4.12 NOISE

This section describes existing noise and vibration conditions, sets forth criteria for determining the significance of noise and vibration impacts, and estimates the likely noise and vibration impacts that would result from construction and operation of the proposed project. Standard conditions of approval and/or mitigation measures to reduce or avoid potentially significant noise and vibration impacts are identified, where appropriate.

In addition to the references listed in this section, a Noise and Vibration Technical Report[1] (Technical Report) was prepared for the proposed project. This report was utilized in the analysis provided in this section, and is provided in Appendix J. Additionally, the Technical Report was peer reviewed.[2]

4.12.1 Setting

This section describes the fundamentals of noise and vibration, summarizes the regulatory framework, and describes the existing noise environment of the project site and its vicinity.

4.12.1.1 Characteristics of Sound

Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effects on adjacent sensitive land uses.

Measurement of Sound. Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve as explained below. Table 4.12.A contains a list of typical acoustical terms and definitions. Figure 4.12-1 shows representative outdoor and indoor noise levels in units of A-weighted decibels (dBA).

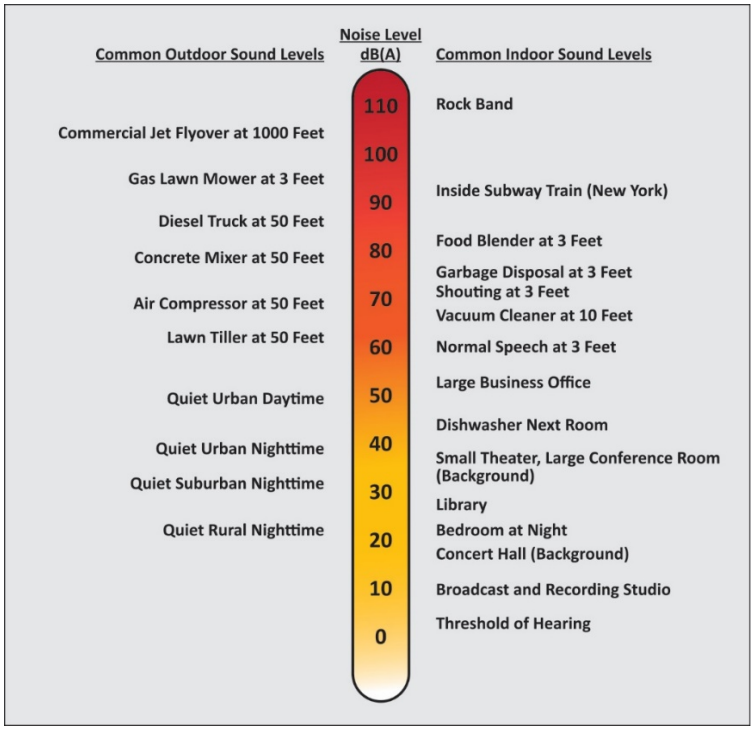
1 Dudek. 2023. *Northgate Town Square Project Noise and Vibration Technical Report.* December.

2 LSA Associates, Inc. 2023. *Peer Review of the Northgate Town Square Project Noise and Vibration Technical Report.* October.

Table 4.12.A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of five decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1998).



Source: Compiled by LSA (2016).

Figure 4.12-1: Typical A-Weighted Sound Levels

A decibel (dB) is a unit of measurement that indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Sound levels in dB are calculated on a logarithmic basis. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Spreading causes the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of noise over a sample period of time. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the Community Noise Equivalent Level (CNEL), and the day-night average level (L_{dn}) based on dBA. CNEL is the noise over a 24-hour period, with a 5 dBA increase (referred to as a "weighting factor") applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours), to recognize that people may be more sensitive to noise during those times. L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. The noise adjustments are added to noise events occurring during the more sensitive hours. Typical A-weighted sound levels from various sources are described on Figure 4.12-1.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Noise standards in terms of percentile exceedance levels, L_n, are often used together with the L_{max} for noise enforcement purposes. When specified, the percentile exceedance levels are not to be exceeded by an offending sound over a stated time period. For example, the L_{10} noise level represents the level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time. For a relatively steady noise, the measured L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dBA or greater, because, as described earlier, this level of noise change has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers

to a change in the noise level between 1 and 3 dBA. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1 dBA that are inaudible to the human ear. A change in noise level of at least 5 dBA would be 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. Only audible changes in existing ambient noise levels are considered potentially significant.

Physiological Effects of Noise. The effects of noise on people can also be described in three categories: annoyance, interference with activities such as speech or sleep, and physiological effects such as hearing loss. Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the ear, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling.

Unwanted community effects of noise occur at levels much lower than those that cause hearing loss and other health effects. Noise annoyance occurs when it interferes with sleeping, conversation, and noise-sensitive work, including learning or listening to the radio, television, or music. According to World Health Organization (WHO) noise studies, few people are seriously annoyed by daytime activities with noise levels below 55 dBA, or are only moderately annoyed with noise levels below 50 dBA.[3]

4.12.1.2 Characteristics of Ground-Borne Vibration

Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. As the vibration spreads from the foundation throughout the remainder of the building, the vibration of floors and walls may cause perceptible vibration from the rattling of windows or a rumbling noise. The rumbling sound caused by the vibration of room surfaces is called ground-borne noise. When assessing annoyance from ground-borne noise, vibration is typically expressed as vibration velocity in units of decibels. To distinguish vibration levels from noise levels, the unit is written as “VdB.” Human perception to vibration starts at levels as low as 67 VdB and sometimes lower. Annoyance due to vibration in residential settings starts at approximately 70 VdB. Ground-borne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of the building, the motion does not provoke the same adverse human reaction.

In extreme cases, excessive ground-borne vibration has the potential to cause structural damage to buildings. Vibration impacts on building structures are generally assessed in terms of peak particle velocity (PPV). Common sources of ground-borne vibration include trains and construction activities such as blasting, pile driving, and operating heavy earthmoving equipment.

[3] World Health Organization (WHO). 1999. *Guidelines for Community Noise*.

4.12.1.3 Existing Noise Environment

The ambient noise environment in San Rafael is affected by a variety of noise sources, including vehicle traffic, aircraft, commercial, and industrial noise. The following section describes the existing noise environment and identifies the primary noise sources in the vicinity of the project site.

Existing Traffic Noise. Motor vehicles with their distinctive noise characteristics are a major source of noise in San Rafael. The amount of noise varies according to many factors, such as volume of traffic, vehicle mix (percentage of cars and trucks), average traffic speed, and distance from the observer. Traffic noise depends primarily on traffic speed (high-frequency tire noise increases with speed) and the proportion of truck traffic, which generates engine, exhaust, and wind noise. The proximity of freeways and major streets, and the large amount of truck traffic serving commercial uses in the area make the city susceptible to traffic noise. Traffic noise at the project site is primarily associated with vehicle traffic on Northgate Drive, United States Route 101 (US-101), and the Manuel T. Freitas Parkway.

Existing Commercial Noise. Commercial activity from the parking lots associated with commercial uses, including the existing project site, and mechanical ventilation noise from commercial and residential uses add to the existing ambient noise environment. Truck access and loading/unloading activities at commercial uses also add to the ambient noise environment sporadically.

Existing Aircraft Noise. As regulated by Federal Aviation Regulations Part 150, 65 dBA CNEL is considered the ambient noise level above which residential and other noise-sensitive land uses (including schools, hospitals, and places of worship) are considered incompatible with airport activity. For each public airport, a noise assessment is completed to determine the extent of noise generated from daily operations, also referred to as contours. The contours act as sort of a boundary at which noise levels would be exceeded relative to the airport. The nearest airport to the project site is the San Rafael Airport, a small private airport located approximately 1 mile northeast of the project site. The 55 dBA L_{dn} contour for airplane noise is over 4,000 feet away from the project site, and the 65 dBA L_{dn} noise contour is within the airport property limits; hence, aviation noise exposures from this facility would be less than 65 dBA L_{dn}.[4] The nearest public airport to the project site is the Marin County Airport at Gnoss Field in Novato, approximately 9 miles to the north. The project site is located over 8.6 miles south of the 65 dBA CNEL contour.

The project site is also over 23 miles northwest of the nearest 65 dBA L_{dn} aviation noise contour of Oakland International Airport[5] and over 25 miles beyond the nearest San Francisco International Airport[6] 65 dBA L_{dn} contour.

Although aircraft-related noise is occasionally audible on the project site, the site does not lie within the 65 dBA L_{dn} noise contours of any of these airports.

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4 City of San Rafael. 2009. *San Rafael Airport Recreational Facility, Draft Environmental Impact Report.* SCH No. 2006012125. March.

5 Port of Oakland. 2016. *2016 Oakland International Airport Master Plan,* Figure 6.17.

6 San Francisco International Airport (SFIA). 2015. *14 CFR Part 150 Noise Exposure Map Report,* Exhibit 5-1. August.

Existing Sensitive Land Uses. Certain land uses are considered more sensitive to noise than others. Examples of these include residential areas, transient lodging, educational facilities, hospitals, childcare facilities, and senior housing. The project site is surrounded by a mix of uses, including commercial, residential, open space, and institutional. Based on this understanding and for purposes of environmental review, the off-site sensitive receptors nearest to the project area or surface roadway segments likely to experience changes in noise due to the project are as follows:

- AlmaVia of San Rafael, an assisted living facility south of the project site
- Single-family homes on Sao Augustine Way and Nova Albion Way near the southern end of the project site along Northgate Drive
- Quail Hill Townhouses on El Faisan Drive south of the project site
- Villa Marin on Thorndale Drive west of the project site
- The Northview Apartments and Terra Linda Manor on Las Gallinas Avenue farther west of the site, at the intersection of Las Gallinas Avenue and Nova Albion Way
- Single-family homes between Elena Circle and Las Gallinas Avenue to the northwest of the project site
- Single-family homes between Orange Blossom Lane and Manuel T. Freitas Parkway to the north of the project site

Although directly east of the project site, across Las Gallinas Avenue, the Mt. Olivet San Rafael Cemetery is not considered a noise-sensitive receptor because the City's 2040 General Plan Noise Element classifies cemeteries as within the same land use category as "golf courses", with a "normally acceptable" exterior noise exposure level of 70 dBA L_{dn}—unlike 60 dBA L_{dn} for single-family residences or 65 dBA L_{dn} for multi-family uses. General Plan Policy N-1.2(b) would appear to set 70 dBA L_{dn} as the limit for the cemetery. Further, there is no special provision for cemeteries in the San Rafael noise regulations.

