4.4 NOISE

4.4.1 INTRODUCTION

The Noise section of the EIR describes the existing noise environment in the project vicinity and identifies potential impacts and mitigation measures related to the noise associated with construction and operation of the proposed project. The method by which the potential impacts are analyzed is discussed, followed by the identification of impacts and recommended mitigation measures designed to reduce significant noise impacts to less-than-significant levels, if required. The Noise section is primarily based on the Environmental Noise Assessment prepared for the proposed project by j.c. brennan & associates, Inc. (see Appendix G),[1] as well as the Davis General Plan[2] and associated EIR.[3]

4.4.2 EXISTING ENVIRONMENTAL SETTING

The Existing Environmental Setting section provides background information on noise and vibration, a discussion of acoustical terminology and the effects of noise on people, existing sensitive receptors in the project vicinity, existing sources and noise levels in the project vicinity, and groundborne vibration.

Fundamentals of Acoustics

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

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

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

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels,

1 j.c. brennan & associates, Inc. *Environmental Noise Assessment University Commons DEIR.* May 10, 2019.
2 City of Davis. *Davis General Plan.* Adopted May 2001. Amended through January 2007.
3 City of Davis. *Program EIR for the City of Davis General Plan Update and Project EIR for Establishment of a New Junior High School*. January 2000.

perception of loudness is relatively predictable, and can be approximated by A-weighted sound levels. A strong correlation exists between A-weighted sound levels and the way the human ear perceives sound. Accordingly, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound. In addition, because of the logarithmic nature of the decibel scale, provided two sources of noise differ in intensity by at least 10 dB, their noise would not be additive. Two noise levels differing by 10 dB, which are added together, essentially equal the higher of the two noise levels.

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

The day/night average noise level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 PM to 7:00 AM) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, L_{dn} tends to disguise short-term variations in the noise environment. Figure 4.4-1 presents a list of several examples of the noise levels associated with common activities.

Effects of Noise on People

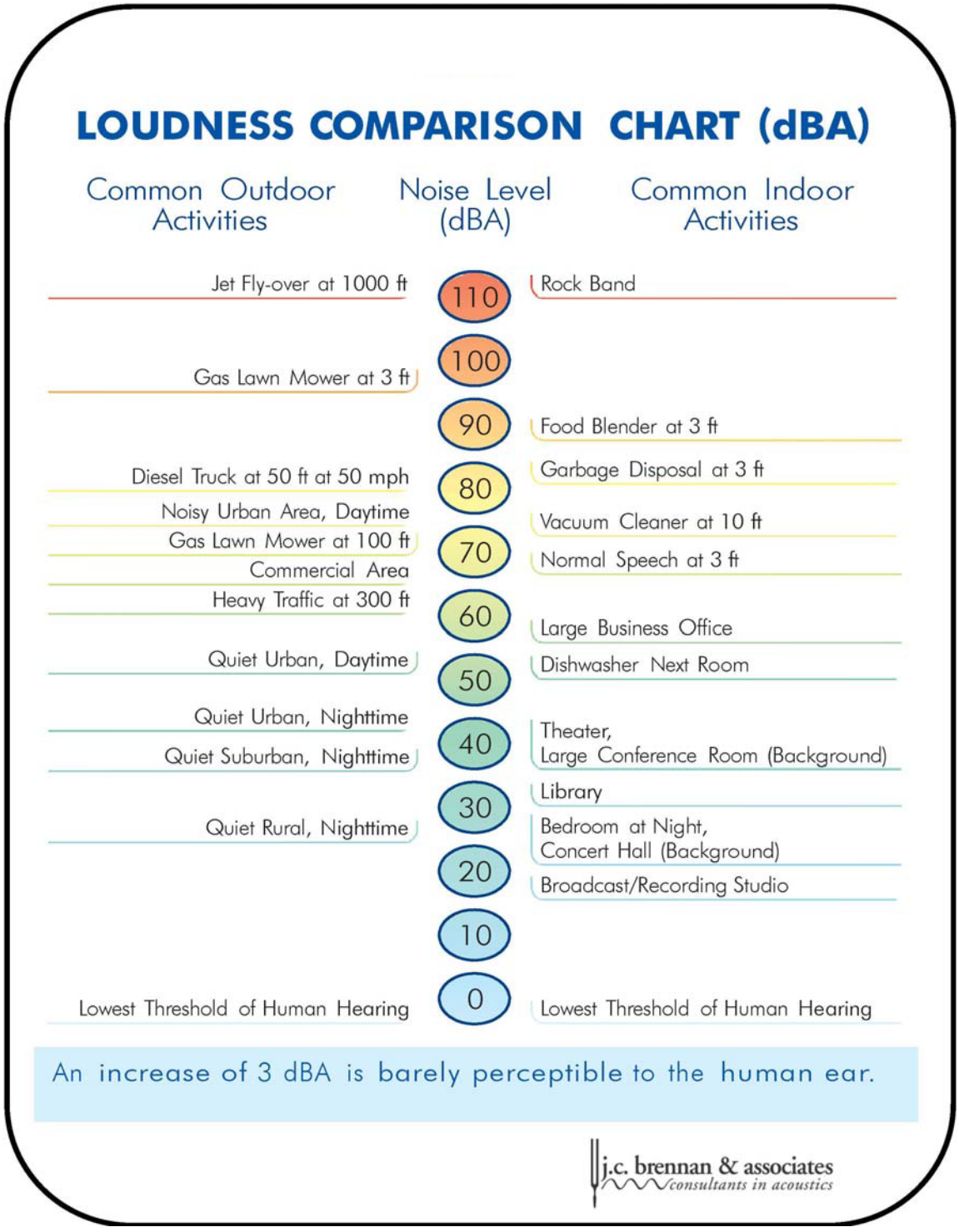
The effects of noise on people can be placed in three categories:

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

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. A satisfactory way of measuring the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction does not exist. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

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

Figure 4.4-1
Loudness Comparison Chart



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

- Except in carefully controlled laboratory experiments, a change of 1.0 dB cannot be perceived;
- Outside of the laboratory, a 3.0 dB change is considered a barely perceivable difference;
- A change in level of at least 5.0 dB is required before any noticeable change in human response would be expected; and
- A 10 dB change is subjectively heard as approximately a doubling in loudness, and would typically cause an adverse response.

