07	1.5E+07	72.8	71.8
Building Construction	Generator Sets	Generator (general purpose utility)	1	50%	82	1	115	0	0	0	3.0E+07	1.5E+07	74.8	71.8
Building Construction	Tractors/Loaders/Backhoes	Backhoe (with loader) 1	1	40%	80	1	115	0	0	0	1.9E+07	7.6E+06	72.8	68.8
Building Construction	Welders	Welding Torch	1	40%	73	3	115	0	0	0	3.8E+06	4.5E+06	65.8	66.6
Paving	Cement and Mortar Mixers	Slurry Plant	1	100%	78	1	115	0	0	0	1.2E+07	1.2E+07	70.8	70.8
Paving	Pavers	Paver (asphalt)	1	50%	85	1	115	0	0	0	6.0E+07	3.0E+07	77.8	74.8
Paving	Paving Equipment	Pavement Scarifier 1	1	20%	85	1	115	0	0	0	6.0E+07	1.2E+07	77.8	70.8
Paving	Rollers	Roller	1	20%	85	2	115	0	0	0	6.0E+07	2.4E+07	77.8	73.8
Paving	Tractors/Loaders/Backhoes	Backhoe (with loader) 1	1	40%	80	1	115	0	0	0	1.9E+07	7.6E+06	72.8	68.8
Architectural Coating	Air Compressors	Compressor (air)	1	40%	80	1	115	0	0	0	1.9E+07	7.6E+06	72.8	68.8

Construction Generated Vibration

North - Residential Uses		Closest Distance (feet):	21
	Approximate RMS a 66	Approximate RMS 73.000	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.273	
Large bulldozer	0.089	0.116	
Small bulldozer	0.003	0.004	
Jackhammer	0.035	0.045	
Loaded trucks	0.076	0.099	
	Criteria	0.250	
East - Residential Uses		Closest Distance (feet):	215
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.008	
Large bulldozer	0.089	0.004	
Small bulldozer	0.003	0.000	
Jackhammer	0.035	0.001	
Loaded trucks	0.076	0.003	
	Criteria	0.250	
South - Residential Uses		Closest Distance (feet):	65
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.050	
Large bulldozer	0.089	0.021	
Small bulldozer	0.003	0.001	
Jackhammer	0.035	0.008	
Loaded trucks	0.076	0.018	
	Criteria	0.250	
West - Residential Uses		Closest Distance (feet):	30
	Approximate RMS a Velocity at 25 ft,	Approximate RMS Velocity Level,	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.160	
Large bulldozer	0.089	0.068	
Small bulldozer	0.003	0.002	
Jackhammer	0.035	0.027	
Loaded trucks	0.076	0.058	
	Criteria	0.250	

Based on distance to nearest structure

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration,*Transit Noise and Vibration Impact Assessment* (2018).

APPENDIX C – TRAFFIC NOISE MODELING

Sonoma Stonehouse

Roadway Segment		Speed	24-hour Traffic Volume: Existing	Future Without Project	Future With Project	Distance to CNEL from Roadway Centerline: Existing 100.0 Feet	60 CNEL	65 CNEL	70 CNEL	Future No Project 100.0 Feet	60 CNEL	65 CNEL	70 CNEL	Future With Project 100.0 Feet	60 CNEL	65 CNEL	70 CNEL	Change From Existing	Change due to Project	Noise Level (CNEL or Ldn) at Distance from Roadway Centerline: Existing 100 feet	100 feet	100 feet	Future No Proj 100 feet	100 feet	100 feet	Future Plus Proj 100 feet	100 feet	100 feet	Change From Existing	Change due to Project
Sonoma Highway		40.0	34,229	34,229	34,716	72.1	640	297	138	72.1	640	297	138	72.2	646	300	139	0.1	0.1	72.1	72.1	72.1	72.1	72.1	72.1	72.2	72.2	72.2	+0.1	+0.1

Assumptions:

Simplified to 2 lanes 6.1 meters= 20.0 feet from centerline

future 6.1 meters= 20.0 feet from centerline

Noise path decay parameter for hard site

Fleet Mix

92%	Autos
3%	Medium Trucks
5%	Heavy Trucks

Time of Day:

70%	Day
15%	Evening
15%	Night

Calculations using methods of Federal Highway Administration *Highway Traffic Noise Prediction Model* , December, 1978. Baseline California vehicle noise levels from Caltrans, TAN 95-03, 1995