Ambient Noise Level Monitoring. To assess the existing noise conditions in the project vicinity, noise measurements were conducted at the project site. One long-term (24-hour) measurement was taken from December 1, 2021, to December 2, 2021. Additionally, four short-term (15-minute) measurements were taken on December 1, 2021. Based on noise measurement results, the uses in the vicinity of the project site are exposed to noise levels between 47.8 dBA L_{eq} and 63.6 dBA L_{dn}, which are primarily associated with vehicle traffic noise. The results are summarized in Table 4.12.B below. Noise measurement data information is provided in Appendix A of the Technical Report (Appendix J to this Environmental Impact Report [EIR]).

Table 4.12.B: Existing Noise Level Measurements

Location No.	Location Description	Daytime Noise Levels[1] (dBA L_{eq})	Nighttime Noise Levels[2] (dBA L_{eq})	Average Daily Noise Levels (dBA L_{dn})	Primary Noise Sources
LT-1	Northgate Drive	54.12–63.6	45.7–56.6	59.3	Ambient traffic noise
ST-1	AlmaVia of San Rafael	61.1	–	–	Ambient traffic noise
ST-2	Nova Albion Way	62.0	–	–	Ambient traffic noise
ST-3	Quail Hill Townhouses (on La Perdiz Court)	52.7	–	–	Ambient traffic noise
ST-4	Villa Marin (on Thorndale Drive)	47.8	–	–	Ambient traffic noise

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
[1] Daytime Noise Levels = noise levels during the hours between 7:00 a.m. and 7:00 p.m.
[2] Nighttime Noise Levels = noise levels during the hours between 10:00 p.m. and 7:00 a.m.
L_{dn} = day-night average noise level
L_{eq} = equivalent continuous sound level
dBA = A-weighted decibels

4.12.1.4 Regulatory Framework

The following section provides brief discussions of the federal and local regulatory framework related to noise.

Federal Transit Administration. The criteria for environmental impacts resulting from ground-borne vibration and noise are based on the maximum levels for a single event. The City of San Rafael (City) Municipal Code does not include specific criteria for assessing vibration impacts associated with structural damage. Therefore, for the purpose of determining the significance of vibration impacts experienced at sensitive uses surrounding the project site, the guidelines within the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (2018) (FTA Manual) have been used to determine vibration impacts associated with potential damage and are presented in Table 4.12.C below.

Table 4.12.C: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
Reinforced concrete, steel, or timber (no plaster)	0.50
Engineered concrete and masonry (no plaster)	0.30
Non-engineered timber and masonry buildings	0.20
Buildings extremely susceptible to vibration damage	0.12

Source: Table 12-3, *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity

The FTA Manual guidelines show that a vibration level of up to 0.12 inches per second (in/sec) in PPV is considered safe for buildings extremely susceptible to vibration damage and would not result in any construction vibration damage. Therefore, to be conservative, the 0.12 in/sec PPV threshold has been used when evaluating vibration impacts at the nearest structures to the site (i.e., an approved storage building north of the project site).

To provide numerical thresholds related to ground-borne vibration impacts, criteria included in the FTA Manual for human annoyance are shown in Table 4.12.D. The criteria account for the variation in project types as well as the frequency of events, which differ widely among projects. It is logical that when there would be fewer events per day, it should take higher vibration levels to evoke the same community response. The variation in project times and the frequency of events is accounted for in the criteria by distinguishing between projects with frequent and infrequent events, in which the term "frequent events" is defined as more than 70 events per day.

Table 4.12.D: Ground-Borne Vibration Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Source: Table 8-1, *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] Frequent events are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] Occasional events are defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] Infrequent events are defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

µin/sec = microinches per second
FTA = Federal Transit Administration
HVAC = heating, ventilation, and air-conditioning
VdB = vibration velocity decibels

State of California. California Government Code Section 65302(g) requires the preparation of a Noise Element in a general plan, which shall identify and appraise the noise problems in the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources:

- Highways and freeways
- Primary arterials and major local streets
- Passenger and freight on-line railroad operations and ground rapid transit systems
- Aviation and airport-related operations
- Local industrial plants
- Other ground stationary noise sources contributing to the community noise environment.

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation. State regulations governing noise levels generated by individual motor vehicles and occupational noise control are not

applicable to planning efforts, nor are these areas typically subject to California Environmental Quality Act (CEQA) analysis. State noise regulations and policies applicable to the project include Title 24 requirements and noise exposure limits for various land use categories.

The 2019 California Building Code (CBC) (Part 2, Title 24, Section 1204.12, California Code of Regulations [CCR]) stipulates "interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (L_{dn}) or the community noise equivalent level (CNEL)."[7]

City of San Rafael. The City addresses noise in the Noise Element of the General Plan[8] and in the Municipal Code.

San Rafael General Plan. The Noise Element of The City of San Rafael General Plan 2040 sets goals and policies for ensuring compatibility between outdoor ambient noise environments and existing and proposed land uses within. These goals include land use compatibility noise standards akin to State guidelines appearing. The goals, policies, and programs that would relate to the Project are reproduced as follows:

> **Goal N-1: Acceptable Noise Levels.** Protect the public from excessive unnecessary, and unreasonable noise. Excessive noise is a concern for many residents of San Rafael. This concern can be addressed through the implementation of standards to protect public health and reduce noise conflicts in the community, including the Noise Ordinance.
>
> > **Policy N-1.1. Land Use Compatibility Standards for Noise. Protect** people from excessive noise by applying noise standards in land use decisions. The Land Use Compatibility standards in Exhibit D of the Noise and Vibration Technical Report are adopted by reference as part of this General Plan and shall be applied in the determination of appropriate land uses in different ambient noise environments.
> >
> > > **Program N-1.1A: Residential Noise Standards.** Maintain a maximum noise standard of 70 L_{dn} dB for backyards, decks, and common/usable outdoor spaces in residential and mixed- use areas. As required by Title 24 insulation requirements, interior noise levels shall not exceed 45 L_{dn} in all habitable rooms in residential units.
>
> **Policy N-1.2. Maintaining Acceptable Noise Levels.** Use the following performance standards to maintain an acceptable noise environment in San Rafael:
>
> (a) New development shall not increase noise levels by more than 3 dB L_{dn} in a residential area, or by more than 5 dB L_{dn} in a non-residential area.
>
> (b) New development shall not cause noise levels to increase above the "normally acceptable" levels.
>
> (c) For larger projects, the noise levels in (a) and (b) should include any noise that would be generated by additional traffic associated with the new development.

[7] Dudek. 2023. *Northgate Town Square Project Noise and Vibration Technical Report.* December.

[8] City of San Rafael. 2021. *San Rafael General Plan 2040, Noise Element.* August 2.

(d) Projects that exceed the thresholds above may be permitted if an acoustical study determines that there are mitigating circumstances (such as higher existing noise levels) and nearby uses will not be adversely affected.

Program N-1.2A: Acoustical Study Requirements. Require acoustical studies for new single- family residential projects within the projected 60 dB L_{dn} noise contour and for multi-family or mixed-use projects within the projected 65 dB L_{dn} contour. The studies should include projected noise from additional traffic, noise associated with the project itself, and cumulative noise resulting from other approved projects. Mitigation measures should be identified to ensure that noise levels remain at acceptable levels.

Policy N-1.3. Reducing Noise Through Planning and Design. Use a range of design, construction, site planning, and operational measures to reduce potential noise impacts.

Program N-1.3A: Site Planning. Where appropriate, require site planning methods that minimize potential noise impacts. By taking advantage of terrain and site dimensions, it may be possible to arrange buildings, parking, and other uses to reduce and possibly eliminate noise conflicts. Site planning techniques include:

(a) Maximizing the distance between potential noise sources and the receiver.

(b) Placing non-sensitive uses such as parking lots, maintenance facilities, and utility areas between the source and receiver.

(c) Using non-sensitive uses such as garages to shield noise sensitive areas.

(d) Orienting buildings to shield outdoor spaces from noise sources.

(e) Incorporating landscaping and berms to absorb sound.

Program N-1.3B: Architectural Design. Where appropriate, reduce the potential for noise conflicts through the location of noise-sensitive spaces. Bedrooms, for example, should be placed away from freeways. Mechanical and motorized equipment (such as air conditioning units) should be located away from noise-sensitive rooms. Interior courtyards with water features can mask ambient noise and provide more comfortable outdoor spaces.

Policy N-1.5: Mixed Use. Mitigate the potential for noise-related conflicts in mixed use development combining residential and nonresidential uses.

Program N-1.5A: Disclosure Agreements. Where appropriate, require disclosure agreements for residents in mixed use projects advising of potential noise impacts from nearby commercial enterprises, such as restaurants and entertainment venues.

Policy N-1.9: Maintaining Peace and Quiet. Minimize noise conflicts resulting from everyday activities such as construction, sirens, yard equipment, business operations, night-time sporting events, and domestic activities.

Program N-1.9B: Construction Noise. Establish a list of construction best management practices (BMPs) for future projects and incorporate the list into San

Rafael Municipal Code Chapter 8.13 (Noise). The City Building Division shall verify that appropriate BMPs are included on demolition, grading, and construction plans prior to the issuance of associated permits.

Policy N-1.11: Vibration. Ensure that the potential for vibration is addressed when transportation, construction, and nonresidential projects are proposed, and that measures are taken to mitigate potential impacts.

Program N-1.11A: Vibration-Related Conditions of Approval. Adopt Standard conditions of approval in San Rafael Municipal Code Chapter 8.13 (Noise) that apply Federal Transit Administration (FTA) criteria for acceptable levels of groundborne vibration for various building types. These conditions should:

(a) Reduce the potential for vibration-related construction impacts for development projects near sensitive uses such as housing, schools, and historically significant buildings.

(b) Reduce the potential for operational impacts on existing or potential future sensitive uses such as uses with vibration-sensitive equipment (e.g., microscopes in hospitals and research facilities) or residences.

Vibration impacts shall be considered as part of project level environmental evaluation and approval for individual future projects. If vibration levels exceed FTA limits, conditions of approval shall identify construction and operational alternatives that mitigate impacts.