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

Existing Sensitive Receptors

Certain land uses are more sensitive to ambient noise levels than others due to the amount of noise exposure (in terms of both exposure time and shielding from noise sources) and the type of activities typically involved. Noise sensitive land uses typically include residences, schools, churches, child care centers, hospitals, long-term health care facilities, convalescent centers, retirement homes, and recreation areas.

In the immediate vicinity of the project site, sensitive land uses include the Sycamore Lane Apartments, located approximately 50 feet north of the site, single-family residences located east of the site, across Anderson Road, the University Court Apartments located across Sycamore Lane to the west of the site, and the Davis Chinese Christian Church located across Anderson Road to the east of the site.

Existing Noise Sources and Ambient Noise Levels

To quantify existing ambient noise levels in the immediate project vicinity, j.c. brennan & associates, Inc. conducted five short-term noise level measurements and one continuous 24-hour noise level measurement on the project site. The locations of the noise measurement sites are shown in Figure 4.4-2. The ambient noise levels are presented in Table 4.4-1. The maximum value (L_{max}) represents the highest noise level measured during an interval. The average value (L_{eq}) represents the energy average of all of the noise measured during an interval. The median value (L_{50}) represents the sound level exceeded 50 percent of the time during an interval.

Based on field observations and noise measurement data described above, the existing noise environment at the project site is defined by roadway traffic and noise sources associated with the existing commercial uses.

Figure 4.4-2
Noise Measurement Locations

Source: j.c. brennan & associates, Inc., 2019.

Table 4.4-1
Measured Ambient Noise Levels

Site	Location	L_{dn}	Average Measured Hourly Noise Levels (dBA)					
			Daytime (7AM–10PM)			Nighttime (10PM–7AM)		
			L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Long-Term Noise Level Measurements								
A	West portion of the Project Site	60.8	57.6	53.1	79.6	53.5	47.4	69.6
Short-Term Noise Level Measurements								
Site	**Location**	**Time**	L_{eq}	L_{50}	L_{max}	**Notes**		
1	Southwest on-site	12:00 PM	63.3	58.7	77.2	Roadway Traffic/Parking Lot Activity		
2	South-central on-site	12:20 PM	58.6	55.1	70.8	Some Roadway Traffic/Parking Lot Activity		
3	Eastern on-site	12:50 PM	56.7	55.0	68.6	Anderson Road Traffic		
4	Northeastern on-site	1:20 PM	50.4	49.7	60.8	Roadway Traffic		
5	Northwestern on-site	2:00 PM	53.2	51.2	64.0	Traffic on Sycamore		

Source: j.c. brennan & associates, Inc., 2019.

Existing Traffic Noise Levels

Traffic volumes for existing conditions were obtained from the project traffic consultant. Truck percentages and vehicle speeds on the local area roadways were estimated from field observations. Traffic noise levels are generally predicted at 75 feet from the centerline along each project-area roadway segment. Sensitive receptors may be located at distances which vary from the assumed calculation distance and may experience shielding from intervening barriers or sound walls. However, the traffic noise analysis is believed to be representative of the majority of sensitive receptors located closest to the project-area roadway segments analyzed in the Environmental Noise Assessment.

Table 4.4-2 presents the existing traffic noise levels in terms of L_{dn} along each roadway segment, as well as the distances to existing traffic noise contours. Appendix G to this EIR provides details regarding the Federal Highway Administration (FHWA) modeling, including the complete inputs and results. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported are generally considered to be conservative estimates of noise exposure along the project-area roadways.

Vibration

While vibration is similar to noise, both involving a source, a transmission path, and a receiver, vibration differs from noise because noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration depends on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Table 4.4-2
Existing Traffic Noise Levels and Distances to Contours

Roadway	Segment	L_{dn}, dBA[1]	Contour Noise Levels (L_{dn}, dBA)[1]			
			Distance (feet)[1]	Distance to Contours (feet)[2]		
				70 dB	65 dB	60 dB
Russell Boulevard	West of Arthur Street	66	75	39	83	179
Russell Boulevard	Arthur Street to SR 113	67	75	46	100	215
Russell Boulevard	SR 113 to Orchard Park	67	75	51	109	236
Russell Boulevard	Orchard Park to Sycamore Lane	68	75	51	111	238
Russell Boulevard	Sycamore Lane to Project Driveways	67	75	45	97	209
Russell Boulevard	Project Driveways to Anderson Road	68	75	54	117	252
Russell Boulevard	Anderson Road to College Park	68	75	53	115	247
Russell Boulevard	College Park to A Street	68	75	55	119	256
Russell Boulevard	A Street to B Street	68	75	54	116	250
Arthur Street	North of Russell Boulevard	61	75	19	42	90
Orchard Park	South of Russell Boulevard	60	75	15	32	70
Sycamore Lane	Russell Boulevard to S. University Mall Driveway	63	75	27	58	125
Sycamore Lane	S. University Mall Driveway to N. University Mall Driveway	62	75	23	50	107
Sycamore Lane	North of Project Site	62	75	23	50	108
La Rue Road	South of Russell Boulevard	66	75	42	91	197
Anderson Road	Russell Boulevard to Central University Mall Driveways	65	75	35	75	162
Anderson Road	Central University Mall Driveways to N. University Mall Drive	65	75	34	72	156
Anderson Road	North of Project Site	65	75	34	73	156
California Avenue	South of Russell Boulevard	61	75	18	40	85
Oak Avenue	North of Russell Boulevard	58	75	13	27	58
Howard Way	South of Russell Boulevard	63	75	26	56	121
College Park	North of Russell Boulevard	56	75	8	18	39
A Street	South of Russell Boulevard	58	75	12	26	55
A Street	North of Russell Boulevard	55	75	8	17	36
B Street	North of Russell Boulevard	62	75	22	46	100
B Street	South of Russell Boulevard	65	75	37	79	170

Notes:
[1] All calculations of traffic noise levels and distances to contours are relative to the roadway centerlines.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding

Source: j.c. brennan & associates, Inc., 2019.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration levels in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 4.4-3 indicates that the threshold for architectural damage to structures is 0.2 peak particle velocity in inches per second (in/sec p.p.v.) and continuous vibrations of 0.1 in/sec p.p.v., or greater, would likely cause annoyance to sensitive receptors.

Table 4.4-3
Effects of Vibration on People and Buildings

Peak Particle Velocity		Human Reaction	Effect on Buildings
mm/sec	in/sec		
0.15 - 0.30	0.006 - 0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10 - 15	0.4 - 0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage

Source: ***Caltrans. Transportation Related Earthborne Vibrations(Caltrans Experiences) Technical Advisory, Vibration, TAV-04-01-R0201.*** **January 23, 2004.**

4.4.3 REGULATORY CONTEXT

In order to limit exposure to physically and/or psychologically damaging noise levels, the State of California, various county governments, and most municipalities in the State have established standards and ordinances to control noise. The following provides a general overview of the existing regulations that are relevant to the proposed project.

State Regulations

The following are the State environmental laws and policies relevant to noise.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations, establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses, and dwellings other than single-family dwellings.

Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room. Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

Local Regulations

The following are the local environmental goals and policies relevant to noise.

City of Davis General Plan

The applicable goals, policies, and standards from the Noise Element of the Davis General Plan are presented below.

Goal NOISE 1 Maintain community noise levels that meet health guidelines and allow for a high quality of life.

Policy NOISE 1.1 Minimize vehicular and stationary noise sources, and noise emanating from temporary activities.

Standard NOISE 1.1a: The City shall strive to achieve the “normally acceptable” exterior noise levels shown in Table 4.4-4 (Table 19 of the General Plan) and the target interior noise levels in Table 4.4-5 (Table 20 of the General Plan) in future development areas and in currently developed areas.

Standard NOISE 1.1b: New development shall generally be allowed only in areas where exterior and interior noise levels consistent with Table 4.4-4 (Table 19 of the General Plan) and Table 4.4-5 (Table 20 of the General Plan) can be achieved.

Standard NOISE 1.1c: New development and changes in use shall generally be allowed only if they will not adversely impact attainment within the community of the exterior and interior noise standards shown in Table 4.4-4 (Table 19 of the General Plan) and Table 4.4-5 (Table 20 of the General Plan). Cumulative and project specific impacts by new development on existing residential land uses shall be mitigated consistent with the standards in

Table 4.4-4 (Table 19 of the General Plan) and Table 4.4-5 (Table 20 of the General Plan).

Table 4.4-4
Exterior Noise Level Standards

Land Use Category	Community Noise Exposure L_{dn} or CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential	Under 60	60-70[1]	70-75	Above 75
Transient Lodging - Motels, Hotels	Under 60	65-75	75-80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Under 60	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	Under 50	50-70	N/A	Above 70
Sports Arenas, Outdoor Spectator Sports	NA	Under 75	N/A	Above 75
Playgrounds, Neighborhood Parks	Under 70	N/A	70-75	Above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Under 70	N/A	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 65	65-75	Above 75	N/A
Industrial, Manufacturing, Utilities, Agriculture	Under 65	70-80	Above 80	N/A

Notes:

- *Normally Acceptable*: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without special noise insulation requirements.
- *Conditionally Acceptable*: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is conducted, and needed noise attenuation features are included in the construction or development.
- *Normally Unacceptable*: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be conducted and needed noise attenuation features shall be included in the construction or development.
- *Clearly Unacceptable*: New construction or development shall not be undertaken.
- *N/A*: Not applicable.
- The City Council shall have discretion within the "conditionally acceptable" range for residential use to allow levels in outdoor spaces to go up to 65 dBA if cost effective or aesthetically acceptable measures are not available to reduce noise levels in outdoor spaces to the "normally acceptable" levels. Outdoor spaces which are designed for visual use only (for example, street-side landscaping in an apartment project), rather than outdoor use space may be considered acceptable up to 70 dBA.

Source: City of Davis, January 2007.

Table 4.4-5
Interior Noise Level Standards

Use	Noise Level (dBA)
Residences, schools through grade 12, hospitals and churches	45
Offices	55

Source: City of Davis, January 2007.

Standard NOISE 1.1d Required noise mitigation measures for new and existing housing shall be provided with the first stage and prior to completion of new developments or the completion of capacity-enhancing roadway changes wherever noise levels currently exceed or are projected within 5 years to exceed the normally acceptable exterior noise levels in Table 4.4-4 (Table 19 of the General Plan).

Policy NOISE 1.2 Discourage the use of sound walls whenever alternative mitigation measures are feasible, while also facilitating the construction of sound walls where desired by the neighborhood and there is no other way to reduce noise to acceptable exterior levels shown in Table 4.4-4 (Table 19 of the General Plan).

Standard NOISE 1.2a Where sound walls are built, they should include dense landscaping along them to mitigate their visual impact, as illustrated in Figure 38 of the General Plan.

Standard NOISE 1.2b Where sound walls are built, they should provide adequate openings and visibility from surrounding areas to increase safety and access, as illustrated in Figure 38 of the General Plan. Openings should be designed so as to maintain necessary noise attenuation.

Standard NOISE 1.2c Review sound walls and other noise mitigations through the design review process.

Goal NOISE 2 Provide for indoor noise environments that are conducive to living and working.

Policy NOISE 2.1 Take all technically feasible steps to ensure that interior noise levels can be maintained at the levels shown in Table 4.4-5 (Table 20 of the General Plan).

Standard NOISE 2.1a New residential development or construction shall include noise attenuation measures necessary to achieve acceptable interior noise levels shown in Table 4.4-5 (Table 20 of the General Plan).

Standard NOISE 2.1b Existing areas that will be subjected to noise levels greater than the acceptable noise levels shown in Table 4.4-5 (Table 20 of the General Plan) as a result of increased traffic on existing city streets (including streets remaining in existing configurations and streets being widened) shall be mitigated to the acceptable levels in Table 4.4-5 (Table

20 of the General Plan). If traffic increases are caused by specific projects, then the City shall be the lead agency in implementing cumulative noise mitigation projects. Project applicants shall pay their fair share for any mitigation.