San Rafael Municipal Code. The City of San Rafael establishes its noise regulations in Chapter 8.13 of its municipal code. Exterior noise limits are based on what is measured at the property of the receiver, the time of day, and the type of sound as reproduced in Table 4.12.E from Table 8.13-1 of Section 8.13.040. These two types of sound are defined in Section 8.13.020 as follows:

a) “Constant noise" means a continuous noise produced where there is no noticeable change in the level of the noise source. Examples would include such noises as those associated with air conditioners and pool equipment.

b) "Intermittent" noise means repetitive noises where there is a distinction between the onset and decay of the sound. Examples would include hammering and dog barking[1]

Per Section 8.13.050.A of the municipal code and treated as a standard exception to the exterior noise limits shown in Table 4.12.E, construction activity and its noise emission is allowed between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday, and 9:00 a.m. and 6:00 p.m. on Saturdays, provided the noise level at any point outside of the property plane of the project shall not exceed 90 dBA L_{max}. Further, all such activities shall be precluded on Sundays and holidays.

Another exception to the Table 4.12.E limits that would apply to the project is Section 8.13.050.C, which pertains to sound performances and states as follows:

Notwithstanding anything in this chapter to the contrary, on public property or any other open area to which the public has access, whether publicly or privately

Table 4.12.E: Noise Limits From the City Municipal Code

Receiving Land Use Category	Exterior Noise Limits at the Receiving Land Use			
	Daytime[1]		Nighttime[2]	
	Constant (L_{eq})	Intermittent (L_{max})	Constant (L_{eq})	Intermittent (L_{max})
Residential Property	50	60	40	50
Mixed-Use Property	55	65	45	55
Commercial Property	55	65	55	65
Industrial Property	60	70	60	70
Public Property	–[3]	–[3]	–[3]	–[3]

Source: City of San Rafael Municipal Code. Section 8.13.040.

[1] Daytime is defined as from 7:00 a.m. to 9:00 p.m. Sunday through Thursday and 7:00 a.m. to 10:00 p.m. on Friday and Saturday.

[2] Nighttime is defined as from 9:00 p.m. to 7:00 a.m. Sunday through Thursday and 10:00 p.m. to 7:00 a.m. on Friday and Saturday.

[3] The limit is defined as the "most restrictive noise limit applicable to adjoining private property."

L_{eq} = equivalent continuous sound level

L_{max} = maximum noise level

owned, sound-generating devices or instruments used for any indoor or outdoor sound performances, athletic events, and special events shall be permitted, provided they do not exceed a noise level of eighty (80) dBA measured at a distance of not less than fifty feet (50') from the property plane or such other limit as may be established by any required approvals and permits therefor obtained from the appropriate governmental entity. Except pursuant to an approved special event, street closure or parade permit, the use of any sound-generating device or instrument for such performances or events between the hours of ten p.m. (10:00 p.m.) and ten a.m. (10:00 a.m.) is unlawful.

4.12.2 Impacts and Mitigation Measures

This section discusses potential noise and vibration impacts that could result from implementation of the proposed project. The section begins with the criteria of significance, which establish the thresholds used to determine whether an impact is significant. The latter part of this section presents potential impacts associated with implementation of the proposed project and identifies applicable mitigation measures, as appropriate.

4.12.2.1 Significance Criteria

The following thresholds of significance were adapted from Appendix G of the *State CEQA Guidelines* and the specific thresholds identified in the City's Municipal Code. Based on these thresholds, implementation of the proposed project would have a significant impact related to noise and vibration if it would:

Threshold 4.12.1: Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the City of San Rafael General Plan or Noise Ordinance, or industry standards determined by the City to be applicable;

Threshold 4.12.2: Generate excessive ground-borne vibration or ground-borne noise levels; or

Threshold 4.12.3: Expose people residing or working in the area to excessive noise levels associated with proximity to a private airport or public use airport or within and airport land use plan.

To apply the significance criteria listed above for Thresholds 4.12.1, 4.12.2 and 4.12.3, the analysis in this section uses the following thresholds, which are based on the San Rafael General Plan and Noise Ordinance as well as the Federal Aviation Administration and accepted noise level increase thresholds used by other jurisdictions.

Threshold 4.12.1: Increases in Ambient Noise Levels. The following thresholds are used to determine whether the proposed project would result in a substantial temporary or permanent increase in ambient noise levels in the project vicinity that would exceed applicable thresholds.

Construction Noise. The proposed project would result in a significant impact when construction noise exceeds 90 dBA L_{max} at the project property line, per the City's Noise Ordinance. Additionally, the assessment herein evaluates an hourly L_{eq} value associated with predicted project construction noise and compares it to pre-project L_{eq} for the purpose of quantifying and disclosing the anticipated increase over baseline ambient environmental sound levels at off-site noise-sensitive receptors. In this context, the City has determined that an increase of more than 10 dB (perceived as a doubling of loudness) would be considered significant per CEQA impact assessment even if the City's 90 dBA L_{max} regulation was satisfied at the project property boundary.

Project-Attributed Change to Roadway Traffic Noise. The proposed project would result in a significant impact related to traffic noise if it results in a change to the outdoor noise environment due to project-attributed changes to existing and future roadway traffic noise greater than 3 dB L_{dn} in a residential area or greater than 5 dB L_{dn} in a non-residential area, or that would cause outdoor ambient noise to exceed 60 dBA L_{dn} at the exteriors of single-family residences or 65 dBA L_{dn} for multi-family land uses unless existing outdoor ambient L_{dn} values already exceed these "normally acceptable" limits as shown in the General Plan Noise Element. Consistent with the City's General Plan Policy N-1.1A, 70 dBA L_{dn} is the maximum exposure level from this sound source.

Project-Attributed Stationary Source Noise Emission to the Community. The proposed project would result in a significant impact related to stationary sources if it results in a change to the outdoor sound environment due to project-attributed stationary noise sources greater than 3 dB L_{dn} in a residential area or greater than 5 dB L_{dn} in a non-residential area, or that would cause outdoor ambient noise to exceed 60 dBA L_{dn} at the exteriors of single-family residences or 65 dBA L_{dn} for multi-family land uses unless existing outdoor ambient L_{dn} values already exceed these "normally acceptable" limits as shown in the General Plan Noise Element. Additionally, under the City's Noise Ordinance, project stationary source noise as received by residential and

mixed-use properties would need to comply with the L_{eq} and L_{max} limits appearing in Table 4.12.E.

Additionally, a significant impact would occur when the project on-site event venue features amplified live performances or playback of pre-recorded music or speech between the hours of 10:00 a.m. and 10:00 p.m., if sound exceeds the threshold of 80 dBA L_{max} at a distance of 50 feet within the project boundary, or any audible amplified sound from 10:00 p.m. to 10:00 a.m. the following day. Per 8.13.050.C of the City's municipal code, this limit applies only to the "sound-generating devices" and not crowd noise from participants attending the event.

Threshold 4.12.2: Construction Vibration Impacts. The proposed project would result in a significant impact if it generates 72 VdB within the interior of an off-site residential building, which is associated with "frequent events" threshold value per FTA guidance. For building damage risk to these existing off-site residential buildings, the thresholds would vary by their known or anticipated structural type or condition. By way of example, a typical single-family home could reasonably be classified as a Type III "non-engineered timber and masonry buildings" and thus have a 0.2 in/sec PPV threshold. Should a home or other receiving structure be classified as potentially historic and thus more sensitive to potential damage, the 0.12 in/sec PPV threshold may be more appropriate to use under the right conditions.

In *California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)*, the California Supreme Court concluded that CEQA generally does not require analysis or mitigation of the impact of existing environmental conditions on a project, including a project's future users or residents.[9] However, as with other laws and regulations enforced by other agencies that protect public health and safety, the City as the lead agency has authority, other than CEQA, to require measures to protect public health and safety. Therefore, this EIR includes an evaluation of the environment's impacts on the proposed project. The evaluation includes an assessment of the project's potential to locate residential land uses in an area considered to be "conditionally acceptable" in the City's noise and land use compatibility standards.

4.12.2.2 Project Impacts

The following section discusses the potential noise and vibration impacts associated with implementation of the proposed project. As discussed in Chapter 3.0, Project Description, the proposed project includes demolition and renovation of the existing Northgate Mall, and the construction and operation of a mix of commercial and residential land uses at the proposed project site. The proposed development would occur in two phases. The buildout of Phase 1 would include the demolition of approximately 308,946 square feet of existing commercial space and construction of approximately 44,380 square feet of new commercial space and up to 922 residential units and would be completed by 2025. Buildout of Phase 2 is expected to occur by 2040, and would include the demolition of approximately 339,861 square feet of existing commercial space and construction of up to 55,440 square feet of commercial space and up to 500 additional residential units. At full buildout, the proposed project would include a total of up to approximately 217,520 square feet of

[9] California Supreme Court. 2015. *California Building Industry Association v. Bay Area Air Quality Management District 62 Cal. 4th 369, Case No. S213478*. December.

commercial space and up to 1,422 residential units in six buildings (1,746,936 square feet of residential area).

At the completion of Phase 1, on-site sensitive receptors would include occupants of multi-story buildings represented by Residential Parcels 1, 2, 3 and 4. Completion of Phase 2 would generate additional on-site sensitive receptors represented by occupants of new buildings at Residential Parcels 5 and 6. The potential impacts that would occur with implementation of Phase 1 and Phase 2 are differentiated by phase in this section.[10]

Threshold 4.12.1: Increases in Ambient Noise Levels. The following addresses the potential for the proposed project to result in a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the City of San Rafael General Plan or Noise Ordinance or otherwise determined by the City to be applicable. Construction and operation period impacts are addressed.

Construction Noise. The applicable maximum construction noise level standard is presented in Section 8.13.050 of the City's Municipal Code. Additionally, based on precedents from other jurisdictions examining increases in noise during construction, a noise increase of 10 dBA over ambient conditions attributed to the proposed project would result in a significant impact. An increase of 10 dBA is considered a perceived doubling of sound intensity and therefore would result in an adverse condition over ambient conditions. The following describes the short-term construction noise impacts of the proposed project, and is based on the analysis and conclusions of the Technical Report[11] prepared for the proposed project and which is included in Appendix J. As discussed, these impacts would be less than significant with mitigation.

To estimate aggregate project-attributed construction noise exposure at seven of the nearest off-site receptors over the course of project construction activities, and thus provide input to evaluate an increase in outdoor ambient noise at these positions, the following summarized methodology and assumptions were adopted along with detailed information on the reference source sound levels from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide. The same methodology is used in considering project Phase 2 construction noise effects on Phase 1 on-site receptors. The analysis applies an FHWA RCNM emulator to evaluate aggregate construction equipment noise levels by listed phase for both L_{max} and L_{eq}, whereby the latter includes application of the equipment "acoustical usage factor" (AUF) that describes—based on FHWA RCNM reference values—what portion of time that equipment is actually working under full load conditions or otherwise emitting noise at its L_{max} value. The results of the construction noise assessment are presented in Appendix B of the Technical Report.