City of Davis Noise Ordinance

Section 24 of the City of Davis Municipal Code establishes a maximum noise level standard of 55 dB during the hours of 7:00 AM to 9:00 PM, and 50 dB during the hours of 9:00 PM to 7:00 AM for stationary noise sources. The ordinance defines maximum noise level as the "maximum continuous sound level or repetitive peak level produced by a sound source or group of sources." For the purposes of this analysis, j.c. brennan & associates, Inc. interprets this definition to be equivalent to the average noise level descriptor, L_{eq}. The Municipal Code makes exemptions for certain typical activities which may occur within the City. The exemptions are listed in Article 24.02.040, Special Provisions, and are summarized below:

a) Normal operation of power tools for non-commercial purposes are typically exempted between the hours of 8 AM and 8 PM unless the operation unreasonably disturbs the peace and quiet of any neighborhood.
b) Construction or landscape operations would be exempt during the hours of 7 AM to 7 PM Mondays through Fridays and between the hours of 8 AM to 8 PM Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carried out by employees or contractors of the city and one of the following conditions apply (conditions summarized, please see section 24.02.040 of the City Code for the full text):
    1) No piece of equipment produces a noise level exceeding 83 dBA at 25-feet.
    2) The noise level at any point outside the property plane of the project shall not exceed 86 dBA.
    3) Requires that impact equipment and tools be fitted with the best available silencing equipment.
    4) Limits individual powered blowers to a noise level of 70 dBA at 50 feet.
    5) Prohibits more than one blower from simultaneously operating within 100 feet of another blower.
    6) On single-family residential property, the 70 dBA at 50 feet requirement would not apply to blowers operated on single-family residential property.
c) The City Code also exempts air conditioners, pool pumps, and similar equipment from the noise regulations, provided that they are in good working order.
d) Work related to public health and safety is exempt from the noise requirements.
e) Safety devices are exempt from the noise requirements.
f) Emergencies are exempt from the noise requirements.

In addition, Section 24 of the City of Davis Municipal Code establishes the noise violations which can be issued by the Davis Police Department. A Sound (Noise) Permit from the Police Department is required for the following uses:

- Amplified sound at any indoor or outdoor event and more than 100 people will attend; and

- Install, use or operate within the City a loudspeaker or other amplifying equipment in a fixed or moveable position or mounted upon any sound truck for purposes of giving instruction, directions, talks, addresses, lectures or transmitting music to any persons upon a street, alley, sidewalk, park, place or other outdoor property.

The Sound (Noise) Permit outlines the noise limits allowable under the permit as well as the requirements for a noise permit.

4.4.4 Impacts and Mitigation Measures

Existing literature, noise and vibration measurements, and application of accepted noise and vibration prediction and propagation algorithms were used to predict impacts due to and upon development of the proposed project. More specific detail on methodology is provided below.

Impacts of the environment on a project (as opposed to impacts of a project on the environment) are beyond the scope of required California Environmental Quality Act (CEQA) review. "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." (*Ballona Wetlands Land Trust v. City of Los Angeles,* (2011) 201 Cal.App.4th 455, 473 (*Ballona*).) The impacts discussed in this section of the EIR relate both to noise that may be caused by the proposed project (e.g. construction noise and operational traffic added to surrounding streets) as well as effects of existing environmental noise sources on residents and users of the project (e.g. background traffic on surrounding streets). The California Supreme Court recently held that "CEQA does not generally require an agency to consider the effects of existing environmental conditions on a proposed project's future users or residents. What CEQA does mandate… is an analysis of how a project might exacerbate existing environmental hazards." (*California Building Industry Assn. v. Bay Area Air Quality Management Dist.* (2015) 62 Cal.4th 369, 392; see also *Mission Bay Alliance v. Office of Community Investment & Infrastructure* (2016) 6 Cal.App.5th 160, 197 ["identifying the effects on the project and its users of locating the project in a particular environmental setting is neither consistent with CEQA's legislative purpose nor required by the CEQA statutes"], quoting *Ballona*, *supra*, 201 Cal.App.4th at p. 474.) Therefore, for the purposes of the CEQA analysis, the relevant inquiry is not whether the proposed project's future users or residents will be exposed to preexisting environmental noise-related hazards, but instead whether project-generated noise will exacerbate the pre-existing conditions. Nonetheless, for informational purposes, this section considers both the proposed project's contribution to on- and off-site noise levels as well as exposure of future users or residents of the proposed project to potential hazards associated with the preexisting noise environment.

Standards of Significance

Consistent with Appendix G of the CEQA Guidelines, the City's General Plan, and professional judgment, a significant impact would occur if the proposed project would result in the following:

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

airport, would the project expose people residing or working in the project area to excessive noise levels.

The first two thresholds listed above, taken from Appendix G of the CEQA Guidelines, are hereby defined more specifically for the City of Davis based upon General Plan and Noise Ordinance requirements, as well as previous EIRs prepared and certified by the Davis City Council:

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

  Section 24.02.240 of the City's Noise Ordinance is used, specifically,

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

     1) No individual piece of equipment shall produce a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.
     2) The noise level at any point outside of the property plane of the project shall not exceed eighty-six dBA.

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

  Transportation Noise Standards

  The General Plan establishes a threshold of 60 to 70 dB L_{dn} for transportation noise sources at existing residential uses and churches. The standards are used in conjunction with the substantial increase in noise levels described below.

  Table 4.4-6 is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, the recommendations are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}. Use of the standards is considered an industry-standard approach.

Based on Table 4.4-6, an increase in the traffic noise level of 5.0 dB or more would be significant where the pre-project noise level is below 60 dB L_{dn}. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB L_{dn}. The rationale for the Table 4.4-6 criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

Table 4.4-6
Significance of Changes in Noise Exposure

Ambient Noise Level Without Project, L_{dn}	Increase Required for Significant Impact
< 60 dB	+ 5.0 dB or more
60 to 65 dB	+ 3.0 dB or more
> 65 dB	+ 1.5 dB or more

Source: FICON, 1992.

For the purposes of this project, the FICON criteria shown in Table 4.4-6 are applied for transportation-related noise levels.

The test of significance for increases in off-site traffic noise is two-fold. First, traffic noise levels are reviewed to see if the project's contribution to traffic noise would exceed the FICON levels identified in Table 4.4-6. If the project's increase in traffic noise levels along surrounding roadways would exceed the FICON criteria shown in Table 4.4-6, the proposed project would be considered to have a significant noise impact along that roadway segment.

The second part of the significance test would be applied if the project does not result in the traffic noise level increases shown in Table 4.4-6 (i.e., the project does not exceed the FICON criteria). In this case, each roadway segment is assessed to determine:

1. Whether the project's traffic noise contribution would cause any new receptors along the roadway to be exposed to exterior noise levels exceeding the Table 4.4-4 and Table 4.4-5 standards (i.e., the City's General Plan Noise Element standards); and
2. Whether the project's traffic would cause any receptor locations already exceeding the values in Table 4.4-4 and Table 4.4-5 to experience a perceivable increase in noise at these locations, defined as 1.5 dB.

Non-Transportation Noise Standards

Non-transportation noise sources are determined by the standards of the City of Davis Municipal Code, Section 24.02.020. See Table 4.4-4 and Table 4.4-5 above.