10 Although this analysis discusses the potential impacts of Phase 1 and Phase 2 development as projected to occur in the years 2025 and 2040, respectively, it is acknowledged that potential development could be accelerated or slowed, depending on market conditions.

11 Dudek. 2023. *Northgate Town Square Project Noise and Vibration Technical Report.* December.

The predictive analysis herein locates one or multiple sound-emitting sources (i.e., stationary and mobile equipment) associated with a distinct construction activity or phase as a collective single point at an approximate geographic position near the activity boundary considered closest to the set of studied receptors. This method is also used to determine whether or not the project would comply with the City's limit of 90 dBA L_{max} at the project boundary.

Due to the size of the project area, this approach predicts noise during each monthly period from each distinct phase or activity across the project construction period. The assumed schedule of activities is based on estimated time periods provided in Chapter 3.0, Project Description. Therefore, the total concurrent noise level at an indicated receptor for each month is estimated from the logarithmic sum of noise levels from nearby concurrent on-site construction activities. The studied construction activity locations and the seven receptors appear in Exhibit E of the Technical Report. The construction activities that could occur include anticipated operating equipment shown in Table 4.12.F. Impact or vibratory pile driving is not required for the project and therefore is not included in the construction noise analysis. Piles anticipated as part of project foundations would be cast-in-place and utilize an auger drill rig for installation.

Table 4.12.F: Modeled Construction Activities and Equipment Types

Activity Name	Anticipated Construction Equipment Types
Site Demolition	Excavator, dozer, hoe-ram, dump truck, welder/torch, jackhammer, flat-bed truck
Site Preparation	Excavator, dozer, front-end loader, flat-bed truck
Site Grading	Grader, scraper, front-end loader, flat-bed truck
Rough Roads	Grader, scraper, compactor, flat-bed truck
Building Erection	Crane, man-lift, auger drill rig, flat-bed truck, generator, welder/torch
Final Roads	Paver, roller, vacuum street sweeper
Architectural Finishes	Air compressor, man-lift, flat-bed truck

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).

Compliance with applicable noise standards at the seven studied receptors would imply that construction activities at more distant receptors would also be compliant; therefore, additional receptors farther away from the site are not specifically analyzed. After completion of Phase 1 of the project, there would be newly occupied noise-sensitive residences on site at the buildings represented by Residential Parcels 1, 2, 3 and 4. Potential construction period impacts associated with Phases 1 and 2 are potentially significant and are discussed further below.

Impact NOI-1 Construction of the proposed project would result in a significant short-term increase in ambient noise levels in the vicinity of the project site in excess of the thresholds established in the City of San Rafael General Plan or Noise Ordinance. (S)

Phase 1 Impacts. The noisiest expected on-site project construction activities evaluated for the proposed project are associated with the site demolition phase. The assessment conservatively assumes that during this phase, all seven listed anticipated equipment types as shown in Table 4.12.G are operating concurrently at or near a single location or within a shared zone that is no closer than 50 feet to the project boundary. Additionally, the noisiest two types of equipment, a hoe-ram and a jackhammer, would not be needed or used any closer to the project boundary than 150 feet because there are no poured concrete buildings to be demolished in these areas and no surface pavements would be demolished. Therefore, the logarithmic sum of noise emission from these two equipment types at 150 feet and noise emission from the five other equipment types at a distance of 50 feet would not exceed 88 dBA L_{max} at the project boundary. For this reason, and because all other phases or groupings of concurrently operating noise-emitting construction processes would involve fewer and/or quieter pieces of equipment, the project would comply with the City's significance threshold of 90 dBA L_{max} at the project boundary.

Table 4.12.G: Predicted Phase 1 Construction Noise (Hourly L_{eq}) at Nearest Off-Site Noise Sensitive Receptors

Activity Name	Range of Predicted Construction Noise Levels (dBA L_{eq})
RND1 (AlmaVia of San Rafael)	56–80
RSA1 (Sao Augustine Way)	58–79
RSA2 (Sao Augustine Way)	56–80
RSA3 (Sao Augustine Way)	55–77
RNA1 (Nova Albion Way)	54–79
RLP1 (La Perdiz Court)	49–69
RLP2 (La Perdiz Court)	49–72

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

While some construction equipment may actually operate on site at distances closer than 50 feet to the project boundary, they are expected to be smaller and/or less powerful than those studied in the listed phases appearing in Table 4.12.F. For example, a typical equipment pair operating as close as 15 feet to the project property line would comprise a 14-ton rated excavator and an 8-ton rated loader working together and be predicted to have a combined noise level of 79 dBA at the property line, which is well below the City's 90 dBA L_{max} standard. Furthermore, by having a predicted sound level 11 dB less than the City's standard, the combined noise from this pair of smaller equipment operating nearer to the project boundary than those listed in Table 4.12.F would, on the basis of logarithmic addition, have a negligible cumulative effect that would not compromise project construction noise compliance as discussed in the following paragraphs. By way of illustration, the site demolition phase 88 dBA L_{max} value at the project property line estimated in the preceding paragraph added logarithmically to 79 dBA estimate for the smaller excavator-and-loader pairing would result in 88.5 dBA and thus still be compliant with the City's limit.

Table 4.12.G presents highest predicted hourly L_{eq} construction noise level exposures at the seven studied receptors nearest to anticipated concurrent construction of Phase 1.

Table 4.12.H presents the estimated pre-project hourly L_{eq} values at the studied off-site receptors, the predicted project-attributed Phase 1 construction hourly L_{eq} values from Table 4.12.G, the logarithmic sums of these two values, and the corresponding hourly L_{eq} increases (i.e., the arithmetic difference between the log-sum value and the existing sound level).

Table 4.12.H: Predicted Phase 1 Increase of Outdoor Ambient Noise at Off-Site Noise Sensitive Receptors

Activity Name	Existing Hourly (dBA L_{eq})	Highest Phase 1 Hourly Level (dBA L_{eq})	Combined Ambient and Construction Noise Level (dBA L_{eq})	Increase Over Existing Level (dBA L_{eq})	Potentially Significant Impact
RND1 (August-October 2024)	63.4	80	80.1	16.7	Yes
RND1 (March-July 2024)	63.4	78	78.1	14.7	Yes
RND1 (remaining schedule)	63.4	71	71.7	8.3	No
RSA1 (July-September 2024)	64.3	79	79.1	14.8	Yes
RSA1 (February-June 2024)	64.3	77	77.2	12.9	Yes
RSA1 (remaining schedule)	64.3	71	71.8	7.5	No
RSA2 (July-September 2024)	64.3	80	80.1	15.8	Yes
RSA2 (February-June 2024)	64.3	78	78.2	13.9	Yes
RSA2 (remaining schedule)	64.3	71	71.8	7.5	No
RSA3 (July-September 2024)	64.3	77	77.2	12.9	Yes
RSA3 (February-June 2024)	64.3	75	75.4	11.1	Yes
RSA3 (remaining schedule)	64.3	67	68.9	4.6	No
RNA1 (July-September 2024)	64.3	79	79.1	14.8	Yes
RNA1 (February-June 2024)	64.3	77	77.2	12.9	Yes
RNA1 (Nov. 2024 to June 2026)	64.3	70	71.0	6.7	No
RNA1 (remaining schedule)	64.3	63	66.7	2.4	No
RLP1 (June-August 2024)	53.6	69	69.1	15.5	Yes
RLP1 (Jan.-May 2024, Sept. 2024)	53.6	67	67.2	13.6	Yes
RLP1 (remaining schedule)	53.6	63	63.5	9.9	No
RLP2 (June-August 2024)	53.6	72	72.1	18.5	Yes
RLP2 (January-May 2024)	53.6	70	70.1	16.5	Yes
RLP2 (September 2024)	53.6	66	66.2	12.6	Yes
RLP2 (remaining schedule)	53.6	63	63.5	9.9	No

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Table 4.12.H illustrates at which studied off-site receptors and within which construction periods, project-attributed construction noise hourly L_{eq} would cause an increase in the outdoor ambient sound level to be greater than existing estimated hourly L_{eq} by more 10 dB and thereby result in a significant impact based on the 10 dB relative increase noise threshold. Implementation of Mitigation Measure NOI-1 would reduce these predicted increases in outdoor ambient noise level at these closest off-site noise-sensitive receptors to less than or equal to 10 dB. Specific calculations of the proposed barrier for various conditions are presented in the Technical Report. In addition, implementation of Best Management Practices (BMPs) during the construction period would be required to be

implemented per the City's General Plan and would further ensure that construction period noise is reduced to the maximum extent practicable.

Mitigation Measure NOI-1

Sound Barriers. The City of San Rafael (City) Director of Community Development, or designee, shall verify prior to issuance of demolition or grading permits that the approved plans require that the construction contractor implement the following measures during project construction activities:

- Temporary noise barriers or shrouds shall be installed (featuring materials and methods of assembly and installation that yields a sound transmission class [STC] of 20 or better) near the operating equipment in a safe, feasible, and practical manner to break sound paths between it and the on-site noise-sensitive receptors (e.g., single- or multi-family residences) of concern.
- During Phase 1 of construction, the temporary barriers shall be a minimum of 10 feet tall.
- During Phase 2 of construction, the barriers shall be a minimum of 11 feet tall. (LTS)

The measures described under Mitigation Measure NOI-1 would implement a temporary construction barrier near construction activities during Phase 1 at a height of 10 feet. These measures would ensure that short-term construction period impacts associated with temporary increases in ambient noise levels during Phase 1 would be reduced to below established thresholds and would ensure that this impact would be **less than significant with mitigation**.

The following additional BMPs would also be expected by the City consistent with its General Plan Noise Element activities and would further reduce potential construction period noise impacts:

- Utilize the best available and factory-approved noise control techniques (e.g., improved mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds) on stationary and mobile construction equipment and vehicles.
- Require the contractor to use impact tools (e.g., jack hammers and hoe rams) that are hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Locate stationary equipment such as generators and air compressors as far as feasible from nearby noise-sensitive uses.
- Locate stockpiling as far as feasible from nearby noise-sensitive receptors.

- Limit construction traffic —to the extent feasible—to haul routes approved in advance of issuing building permits by the City.

- Require the telephone numbers of the authorized representatives for the City and the contractor that are assigned to respond in the event of a noise or vibration complaint to be displayed on construction signs posted at the construction site. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.