For the purposes of analysis, an increase in noise levels of a 5-dB hourly L_{eq} level is used for determining a substantial permanent increase in ambient noise levels. The rationale for the 5 dB increase is based upon the fact that, as discussed earlier, 5 dB is the threshold where noise is "clearly perceptible", and for the proposed project, the stationary noise sources generally only occur a few hours out of each day, and are not a continuous noise source such as roadway traffic.

Interior Noise Standards

With regard to interior noise levels, modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Accordingly, sensitive receptors exposed to exterior noise levels of 70 dB L_{dn}, or less, would typically comply with the City's 45 dB L_{dn} interior noise level standard.

- **Generation of excessive groundborne vibration or groundborne noise levels**

  A limit of 0.2 in/sec p.p.v. is considered a safe criterion that would protect against architectural or structural damage.

Issues Not Discussed Further

The project site is located within a two-mile radius of the UC Davis Airport. However, the project site is located outside of the 55 dB CNEL noise level contour, which extends approximately 4,500 feet from either terminus of the airport's runway. Therefore, the Initial Study prepared for the proposed project (see Appendix C) determined that development of the proposed project would result in a less-than-significant impact related to the following noise-related issues:

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

Accordingly, the above impacts are not analyzed further in this EIR.

Method of Analysis

The analysis and conclusions in this Section of the EIR are based on the Environmental Noise Assessment prepared for the proposed project. All modeling details and calculations are provided in Appendix G. The results of the noise and vibration impact analyses were compared to the standards of significance discussed above in order to determine the associated level of impact.

j.c. brennan & associates, Inc. conducted noise level measurements to determine typical background noise levels for comparison to the project-related noise levels. On November 5 and 6, 2018, j.c. brennan & associates, Inc. staff conducted short-term noise level measurements and 24-hour noise level measurements on the project site to quantify the existing ambient noise environment in the project vicinity. Larson Davis Laboratories (LDL) Model 820 and Model 824 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

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

value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period.

Traffic volumes for existing conditions were obtained from the project traffic consultant, Fehr & Peers. A detailed summary of traffic volumes is provided in Section 4.6, Transportation and Circulation, of this EIR. All traffic calculations and data are listed in Appendix J of this EIR. All traffic noise calculations are also included in Environmental Noise Assessment in Appendix G to this EIR. Truck percentages and vehicle speeds on the local area roadways were estimated from field observations and Caltrans counts. Traffic noise levels were predicted at 75 feet from the centerline along each project-area roadway segment. The FHWA model was used to estimate traffic noise levels.

In addition to the traffic volumes obtained for existing conditions, traffic volumes were also provided by the traffic consultant for an Existing Plus Project and Cumulative Plus Project scenario. The cumulative context for noise impacts associated with the proposed project consists of the existing and future noise sources that could affect the project or surrounding uses. The scenarios are discussed in further detail in Section 4.6, Transportation and Circulation, of this EIR.

Construction noise and vibration was analyzed using data compiled for various pieces of construction equipment at a representative distance of 50 feet. Construction activities are discussed relative to the applicable City of Davis noise policies.

Project-Specific Impacts and Mitigation Measures

The following discussion of impacts is based on implementation of the proposed project in comparison with the baseline and standards of significance identified above.

4.4-1 Generation of a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Based on the analysis below and with implementation of mitigation, the impact is *less than significant.*

Construction activities associated with the proposed project, including demolition, improvements to parking lots, water and sewer lines, and related infrastructure, would require the use of numerous pieces of noise-generating equipment, such as excavating machinery (e.g., backhoes, bulldozers, excavators, front loaders) and other construction equipment (e.g., compactors, scrapers, graders). Construction worker traffic and construction-related material haul trips would raise ambient noise levels along local haul routes, depending on the number of haul trips made and types of vehicles used.

Table 4.4-7 presents the typical noise levels associated with various pieces of equipment that may be used during project demolition and construction activities. As shown in the table, activities involved in project construction could be expected to generate maximum noise levels ranging from 76 to 90 dB at a distance of 50 feet. The nearest sensitive receptor would be located within 50 feet to the north. As a result,

construction would result in periods of elevated ambient noise levels and the potential for annoyance.

Table 4.4-7
Construction and Demolition Equipment Noise

Type of Equipment	Predicted Noise Levels, L_{max} dB				Distances to Noise Contours (feet)	
	Noise Level at 20'	Noise Level at 50'	Noise Level at 100'	Noise Level at 200'	70 dB L_{max} contour	65 dB L_{max} contour
Backhoe	86	78	72	66	126	223
Compactor	91	83	77	71	223	397
Compressor (air)	86	78	72	66	126	223
Concrete Saw	98	90	84	78	500	889
Dozer	90	82	76	70	199	354
Dump Truck	84	76	70	64	100	177
Excavator	89	81	75	69	177	315
Generator	89	81	75	69	177	315
Jackhammer	97	89	83	77	446	792
Pneumatic Tools	93	85	79	73	281	500

Source: j.c. brennan & associates, Inc., 2019.

Based upon measured background noise levels, the existing maximum noise levels can be as high as 79 dBA. Assuming ambient maximum noise levels would occur during the same time when noise levels from construction would be 86 dBA (assuming compliance with the requirement of 86 dBA at the property plane as required in the Noise Ordinance [see Mitigation Measure 4.4-1]), the overall combined noise level could be as high as 86.8 dBA L_{max}. An increase in noise levels of 0.8 dB would not be perceptible to the human ear.

It should be noted that the proposed residential uses could result in short-term noise level increases associated with use of outdoor activity areas and other standard residential noise sources. However, outdoor activities would take place in interior courtyards shielded by the proposed buildings, and, thus, noise level increases would not be substantial. Additionally, short-term noise associated with the proposed residences would be consistent and compatible with existing residential uses in the project area. Any temporary noise-generating activities would be subject to applicable regulations within the City's Noise Ordinance. As such, short-term noise level increases associated with the proposed residential uses would be less than significant.

Nonetheless, based on the above, project construction activities could result in the generation of a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies, and a ***significant*** impact could occur.

Mitigation Measure(s)

Implementation of the following mitigation measure would reduce the above impact to a *less-than-significant* level.