- Post signs at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.

- Limit the use of noise-producing signals, including horns, whistles, alarms, and bells, to safety warning purposes only, to the extent feasible. The construction manager shall use smart backup alarms, which automatically adjust the alarm level based on the ambient noise level or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.

Phase 2 Impacts. Residences on the northern façade of the Residential Parcel 1 building would be at least 360 feet from on-site construction associated with the closest Phase 2 structure: the mixed-use Residential Parcel 6 building. Residences on the northern façade of the Residential Parcel 4 building would be as close as 100 feet from on-site construction associated with the closest Phase 2 structure: the Residential Parcel 5 building. To assess potential exceedance of the City's noise thresholds at the exteriors or exterior use areas of these Residential Parcel 1 and Residential Parcel 4 buildings, and using the equipment types appearing in Table 4.12.F, construction of other Phase 2 structures and improvements would be further away and thus expected to cause lower noise exposure levels than these studied on-site assessment scenarios. Similarly, because new occupants of Residential Parcel 2 townhomes and the Residential Parcel 3 building would be more than 360 feet from the construction of the nearest Phase 2 improvements, and new or renovated buildings associated with the Phase 1 implementation may occlude direct sound paths, construction noise exposure levels at these on-site locations would be lower than the studied scenarios for occupants of Residential Parcel 1.

Table 4.12.I presents highest predicted L_{max} noise level exposures from on-site Phase 2 construction activities at the two nearest on-site residences overlooking the activity from an upper floor Residential Parcel 1 unit and an upper floor Residential Parcel 4 unit. The supporting construction noise model confirms that while the upper floor receptors are slightly farther away, they lose some acoustical ground absorption by being high above grade, thus the upper floor receptor levels are reported to show a worst-case scenario.

Table 4.12.I: Predicted Phase 2 Construction Noise (Hourly L_{eq}) at Nearest On-Site Noise Sensitive Receptors

Activity Name	Highest Predicted Construction Noise Levels (dBA L_{max})	
	Nearest Residential Parcel 1 Receiver	Nearest Residential Parcel 4 Receiver
Site Demolition	73	86
Site Preparation	66	80
Site Grading	69	82
Rough Roads	69	82
Building Erection	67	80
Final Roads	64	78
Architectural finishes	61	75

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{max} = maximum noise level

The predicted L_{max} values appearing in Table 4.12.I are all less than the City's 90 dBA L_{max} construction noise limit and therefore would not exceed established thresholds. Table 4.12.J presents the following values at the same two studied sample on-site upper floor receptors associated with Residential Parcel 1 and Residential Parcel 4: (1) estimated pre-project hourly L_{eq} values for 2025 as predicted in the evaluation of on-site traffic noise (see discussion in subsection below); (2) the predicted Phase 2 construction noise levels; and (3) the resulting increase in outdoor ambient noise level due to Phase 2 project construction. As shown in Table 4.12.J, the nearest residence within Parcel 1 of Phase 1 is not predicted to be subjected to more than a 4.6 dB increase to the outdoor ambient sound level and, on that basis, the impact would be less than significant impact per the 10 dBA L_{eq} relative increase noise threshold.

Table 4.12.J: Predicted Phase 2 Increase of Outdoor Ambient Noise at Nearest On-Site Noise Sensitive Receptors

Activity Name	Highest Predicted Construction Noise Levels (dBA L_{max})						Potentially Significant Impact
	Nearest Residential Parcel 1 Receiver			Nearest Residential Parcel 4 Receiver			
	Estimated Hourly Noise Level in 2025 (dBA)	Highest Predicted Construction Noise Hourly (dBA L_{eq})	Increase in Outdoor Ambient Noise (dBA)	Estimated Hourly Noise Level in 2025 (dBA)	Highest Predicted Construction Noise Hourly (dBA L_{eq})	Increase in Outdoor Ambient Noise (dBA)	
Site Demolition	64.2	67	4.6	63.6	80	16.5	Yes
Site Preparation	64.2	62	2.0	63.6	76	12.6	Yes
Site Grading	64.2	65	3.4	63.6	78	14.6	Yes
Rough Roads	64.2	65	3.4	63.6	78	14.6	Yes
Building Erection	64.2	61	1.7	63.6	74	10.8	Yes
Final Roads	64.2	58	0.9	63.6	71	8.1	No
Architectural finishes	64.2	57	0.8	63.6	70	7.3	No

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum noise level

At the nearest Parcel 4 residence, Table 4.12.J shows that the first five phases of Phase 2 construction may cause an increase to the daytime outdoor ambient hourly L_{eq} of more than 10 dBA. Therefore, implementation of Mitigation Measure NOI-1 would be required to reduce this L_{eq} increase to no more than 10 dB to ensure that this impact would be less than significant. These measures would ensure that short-term construction period impacts associated with temporary increases in ambient noise levels during Phase 2 would be reduced to below established thresholds and to the maximum extent practicable.

The measures described under Mitigation Measure NOI-1 would implement a temporary construction barrier near construction activities during Phase 2 at a height of 11 feet. These measures would ensure that short-term construction period impacts associated with temporary increases in ambient noise levels during Phase 2 would be reduced to below established thresholds and would ensure that this impact would be **less than significant with mitigation**.

Project-Attributed Change to Roadway Traffic Noise. Existing and future roadway noise levels were predicted with algorithms based on the FHWA RD-77-108 report, with adjustments to reflect "Calveno" vehicle noise emission levels as adopted by the California Department of Transportation (Caltrans). Based on details from the Technical Report appendices, Table 4.12.K, Table 4.12.L, and Table 4.12.M present the prediction results for the three scenarios as follows:

- **Baseline Plus Phase 1:** A contrast of the predicted traffic noise levels at 50 feet from the listed studied roadway segment under baseline conditions versus baseline conditions that include traffic changes due to development of Phase 1 expected to be completed in 2025.
- **Future Plus Phase 1:** A contrast of the predicted traffic noise levels at 50 feet from the listed studied roadway segment under future conditions versus baseline conditions that include traffic changes due to development of Phase 1 expected to be completed in 2025.
- **Future Plus Phase 2:** A contrast of the predicted traffic noise levels at 50 feet from the listed studied roadway segment under future conditions versus baseline conditions that include traffic changes due to Phase 2 buildout expected to be completed in 2040.

Table 4.12.K: Predicted Roadway Noise Change – Baseline Plus Proposed Project, Phase 1 (2025)

Modeled Roadway Segment	Baseline L_{dn} at 50 feet (dBA)	Baseline + Phase 1 L_{dn} at 50 feet (dBA)	Change in Traffic Noise Level (dBA)	Compliant with City General Plan?
Northgate Drive (Intersections 15 to 16)	61.8	62.8	0.9	Yes
Northgate Drive (Intersections 14 to 15)	62.0	62.9	0.9	Yes
Northgate Drive (Intersections 13 to 14)	62.0	63.0	1.0	Yes
Northgate Drive (Intersections 9 to 13)	62.8	63.5	0.6	Yes
Las Gallinas Avenue (Intersections 8 to 9)	67.1	67.4	0.4	Yes
Las Gallinas Avenue (Intersections 1 to 8)	65.8	65.9	0.1	Yes
Manuel T. Freitas Parkway (Intersections 1 to 2)	74.3	74.4	0.1	Yes

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{dn} = day-night average level

Table 4.12.L: Predicted Roadway Noise Change – Future Plus Proposed Project, Phase 1 (2025)

Modeled Roadway Segment	Future L_{dn} at 50 feet (dBA)	Future + Phase 1 L_{dn} at 50 feet (dBA)	Change in Traffic Noise Level (dBA)	Compliant with City General Plan?
Northgate Drive (Intersections 15 to 16)	62.9	63.6	0.7	Yes
Northgate Drive (Intersections 14 to 15)	63.4	64.1	0.7	Yes
Northgate Drive (Intersections 13 to 14)	63.4	64.2	0.7	Yes
Northgate Drive (Intersections 9 to 13)	64.0	64.5	0.5	Yes
Las Gallinas Avenue (Intersections 8 to 9)	67.9	68.2	0.3	Yes
Las Gallinas Avenue (Intersections 1 to 8)	66.6	66.6	< 0.1	Yes
Manuel T. Freitas Parkway (Intersections 1 to 2)	74.9	75.0	0.1	Yes

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{dn} = day-night average level

Table 4.12.M: Predicted Roadway Noise Change – Future Plus Proposed Project, Phase 2 (2040)

Modeled Roadway Segment	Future L_{dn} at 50 feet (dBA)	Future + Phase 2 L_{dn} at 50 feet (dBA)	Change in Traffic Noise Level (dBA)	Compliant with City General Plan?
Northgate Drive (Intersections 15 to 16)	62.9	63.5	0.6	Yes
Northgate Drive (Intersections 14 to 15)	63.4	63.9	0.5	Yes
Northgate Drive (Intersections 13 to 14)	63.4	63.9	0.5	Yes
Northgate Drive (Intersections 9 to 13)	64.0	64.2	0.1	Yes
Las Gallinas Avenue (Intersections 8 to 9)	67.9	68.3	0.4	Yes
Las Gallinas Avenue (Intersections 1 to 8)	66.6	66.7	0.1	Yes
Manuel T. Freitas Parkway (Intersections 1 to 2)	74.9	75.0	0.1	Yes

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{dn} = day-night average level

For all three studied traffic noise scenarios that involve contribution from the proposed project, changes to the traffic noise levels (expressed as an L_{dn} value) at noise sensitive receivers along the studied roadway segments would be less than 3 dBA and thus consistent with the requirements of the City's 2040 General Plan. As such, these predictions indicate that project changes to community traffic noise levels would represent a **less than significant** impact.

Project-Attributed Stationary Source Noise Emission to the Community. The expected sources of noise emission from within the project site boundary can include a variety of on-site intermittent acoustical contributors such as modest amplified music from outdoor dining or other commercial areas (or what may be the result of interior space music momentarily emanating from an open door), speech from pedestrians or patrons of an outdoor dining area, audible safety or security alarms, and occasional vehicle door closures and associated low-speed vehicle movements or idling engines on parking areas. But of larger concern are stationary sources of noise such as electro-mechanical equipment (e.g., rooftop heating, ventilating and air-conditioning [HVAC] systems) that must continuously operate to provide required ventilation and reliable indoor comfort for project residential and non-residential uses. The proposed Town Square area and its partially covered outdoor stage is configured to host occasional live musical

performances or comparable events with substantial speech or music reinforcement. Therefore, this stationary operational noise analysis broadly considers five scenarios for each project phase (i.e., Phase 1 and Phase 2) as follows:

- **Typical Daytime Conditions During Daytime or "Business Hours"** (i.e., between 7:00 a.m. and 9:00 p.m. on Sunday through Thursday, and between 7:00 a.m. and 10:00 p.m. on Friday and Saturday): This includes steady-state noise emission from operating outdoor-exposed building HVAC (anticipated rooftop air handling unit [AHU] fans and air-cooled chiller [ACC] units) for all residential and non-residential buildings on site.