4.4-1 *Prior to issuance of any grading permit, the applicant shall submit proposed noise-reduction practices (to ensure individual piece of equipment shall not produce a noise level exceeding 83 dBA at a distance of 25 feet and the noise level at any point outside the property plane of the project shall not exceed 86 dBA), for review and approval by the Department of Community Development and Sustainability. The following measures shall be utilized to reduce the impact of construction noise (below the above stated single-source and property boundary standards):*

- *Comply with the hours of operations between 7:00 AM and 7:00 PM on Mondays through Fridays, and between the hours of 8:00 AM and 8:00 PM on Saturdays and Sundays;*
- *Impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers;*
- *All equipment shall not exceed 86 dBA outside of the property line. Based upon Table 4.4-7, compactors, dozers and excavators shall maintain a distance of 50-feet from the north property line. Concrete saws and jackhammers shall maintain a distance of 100-feet from the nearest property line. If any equipment listed cannot provide either a housing or muffler, or other type of noise suppression equipment to reduce noise levels to 86 dBA or less outside of the property line, then approval by the Director of Public Works shall be required;*
- *If equipment such as compactors, dozers and excavators need to be within 50 feet of the north property line, temporary barriers such as "Noise Soaker" curtains shall be applied at the construction site fence. The barriers shall be eight feet in height along the north property line.*

4.4-2 Generation of a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. Based on the analysis below and with implementation of mitigation, the impact is *less than significant.*

The primary source of noise associated with the proposed residential and commercial development would be vehicle noise associated with traffic on local roadways. It should be noted that CEQA does not require an analysis of the existing environment's impact on the project; however, impacts to future residents of the proposed project due to traffic noise along local roadways is evaluated for the purposes of considering the project's consistency with policies in the City's General Plan.

Traffic Noise at Existing Sensitive Receptors

Vehicle trips associated with operation of the proposed project would result in changes to traffic on the existing roadway network within the project vicinity. As a result, project buildout would cause an increase in traffic noise levels on local roadways. To assess noise impacts due to project-related traffic increases on the existing local roadway network, noise levels have been calculated for the Existing and Existing Plus Project traffic conditions.

Table 4.4-8 shows the comparison between the existing and projected traffic noise levels with implementation of the proposed project. Traffic noise levels are predicted at locations that are assumed to be typical residential outdoor use areas along each project-area roadway segment. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Table 4.4-8 are generally considered by j.c. brennan & associates, Inc. to be conservative estimates of noise exposure along the project-area roadways.

Table 4.4-8
Existing and Existing Plus Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)			
		Distance (feet)	Existing	Existing plus Project	Change
Russell Boulevard	West of Arthur Street	75	66	66	0
Russell Boulevard	Arthur Street to SR 113	75	67	67	0
Russell Boulevard	SR 113 to Orchard Park	75	67	68	+1
Russell Boulevard	Orchard Park to Sycamore Lane	75	68	68	0
Russell Boulevard	Sycamore to Project Driveways	75	67	67	0
Russell Boulevard	Project Driveways to Anderson Road	75	68	68	0
Russell Boulevard	Anderson Road to College Park	75	68	68	0
Russell Boulevard	College Park to A Street	75	68	68	0
Russell Boulevard	A Street to B Street	75	68	68	0
Arthur Street	North of Russell Boulevard	75	61	61	0
Orchard Park	South of Russell Boulevard	75	60	60	0
Sycamore Lane	Russell Boulevard to S. University Mall Driveway	75	63	64	+1

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Table 4.4-8
Existing and Existing Plus Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)			
		Distance (feet)	Existing	Existing plus Project	Change
Sycamore Lane	S. University Mall Driveway to N. University Mall Driveway	75	62	63	+1
Sycamore Lane	North of Project Site	75	62	63	+1
La Rue Road	South of Russell Boulevard	75	66	66	0
Anderson Road	Russell Boulevard to Central University Mall Driveways	75	65	65	0
Anderson Road	Central University Mall Driveways to N. University Mall Drive	75	65	65	0
Anderson Road	North of Project Site	75	65	65	0
California Avenue	South of Russell Boulevard	75	61	61	0
Oak Avenue	North of Russell Boulevard	75	58	58	0
Howard Way	South of Russell Boulevard	75	63	63	0
College Park	North of Russell Boulevard	75	56	56	0
A Street	South of Russell Boulevard	75	58	58	0
A Street	North of Russell Boulevard	75	55	55	0
B Street	North of Russell Boulevard	75	62	62	0
B Street	South of Russell Boulevard	75	65	65	0

Notes: Distances to predicted traffic noise levels and traffic noise contours are measured in feet from the centerlines of the roadways.

Source: j.c. brennan & associates, Inc., 2018.

As shown in the table, noise along the roadway segments would not exceed the FICON criteria set forth in Table 4.4-6. An evaluation was also conducted as to whether the project's traffic noise contribution would cause any new receptors along roadways to be exposed to exterior noise levels exceeding the City's standards, and whether the project's traffic would cause any receptor locations already exceeding the City's standards to experience an increase of 1.5 dB of noise. Based on Table 4.4-8, the maximum expected noise level increase associated with a roadway segment would be 1 dB, which would not exceed the 1.5 dB increase standard.

As noted previously, sensitive receptors exposed to exterior noise levels of 70 dB L_{dn}, or less, will typically comply with the City's 45 dB L_{dn} interior noise level standard due to the noise attenuation provided by standard construction materials. As shown in the table, exterior traffic noise levels at the outdoor activity areas of the existing residences would be 68 dB L_{dn} or less, and the proposed project would not result in conflicts with

the City's 45 dB L_{dn} at existing residences under Existing Plus Project conditions. Therefore, transportation noise impacts at existing sensitive receptors in the project vicinity would not generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance.

Traffic Noise at New Sensitive Receptors

The proposed residential uses would be considered sensitive receptors and would be located approximately 345 feet from the Russell Boulevard centerline. The Cumulative Plus Project traffic scenario is used in order to accurately determine future noise levels at the proposed residences in conjunction with future development within the City. Under the Cumulative Plus Project scenario, listed in Table 4.4-10 below, the 60 dB L_{dn}/CNEL contour is located at a distance of 336 feet from the Russell Boulevard centerline. The nearest facade of the residential portion of the site would be located approximately 75 feet from the Sycamore Lane centerline. Under the Cumulative Plus Project scenario, the traffic noise levels from Sycamore Lane would be 63 dB L_{dn}/CNEL at the nearest on-site residential unit facades.

The proposed project would include a large common outdoor activity area with a potential pool and areas for relaxation at the interior of the residential portion of the site. The building facades would reduce traffic noise levels by a minimum of 10 dB. Thus, the overall traffic noise levels would be less than 55 dB L_{dn}/CNEL at the common outdoor area, which would be consistent with the City's 60 dB L_{dn}/CNEL exterior noise level standard.