- **Typical Daytime Conditions with a Town Square Event in Progress**: Same as the above "typical daytime conditions" scenario, but with the added average acoustical contribution from the voices of up to 200 spectators at an average "raised normal speech" level for a cumulative duration of half a given hour during a Town Square event. The operating sound-producing apparatus located at the stage area of the Town Square event venue space is not included as it would be subject to Section 8.13.050.C of the City's municipal code.

- **Sound Generation from Typical Daytime Town Square Event in Progress:** This scenario evaluates the sound production from a live-performing musical act (or playback of pre-recorded speech or music) with all speakers and related equipment that, in total, yield up to 123 dBA sound power level [e.g., based upon operation of one Mackie "Thump Go" 200-watt speaker at maximum setting or comparable acoustic energy from a distributed speaker set] from the Town Square event venue stage area.

- **Typical Nighttime Conditions During Nighttime or "Non-Business Hours"** (i.e., between 9:00 p.m. and 7:00 a.m. on Sundays through Thursdays, and between 10:00 p.m. and 7:00 a.m. on Fridays and Saturdays): This includes steady-state noise emission from operating outdoor-exposed building HVAC (anticipated rooftop AHU fans and ACC units for only residential buildings on site). The assessment assumes that major noise-producing mechanical equipment serving non-residential buildings would not be operating during these non-business hours, since such equipment is typically set to operate only when such structures are occupied or a short duration prior to occupancy to correct for interior temperature drift. Therefore, these HVAC systems would not generate noise during these periods. No in-progress Town Square event (per the preceding scenario) would occur during these nighttime hours.

- **Typical Nighttime Conditions with Occupied Theater:** This is the same as the "typical nighttime conditions" scenario above, but includes operation of rooftop HVAC systems associated with the onsite theater—should it be operating and occupied during final showings on a given night after 10:00 p.m.—as being a representative example (and the likely acoustically dominant one, given its anticipated larger and/or greater quantities of rooftop HVAC equipment) of the potential for some on-site commercial establishment (e.g., restaurant) operating after 10:00 p.m.

Figures showing a graphical representation of stationary noise impacts for each phase discussed below are presented in the Noise and Vibration Technical Report. Predicted project stationary equipment operation sound levels are depicted across a horizontal plane approximately 5 feet above grade (i.e., a typical pedestrian listening elevation).

Additionally, for each phase, the analysis below presents both the existing or pre-project baseline L_{dn} values at the four nearest off-site receptors and the project operations L_{dn} values derived from the predicted hourly noise levels for four cases representing the product of two pairs of possible conditions: with and without the Town Square Event in progress, and with and without the theater operating during a nighttime hour (i.e., after 10:00 p.m.).

Phase 1 Impacts. Table 4.12.N presents the predicted noise exposure levels during Phase 1 (expressed as hourly L_{eq} values) attributed to project on-site stationary sources (i.e., rooftop HVAC and parking areas) at the four representative nearest off-site receptors for each of the five studied scenarios. The hourly noise levels are modeled to determine if hourly operations are consistent with the municipal code noise standards.

Table 4.12.N: Predicted Hourly Project Stationary Source Noise Levels to Off-Site Receptors, Phase 1

Studied Scenario	Project Hourly Noise Level (dBA L_{eq})			
	AlmaVia of San Rafael (ST-1)	Nova Albion Way (ST-2)	Quail Townhouses (ST-3)	Villa Martin (ST-4)
Daytime	39	39	40	38
Daytime with Town Square Event in Progress	39	39	40	38
Daytime with Town Square Event with Sound Reinforcement[1]	45	49	58	56
Nighttime	38	38	37	34
Nighttime with Theater Operations	38	38	38	36

Source: Northgate Town Square Project Noise and Vibration Technical Report (Dudek 2023).

[1] Added here for informational purposes, since such sound reinforcement is subject to Section 8.13.050.C of the City of San Rafael's noise ordinance, not the exterior noise limits appearing in Table 4.12.E.

dBA = A-weighted decibels

L_{eq} = equivalent continuous sound level

Table 4.12.O presents daily noise levels assessment for the with and without the Town Square event in progress and with and without the theater operating during a nighttime hour. The daily noise levels are modeled to determine if daily operations would result in a significant noise increase over ambient noise conditions.

As presented above, all predicted daytime hourly noise levels at the four nearest representative offsite receptor locations as presented in Table 4.12.N are less than the City's 50 dBA L_{eq} threshold. At night, when operating HVAC systems and parking garage activities associated with the non-residential land uses are not contributing to the aggregate noise emission, predicted operation noise levels shown in Table 4.12.N do not exceed the City's 40 dBA hourly L_{eq} threshold and would therefore comply with City's noise ordinance. When the theater may be occupied during a nighttime hour and thus contributes its rooftop HVAC noise to the nighttime operation scenario, the predicted levels are still compliant with the City's noise ordinance.

Table 4.12.O: Predicted Daily Project Stationary Source Noise Levels to Off-Site Receptors, Phase 1

Studied Scenario	Project Hourly Noise Level (dBA L_{dn})			
	AlmaVia of San Rafael (ST-1)	Nova Albion Way (ST-2)	Quail Townhouses (ST-3)	Villa Martin (ST-4)
Existing Daily Noise Level[1]	62.9	63.8	53.1	48.2
Daytime w/o Town Square Event and Nighttime w/o Theater Operations	44.6	44.6	44.4	40.9
Daytime with Town Square Event and Nighttime w/o Theater Operations	44.9	45.5	49.3	46.8
Daytime w/o Town Square Event and Nighttime with Theater Operations	44.6	44.7	44.5	41.4
Daytime with Town Square Event and Nighttime with Theater Operations	44.9	45.5	49.4	47.0

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).

[1] These L_{dn} values are derived from the baseline outdoor sound level measurement survey, by comparing the measured L_{eq} during concurrent time frames among the ST1, ST2, ST3, and ST4 survey positions and the LT1 location and assume that these arithmetic decibel differences would—if largely attributed to ambient roadway traffic noise—correspondingly be consistent for each hour during the course of a 24-hour period and thus be a similar decibel add or reduction to the LT1 calculated L_{dn} of 59.3 dBA.

dBA = A-weighted decibels
L_{dn} = day-night average level
L_{eq} = equivalent continuous sound level

The predicted hourly L_{eq} values due to sound reinforcement (i.e., speakers) during a Town Square event are presented for informational purposes in Table 4.12.N, since such events are exempt from daytime and nighttime exterior noise thresholds presented in Table 4.12.E. The noise emission from the sound reinforcement systems at the Town Center stage area would be compliant with the 80 dBA L_{max} limit at a distance of 50 feet from the project site boundary, and thus compliant with Section 8.13.050.C of the City's municipal code.

With respect to the City's General Plan Noise Element expectation of no more than a 3 dB increase to the pre-existing L_{dn} value, the calculated L_{dn} values for the Phase 1 scenarios shown in Table 4.12.O are all less than the existing L_{dn} values for the four studied off-site receptors and would make no more than a 3 dB change to the existing L_{dn} values. For purposes of this L_{dn} calculation and value comparison with non-project conditions, the sound from the Town Square event in progress is included (i.e., both spectator speech and from the speech/music reinforcement systems at the stage) and expected to last no more than 2 hours. Additionally, the theater is anticipated to operate for up to 2 hours at night when that condition occurs.

Given the above, Phase 1 of the proposed project would not result in a temporary increase in operational noise that exceeds the City's established thresholds, and this impact would be **less than significant**.

Phase 2 Impacts. Table 4.12.P presents the predicted noise exposure levels during Phase 2 (expressed as hourly L_{eq} values) attributed to project onsite stationary sources (i.e., rooftop HVAC and parking areas) at the four representative nearest offsite receptors for each of the five studied scenarios. The hourly noise levels are modeled to determine if hourly operations are consistent with the municipal code noise standards.

Table 4.12.P: Predicted Hourly Project Stationary Source Noise Levels to Off-Site Receptors, Phase 2

Studied Scenario	Project Hourly Noise Level (dBA L_{eq})			
	AlmaVia of San Rafael (ST-1)	Nova Albion Way (ST-2)	Quail Townhouses (ST-3)	Villa Martin (ST-4)
Daytime	39	39	41	39
Daytime with Town Square Event in progress	39	39	41	39
Daytime with Town Square Event with Sound Reinforcement[1]	44	49	57	56
Nighttime	38	38	40	37
Nighttime with Theater Operations	39	39	40	38

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).

[1] Added here for informational purposes, since such sound reinforcement is subject to Section 8.13.050.C of the City of San Rafael's noise ordinance, not the exterior noise limits appearing in Table 4.12.E.

dBA = A-weighted decibels

L_{eq} = equivalent continuous sound level

Table 4.12.Q presents a daily noise level assessment for the with and without the Town Square event in progress and with and without the theater operating during nighttime hour scenarios. The daily noise levels are modeled to determine whether daily operations would result in a significant noise increase over ambient noise conditions.

Table 4.12.Q: Predicted Daily Project Stationary Source Noise Levels to Off-Site Receptors, Phase 2

Studied Scenario	Project Hourly Noise Level (dBA L_{dn})			
	AlmaVia of San Rafael (ST-1)	Nova Albion Way (ST-2)	Quail Townhouses (ST-3)	Villa Martin (ST-4)
Existing Daily Noise Level[1]	62.9	63.8	53.1	48.2
Daytime w/o Town Square Event and Nighttime w/o Theater Operations	44.9	45.0	46.6	43.7
Daytime with Town Square Event and Nighttime w/o Theater Operations	45.1	45.8	49.3	47.3
Daytime w/o Town Square Event and Nighttime with Theater Operations	44.9	45.0	46.7	43.9
Daytime with Town Square Event and Nighttime with Theater Operations	45.1	45.8	49.4	47.4

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).

[1] These L_{dn} values are derived from the baseline outdoor sound level measurement survey, by comparing the measured L_{eq} during concurrent time frames among the ST1, ST2, ST3, and ST4 survey positions and the LT1 location and assume that these arithmetic decibel differences would—if largely attributed to ambient roadway traffic noise—correspondingly be consistent for each hour during the course of a 24-hour period and thus be a similar decibel add or reduction to the LT1 calculated L_{dn} of 59.3 dBA.

dBA = A-weighted decibels

L_{dn} = day-night average level

L_{eq} = equivalent continuous sound level

As presented above, all predicted daytime hourly noise levels at the four nearest representative off-site receptor locations as presented in Table 4.12.O are less than the City's 50 dBA L_{eq} threshold. At night, when operating HVAC systems and parking garage activities associated with the non-residential land uses are not contributing to the aggregate noise emission, predicted operation noise levels shown in Table 4.12.O do not exceed the City's 40 dBA hourly L_{eq} threshold and would therefore comply with the City's noise ordinance. When the theater may be occupied during a nighttime hour and thus contributes its rooftop HVAC noise to the nighttime operation scenario, the predicted levels are still compliant with the City's noise ordinance.

The predicted hourly L_{eq} values due to sound reinforcement (i.e., speakers) during a Town Square event are presented for informational purposes in Table 4.12.O, since such events are exempt from the daytime and nighttime exterior noise thresholds presented in Table 4.12.E. The noise emissions from the sound reinforcement systems at the Town Center stage area would be compliant with the 80 dBA L_{max} limit at a distance of 50 feet from the project site boundary, and thus compliant with Section 8.13.050.C of the City's municipal code.

With respect to the City's General Plan Noise Element requirement of no more than a 3 dB increase to the pre-existing L_{dn} value, the calculated L_{dn} values for the Phase 2 scenarios shown in Table 4.12.P are all less than the existing L_{dn} values for the four studied off-site receptors and would make no more than a 3 dB change to the existing L_{dn} values. For purposes of this L_{dn} calculation and value comparison with non-project conditions, the sound from the Town Square event in progress is included (i.e., both spectator speech and from the speech/music reinforcement systems at the stage) and expected to last no more than 2 hours. Additionally, the theater is anticipated to operate for up to 2 hours at night when that condition occurs.

Given the above, Phase 2 of the proposed project would not result in a temporary increase in operational noise to surrounding off-site receptors that exceeds the City's established thresholds, and this impact would be **less than significant**.

On-Site Stationary Noise Impacts to New Sensitive Receptors. Sequential implementation of Phases 1 and 2 would introduce new residential-type noise-sensitive receptors on the project site. Operation of Phase 2 of the project would include a mix of both residential and commercial uses, and these new uses could adversely affect the nighttime noise environment for the Phase 1 and 2 sensitive receptors. This is a potentially significant impact.

Impact NOI-2 Operation period noise levels would exceed the City's land use compatibility thresholds for future on-site sensitive receptors. (S)

Utilizing the same methodology as presented under Threshold 4.12.1, Table 4.12.R presents the predicted hourly L_{eq} noise exposure levels attributed to project stationary sources at nine sample on-site receptors for each of the five studied Phase 1 scenarios: daytime, daytime with a Town Square Event, Town Square Event Sound Speakers (informational only), nighttime, and nighttime with theater operations. Figures within the Technical Report provide an illustration of predicted project stationary equipment operation sound levels across a horizontal plane approximately 5 feet above grade (i.e., a typical pedestrian listening elevation).

Table 4.12.R: Predicted Phase 1 Project Operational Noise Levels at On-Site Noise Sensitive Receptors

On-Site Sensitive Receptor	Hourly Stationary Noise Levels (dBA L_{eq})				
	Daytime	Daytime with Town Square Event	Town Square Event Sound Speakers	Nighttime	Nighttime with Occupied Cinema
Residential Parcel 1 - upper floor, northern (RP1N)	47.1	47.1	62.8	44.8	46.4
Residential Parcel 1 - upper floor, southern (RP1S)	42.8	42.8	53.1	41.4	41.4
Residential Parcel 2 - upper floor, townhome #11 (RP2B11)	44.3	44.3	56.1	40.0	42.7
Residential Parcel 2 - upper floor, townhome #13 (RP2B13)	45.0	45.1	60.1	42.3	43.9
Residential Parcel 2 - upper floor, townhome #3 (RP2B3)	39.4	39.4	46.6	39.2	39.3
Residential Parcel 3 - upper floor northern (RP3N)	46.6	46.6	55.7	46.2	46.2
Residential Parcel 3 - upper floor southern (RP3S)	43.9	43.9	52.7	43.9	43.9
Residential Parcel 4 - upper floor eastern (RP4E)	48.5	48.6	58.8	48.4	48.5
Residential Parcel 4 - upper floor western (RP4W)	51.2	51.7	75.5	45.3	50.0

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

The results indicate that all daytime sound levels at representative upper-floor, on-site receptor locations listed in Table 4.12.R comply with the City's 55 dBA threshold for "constant" type sounds as received by mixed-use land uses. Noise from daytime amplified Town Square events would exceed 55 dBA L_{eq} at five of the on-site receptors but do not exceed the significance threshold due to the City's exemption of these noise sources from its general 55 dBA L_{eq} threshold. At night, predicted operation noise levels received by four on-site mixed-use land uses slightly exceed the City's 45 dBA hourly L_{eq} threshold and would therefore not comply with the City's noise ordinance without some applied noise reduction or other project design feature. For these reasons, there is a need for noise reduction of on-site outdoor-exposed HVAC systems, subsurface parking level ventilation systems, and/or at or above-grade exposed parking areas. Nevertheless, such noise reduction methods, further detailed below as part of the on-site noise compliance requirements, may not be sufficient to attain these predicted noise reduction needs at all of these affected future on-site residential receptors. The loudest sound levels from Town Square speakers during an event are predicted to be less than 80 dBA and would thus be considered compliant with Section 8.13.050.C from the City's exterior noise level exception as it applies to such sound reinforcement systems.

Table 4.12.S presents the predicted hourly L_{eq} noise exposure levels attributed to project stationary sources at 15 sample on-site receptors for each of the five studied Phase 2, scenarios: daytime, daytime with a Town Square Event, Town Square Event Sound Speakers (informational only), nighttime, and nighttime with theater operations. Figures within the Technical Report provide an illustration of predicted project stationary equipment operation sound levels across a horizontal plane approximately 5 feet above grade (i.e., a typical pedestrian listening elevation).

Table 4.12.S: Predicted Phase 2 Project Operational Noise Levels at On-Site Noise Sensitive Receptors

On-site Sensitive Receptor	Hourly Stationary Noise Levels (dBA L_{eq})				
	Daytime	Daytime with Town Square Event	Town Square Event Sound Speakers	Nighttime	Nighttime with Occupied Cinema
Residential Parcel 1 - upper floor, northern (RP1N)	47.5	47.5	62.8	45.8	47.2
Residential Parcel 1 - upper floor, southern (RP1S)	43.6	43.6	53.1	43.3	43.4
Residential Parcel 2 - upper floor, townhome #11 (RP2B11)	44.0	44.0	56.1	41.0	43.3
Residential Parcel 2 - upper floor, townhome #13 (RP2B13)	44.6	44.7	59.9	42.5	44.0
Residential Parcel 2 – upper floor, townhome #3 (RP2B3)	39.4	39.4	46.0	39.3	39.3
Residential Parcel 3 – upper floor northern (RP3N)	46.4	46.4	56.5	46.4	46.4
Residential Parcel 3 – upper floor southern (RP3S)	43.9	43.9	46.4	43.9	43.9
Residential Parcel 4 – upper floor eastern (RP4E)	48.7	48.7	57.1	48.6	48.6
Residential Parcel 4 – upper floor western (RP4W)	51.1	51.6	75.3	46.2	50.3
Residential Parcel 5 – upper floor eastern (RP5E)	50.0	50.0	57.4	49.9	49.9
Residential Parcel 5 – upper floor northern (RP5N)	47.8	47.8	51.7	46.1	46.1
Residential Parcel 5 – upper floor western (RP5W)	48.2	49.2	74.5	43.9	44.8
Residential Parcel 6 – upper floor northern (RP6N)	48.8	49.1	73.8	44.9	46.5
Residential Parcel 6 – upper floor western (RP6W)	43.3	43.3	51.8	42.4	43.1
Residential Parcel 6 – upper floor southern (RP6S)	48.4	48.6	72.6	44.8	47.8

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

The results indicate that all daytime sound levels at representative upper-floor on-site receptor locations listed in Table 4.12.S comply with the City's 55 dBA threshold for "constant" type sounds as received by mixed-use land uses. At night, predicted operation noise levels received by six on-site mixed-use land uses for the nighttime condition and eight on-site mixed-use land uses for the nighttime with occupied cinema conditions slightly exceed the City's 45 dBA hourly L_{eq} threshold and would therefore not comply with the City's noise ordinance without some applied noise reduction or other project design feature. For these reasons, there is a need for noise reduction of on-site outdoor-exposed HVAC systems, subsurface parking level ventilation systems, and/or at or above-grade exposed parking areas. Nevertheless, such noise reduction methods, further detailed below as part of the on-site noise compliance requirements, may not be sufficient to attain these predicted noise reduction needs at all of these affected future on-site residential receptors. The loudest sound levels from Town Square speakers during an event are predicted to be less than 80 dBA and would thus be considered compliant with Section 8.13.050.C from the City's exterior noise level exception as it applies to such sound reinforcement systems.

Given that Phase 1 and 2 project operations would exceed the City's land use compatibility thresholds for future on-site sensitive receptors, the following Mitigation Measure NOI-2 should be incorporated into the proposed project design to reduce operational noise effects to on-site sensitive receptors to the extent feasible.

Mitigation Measure NOI-2

On-Site Noise Compliance Requirements. Prior to City approval of building permits, the project sponsor shall include in construction documents for City review building operation noise control and sound abatement features or considerations for stationary equipment during nighttime hours. The documentation shall include at least the following:

- Equipment sound emission data (or sufficient engineering data from the manufacturer of equipment model[s]);
- Architectural renderings and details depicting roof parapets, screens, walls, or other barriers that may directly or indirectly occlude, reflect, and/or absorb equipment noise emissions—conveyed via airflows or via vibrating equipment casings or enclosures; and
- Incorporation of dissipative duct silencers, shrouds, covers, acoustical louvers, acoustically lined ductwork, and other means to help attenuate noise from fans, pumps, compressors, and other equipment featuring reciprocating or revolving components.