Modern construction typically provides a 25-dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise levels of 70 dB L_{dn}, or less, would be exposed to interior noise levels of 45 dB, which would comply with the City's 45 dB CNEL/L_{dn} interior noise level standard. Exterior noise levels over 70 dB L_{dn} generally require specific upgrades to the building facades, such as upgraded STC rated windows, or details on wall construction improvements.

The predicted future traffic noise levels do not exceed 65 dB CNEL/L_{dn} at the lower floors of the nearest residential buildings. The upper floors are expected to be exposed to traffic noise levels of approximately 68 dB L_{dn}/CNEL. Therefore, the residential portion of the project would comply with the interior noise level standard of 45 dB L_{dn}/CNEL.

Based on the above, the proposed project would not exceed the applicable standards for exterior or interior noise levels, and, thus, would not generate a substantial permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the local general plan or noise ordinance.

Operational Noise at Existing Sensitive Receptors

The proposed project includes a loading and receiving area with two loading docks at the north side of the project site, adjacent to existing residential uses. The proposed project is anticipated to have a maximum of 20 to 28 large truck deliveries over a

seven-day period. Given that there are two proposed loading docks, it is assumed that up to two large eighteen-wheeler truck deliveries could occur per hour. A total of four retail spaces are located along the rear loading dock drive aisle, only two of which could receive deliveries along the north side of the project site. All other tenants would receive deliveries to the front of the stores.

Large 18-wheeler truck passbys and loading dock operations produce an average Sound Exposure Level (SEL) of 88 dBA at a distance of 50 feet. The estimate is based on j.c. brennan & associates, Inc. file date for truck deliveries at large super markets and includes deliveries, loading and unloading of trucks, and departures, as well as the use of back-up beepers, revving of engines, and air brake use, which may be used during arrivals/departures. It should be noted that the north elevations for the proposed loading dock include sealed loading pads. As a result, loading/unloading would be contained within the loading docks and the interior of the trucks. Additionally, the project includes a partial enclosure wall along the loading docks. The resulting truck circulation noise levels associated with large, 18-wheeler truck deliveries at a distance of 50 feet was estimated for the project to be 55 dBA L_{eq}.

In addition to the 18-wheeler truck deliveries, a maximum of four medium trucks, such as bread trucks, UPS, Federal Express, or similar, are assumed to occur per hour at the rear of the building in the loading areas. Medium truck deliveries generally result in an SEL of approximately 84 dBA at a distance of 50 feet. The four medium truck deliveries would result in an hourly L_{eq} of 54 dBA.

Pallet or baling equipment could be used in the loading area, but is anticipated to occur during daytime hours only.

All HVAC equipment would be located on the roof level of the proposed residential uses and would be shielded by parapets. The HVAC equipment could produce noise levels of 50 dBA at a distance of 50 feet. However, shielding from the roof-line and parapets would result in levels of less than 45 dBA at the nearest residences.

Conclusion

Based on the above, traffic noise at existing/proposed receptors would not exceed any of the applicable noise level standards. However, the total cumulative hourly noise level from all operational sources discussed above is anticipated to be 58 dB L_{eq} at the nearest sensitive receptors, which would exceed the daytime (7:00 AM to 9:00 PM) hourly noise level criterion of 55 dBA L_{eq} and the nighttime (9:00 PM to 7:00 AM) noise level criterion of 50 dBA L_{eq}. Therefore, a ***significant*** impact could occur related to the generation of a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

It is important to note that, with respect to the threshold related to a substantial permanent increase in ambient noise levels, stationary loading dock noises are not expected to increase substantially from the baseline. Based upon discussions with the project applicant and the City staff, the current on-site uses have regular truck deliveries in the rear area, similar to the proposed operations. Thus, the CEQA baseline, which, for the purposes of this EIR, is the time the notice of preparation

(NOP) was published by the City, pursuant to CEQA Guidelines Section 15125(a)(1), included loading dock operations similar to that which would occur under the proposed project. Therefore, this analysis reasonably concludes that the proposed project will not result in a significant increase in loading dock noise levels.

Mitigation Measure(s)

As part of the Environmental Noise Assessment, j.c. brennan & associates, Inc. conducted a barrier analysis. According to the analysis, a barrier of eight feet in height would be required to reduce overall noise levels associated with loading docks, truck circulation, and other outdoor noise sources to the daytime (7:00 AM to 9:00 PM) standard of 55 dBA L_{eq}, and a 10-foot barrier would be required to reduce noise levels to the nighttime (9:00 PM to 7:00 AM) standard of 50 dB L_{eq}. Therefore, implementation of the following mitigation measures would reduce the above impact to a *less-than-significant* level.

4.4-2(a) *Prior to building permit issuance, the construction drawings shall include a noise barrier located along the north property line of the project site where trucks circulate for the loading docks. The partial loading dock walls may be eliminated, if desired. Based upon the Environmental Noise Assessment (October 2, 2019) prepared for this EIR, the noise barrier height requirements would be different depending upon the delivery hours, as follows:*

- *Daytime deliveries only (7:00 AM to 9:00 PM): An eight-foot wall shall be required along the north property line of the project site to meet the City's 55 dB L_{eq} daytime noise standard.*
- *Daytime <u>AND</u> Nighttime (9:00 PM to 7:00 AM): A 10-foot wall shall be required along the north property line of the project site to meet the City's daytime (55 dB L_{eq}) and nighttime 50 dB L_{eq} noise standards.*

The delivery truck hours and sound wall height shall be finalized prior to City approval of the Final Planned Development for the project. Final design and height of the barrier shall be approved by the City of Davis Department of Community Development and Sustainability.

4.4-2(b) *Alternatively, the applicant may submit a subsequent acoustical report in conjunction with the submittal of the Final Planned Development to the City. The subsequent acoustical report, using additional design-level details developed during the Final Planned Development process, shall estimate the delivery truck/loading dock noise levels at the nearest sensitive receptors to verify the height of the wall needed to meet the City's stationary noise level standards (55 dB L_{eq} daytime and 50 dB L_{eq} nighttime). If the report determines that a reduced sound wall height, compared to the heights identified in MM 4.4-2(a), could achieve the City's noise standards at the nearest sensitive receptors, then the reduced height should be considered acceptable.*

The subsequent acoustical report could also consider the feasibility of relocating or eliminating the loading dock. Any proposed relocation would require analysis within the acoustical report to ensure that those sensitive receptors located closest to the relocated loading dock would not be subject to noise levels in excess of the City's noise level standards. Final loading dock design and barrier height shall be approved by the City of Davis Department of Community Development and Sustainability.