The documentation shall demonstrate whether these measures, or any additional feasible mitigation measures, will reduce the sound level to below the established 55 dBA L_{eq} daytime and 45 dBA L_{eq} thresholds for on-site sensitive receptors. After City approval, information on subsequent project design changes, equipment selections, or construction alterations that substantially deviate from these noise control and/or sound abatement details appearing in the construction documents must be reviewed by a qualified acoustician and provided to the City with respect to expected sufficiency of expected conformance with applicable City noise thresholds or as otherwise approved by the City. (SU)

Given it is not possible to confirm that noise levels would absolutely be below the applicable City's established thresholds, this impact would be **significant and unavoidable**.

Threshold 4.12.2: Construction Vibration Impacts. Ground-borne vibration attenuates rapidly, even over short distances. The attenuation of ground-borne vibration as it spreads from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA and Caltrans guidance. To examine potential building damage risk and potential vibration

annoyance, vibration levels were calculated using formulas found in Section 3.1 of the Technical Report. Phase 1 and 2 impacts are discussed below.

Phase 1 Impacts. Table 4.12.T shows the approximate distances between the studied receptor position and an anticipated nearest location of construction equipment, the PPV of construction vibration, and the vibration velocity (VdB) for three sets of assumed equipment.

Table 4.12.T: Predicted Construction Vibration Levels to Off-Site Receptors, Phase 1

Receptor	Anticipated Closest Distance (feet)	Predicted PPV (in/sec) and VdB (rms) for Indicated Equipment Type					
		Hoe-Ram[1] (during SDEMO phase); Caisson Drilling[2] (during BLDGE phase)		Dozer, Grader, Scraper[3] (during SPREP or SGRAD phases)		Roller[4] (during FROAD phase)	
		PPV	VdB	PPV	VdB	PPV	VdB
RND1 (AlmaVia of San Rafael)	157	0.006	63	0.006	63	0.013	70
RSA1 (Sao Augustine Way)	172	0.005	62	0.005	62	0.011	69
RSA2 (Sao Augustine Way)	162	0.005	63	0.005	63	0.013	70
RSA3 (Sao Augustine Way)	193	0.004	60	0.004	60	0.010	68
RNA1 (Nova Albion Way)	172	0.005	62	0.005	62	0.011	69
RLP1 (La Perdiz Court)	412	0.001	50	0.001	50	0.003	58
RLP2 (La Perdiz Court)	298	0.002	55	0.002	55	0.005	62

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
[1] Expected to operate during the Site Demolition phase (SDEMO)
[2] Expected to operate for ground improvements and foundations during the Building Erection phase (BLDGE)
[3] Expected to operate during the Site Preparation or Grading phases (SPREP or SGRAD)
[4] Expected to operate during the Final Roads phase (FROAD)
in/sec = inches per second
PPV = peak particle velocity
rms = root mean square
VdB = vibration velocity decibels

All predicted vibration levels are lower than the occupant annoyance threshold of 72 VdB, and lower than the building damage risk threshold of 0.2 in/sec PPV. On the basis of compliance with these City-adopted vibration standards, impacts associated with construction vibration would be **less than significant**.

Phase 2 Impacts. Table 4.12.U shows the approximate distances between the on-site studied receptor position and an anticipated nearest location of construction equipment, the PPV of construction vibration, and the vibration velocity (VdB) for three sets of assumed equipment.

All predicted vibration levels are lower than the occupant annoyance threshold of 72 VdB, and lower than the building damage risk threshold of 0.2 in/sec PPV. On the basis of compliance with these City-adopted vibration standards, impacts associated with construction vibration would be **less than significant**.

Table 4.12.U: Predicted Construction Vibration Levels to On-Site Receptors, Phase 2

Receptor	Anticipated Closest Distance (feet)	Predicted PPV (in/sec) and VdB (rms) for Indicated Equipment Type					
		Hoe-Ram[1] (during SDEMO phase); Caisson Drilling[2] (during BLDGE phase)		Dozer, Grader, Scraper[3] (during SPREP or SGRAD phases)		Roller[4] (during FROAD phase)	
		PPV	VdB	PPV	VdB	PPV	VdB
Residential Parcel 1, northern unit facade	360	0.001	48[5]	0.001	48[5]	0.002	56[5]
Residential Parcel 4, northern unit facade	100	0.007	65[5]	0.007	65[5]	0.016	72[5]

Source: *Northgate Town Square Project Noise and Vibration Technical Report* (Dudek 2023).
1 Expected to operate during the Site Demolition phase (SDEMO)
2 Expected to operate for ground improvements and foundations during the Building Erection phase (BLDGE)
3 Expected to operate during the Site Preparation or Grading phases (SPREP or SGRAD)
4 Expected to operate during the Final Roads phase (FROAD)
5 Includes net coupling loss of -4 VdB (-10 loss, but +6 for floor resonance amplification) for multi-story masonry buildings
in/sec = inches per second
PPV = peak particle velocity
rms = root mean square
VdB = vibration velocity decibels

Threshold 4.12.3: Proximity to an Airport. Although the project site is less than 2 miles southwest of the San Rafael Airport[12], the 55 dBA L_{dn} contour is over 4,000 feet northeast of the project site. Aviation noise exposures from this facility would be less than 65 dBA L_{dn}. The nearest public airport to the project site is the Marin County Airport at Gnoss Field in Novato, approximately 9 miles to the north. The project site is not located within the land use plan area for the Marin County Airport at Gnoss Field.[13] Similarly, the project is over 23 miles northwest of the nearest 65 dBA L_{dn} aviation noise contour of the Oakland International Airport[14] and over 25 miles beyond the nearest San Francisco International Airport[15] 65 dBA L_{dn} contour.

Therefore, new occupants, workers, and visitors to the proposed project would not be exposed to excessive aviation noise levels, and there would be **no impact**.

4.12.2.3 Cumulative Impacts

As explained above, both noise and vibration are localized impacts. For construction noise and vibration impacts, the only relevant cumulative projects would be probable future projects near the project site that are anticipated to be under construction at the same time as the project. The City's review of potential cumulative projects has not identified any projects that meet these criteria. Accordingly, the project would not contribute to any significant cumulative construction noise or vibration impact. The City's General Plan determined that construction period noise impacts associated with future development occurring under General Plan buildout would be less than

12 City of San Rafael. 2009. *San Rafael Airport Recreational Facility, Draft Environmental Impact Report*. SCH No. 2006012125. March.
13 Cortright & Seibold. 1991. *Airport Land Use Plan, Marin County Airport Gnoss Field*. June 10.
14 Port of Oakland. 2016. *2016 Oakland International Airport Master Plan,* Figure 6.17.
15 San Francisco International Airport (SFIA). 2015. *14 CFR Part 150 Noise Exposure Map Report*, Exhibit 5-1. August.

significant with required compliance with General Plan policies and municipal code standards, or with implementation of project-specific noise reduction requirements such as those identified for the proposed project in Mitigation Measure NOI-1. Future projects that could be under construction in the vicinity of the project site as part of General Plan implementation would undergo separate evaluation and potential environmental review and would be required to consider the proposed project in the cumulative assumptions and analyses to ensure that cumulative construction period impacts would not occur.

Regarding operational noise, the City similarly has not identified any potential cumulative projects in the vicinity of the project site that could contribute to a cumulative stationary source or traffic noise impact. Potential impacts of generalized future traffic growth identified in the General Plan in combination with the project are already captured by the off-site traffic analysis in Section 4.12.2 above. Accordingly, the project would not contribute to any significant cumulative noise impact during project operations.

Therefore, the proposed project would not contribute to a cumulatively considerable noise-related effect, and this impact would be **less than significant**.

4.12.2.4 Non-CEQA Land Use Compatibility Assessment

As identified above in Section 4.12.2.4, per the California Supreme Court in its *California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)* decision, the potential exposure of proposed future project occupants to existing off-site conditions such as traffic noise is not a CEQA concern and is presented here only for informational purposes.

On-Site Traffic Noise. Sequential implementation of Phases 1 and 2 would introduce new residential-type, noise-sensitive receptors on the project site near all four of the Northgate Drive roadway segments. Several newly occupied units in the upper floors of project buildings associated with Residential Parcels 1, 2, 3, and 6 would have exterior façades or, in some cases, usable outdoor spaces located as horizontally close as 50 feet to the Northgate Drive roadway centerline. Estimated traffic noise level exposures, in terms of L_{dn} value, from Northgate Drive would thus be comparable to the values in the off-site traffic assessment tables above. More specifically, the "Future + Phase 2" L_{dn} values at 50 feet for the Northgate Drive segments range from 62.9 to 64.0 L_{dn}.

As shown in Section 4.12.1.4., Program N-1.1A Residential Noise Standards from the City's General Plan guidance expects maintenance of a maximum noise standard of 70 L_{dn} for backyards, decks, and common/usable outdoor spaces in residential and mixed-use areas. This City planning standard means that the predicted traffic noise exposure levels of 62.9 to 64.0 L_{dn} at the nearest receiving on-site residences would be compliant.

Sequential implementation of Phases 1 and 2 would also introduce new residential-type receptors on the project site near Las Gallinas Avenue segments between Del Presidio and Merrydale Road, Merrydale Road, and Northgate Drive. Several newly-occupied units in the upper floors of project buildings associated with Residential Parcels 3, 4, and 5 would have exterior façades or, in some cases, usable outdoor spaces located as horizontally close as 50 feet to the Las Gallinas Avenue roadway centerline. Estimated traffic noise level exposures, in terms of L_{dn} value, from Las Gallinas

Avenue at this distance range between 63.5 dBA L_{dn} and 63.9 dBA L_{dn} and would thus be below the City's General Plan guidance standard of 70 L_{dn} for backyards, decks, and common/usable outdoor spaces in residential and mixed-use areas and correspondingly compliant.

Upper-floor occupied units of the Residential Parcel 5 building with eastern exteriors facing US-101 would be exposed to its traffic noise levels, which are estimated to be 69.5 dBA L_{dn} and thus also compliant with the City's 70 dBA L_{dn} standard for compatibility.

As indicated in the City's Noise Compatibility Guidelines, proposed multi-family residential development exposed to exterior noise levels ranging from 65 to 70 dBA L_{dn} would be considered "conditionally acceptable" and "conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice" with respect to ensuring a provided ambient interior sound level of 45 dBA L_{dn} for such inhabited spaces. Proposed project residential units include such building shell components and interior comfort mechanical systems.

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