4.4-3 Generation of excessive groundborne vibration or groundborne noise levels. Based on the analysis below, the impact is *less than significant*.

The primary vibration-generating activities associated with the proposed project would occur during demolition and construction, when activities such as grading, utilities placement, and parking lot construction occur. Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 4.4-9 shows the typical vibration levels produced by demolition and construction equipment.

The most significant source of groundborne vibrations during the project demolition and construction would occur from the use of vibratory compactors, which may be used for compacting fill-soil where new foundations or footings may be required. Vibratory compactors would generate typical vibration levels of 0.21 in/sec p.p.v. at 25 feet, and 0.070 in/sec p.p.v. at a distance of 50 feet. The closest residential buildings to the project site where construction activities could include vibratory compactors are at a distance of approximately 50 feet. At a distance of 50 feet, groundborne vibration at the buildings would not exceed the Caltrans standard of 0.20 in/sec p.p.v. at which vibrations cause damage to buildings or the 0.10 in/sec threshold at which vibrations may cause annoyance to sensitive receptors.

Table 4.4-9
Vibration Levels for Various Construction Equipment

Type of Equipment	Peak Particle Velocity @ 25 feet (in/sec)	Peak Particle Velocity @ 50 feet (in/sec)
Large Bulldozer	0.089	0.029
Loaded Trucks	0.076	0.025
Pile Driving (Sonic)	0.734	0.50
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.029
Jackhammer	0.035	0.011
Vibratory Hammer	0.070	0.023
Vibratory Compactor/roller	0.210	0.070

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines, May 2006.

Therefore, construction vibrations associated with project construction are not predicted to cause damage to existing buildings or cause annoyance to sensitive

receptors. In addition, construction activities would be temporary in nature and, per Mitigation Measure 4.4-1, would be limited to normal daytime working hours.

Based on the above, implementation of the proposed project would not generate excessive groundborne vibration or groundborne noise levels, and impacts would be considered ***less than significant***.

Mitigation Measure(s)

None required.

Cumulative Impacts and Mitigation Measures

The following discussion of impacts is based on the implementation of the proposed project in combination with other cumulative development within the region. Refer to Chapter 5, Statutorily Required Sections, of this EIR for more detail regarding the cumulative setting.

4.4-4 Generation of a substantial permanent increase in ambient noise levels associated with cumulative development of the proposed project in combination with future buildout of the City's Planning Area. Based on the analysis below, the cumulative impact is *less than significant*.

Future development projects within the City's Planning area, including the proposed project, would incrementally affect the future cumulative ambient noise environment. To assess noise impacts due to project-related traffic increases on the existing local roadway network, noise levels have been calculated for the Cumulative Plus Project Condition at the proposed residences and at existing sensitive receptors located along area roadways.

Cumulative Traffic Noise at Existing Sensitive Receptors

Traffic noise occurring under the Cumulative Plus Project condition was modeled with the FHWA model using the assumptions discussed under the Method of Analysis section above. Table 4.4-10 displays the predicted noise level estimates at the exterior of the closest existing residents for Cumulative No Project and Cumulative Plus Project conditions.

Noise levels at existing sensitive receptors would continue to exceed the City's 60 dB exterior noise level threshold along a majority of the study roadway segments. However, the proposed project would result in a 1 dB increase or less on all traffic segments, which is below the 1.5 dB FICON threshold used to evaluate the significance of traffic noise increase along roadways. Based on the FICON noise level increase criteria shown in Table 4.4-6, none of the study roadway segments would experience a significant cumulative noise level increase as a result of project traffic. Therefore, the project's incremental contribution to cumulative traffic noise at existing sensitive receptors would not generate a substantial permanent increase in ambient noise levels associated with cumulative development of the City.

Sensitive receptors exposed to exterior noise levels of 70 dB L_{dn}, or less, will typically comply with the City's 45 dB L_{dn} interior noise level standard, due to 25-db exterior-to-

interior noise reductions with windows closed. As shown in the table, exterior traffic noise levels at the outdoor activity areas of the existing residences would be 70 dB L_{dn} or less for the roadway segments analyzed. Therefore, the proposed project would not result in conflicts with the City's 45 dB L_{dn} at existing residences under Cumulative Plus Project conditions.

Cumulative Traffic Noise at New Sensitive Receptors

As discussed above in Section 4.4.2 above, cumulative growth within the City would not expose new sensitive receptors at the project site to noise levels exceeding any standards set forth in the City's general plan, noise ordinance, or applicable standards set forth by other agencies.

Cumulative Operational Noise at Existing Sensitive Receptors

As discussed above, the proposed project would operate a loading dock and truck circulation area at the north end of the project site, approximately 50 feet from existing residences. The aforementioned operations would include noise sources from back up beepers, fork lifts, pallet and baling operations, and HVAC equipment. As concluded above, operation of all external equipment in the loading and truck circulation area could expose the nearest sensitive receptors to noise levels above the acceptable threshold of 55 dB in the loading area during the daytime hours of 7:00 AM to 9:00 PM. However, Mitigation Measure 4.4-2(a) would be implemented which would require development of a noise barrier between the loading area and the existing residences to the north. Upon construction of the sound barrier, noise levels would be reduced below the acceptable 55 dB threshold for residences.

Table 4.4-10
Cumulative and Cumulative Plus Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)			
		Distance (feet)	Cumulative	Cumulative plus Project	Change
Russell Boulevard	West of Arthur Street	75	67	67	0
Russell Boulevard	Arthur Street to SR 113	75	68	68	0
Russell Boulevard	SR 113 to Orchard Park	75	69	69	0
Russell Boulevard	Orchard Park to Sycamore Lane	75	69	69	0
Russell Boulevard	Sycamore to Project Driveways	75	68	68	0
Russell Boulevard	Project Driveways to Anderson Road	75	70	70	0
Russell Boulevard	Anderson Road to College Park	75	70	70	0
Russell Boulevard	College Park to A Street	75	70	70	0

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Table 4.4-10
Cumulative and Cumulative Plus Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels (L_{dn}, dB)			
		Distance (feet)	Cumulative	Cumulative plus Project	Change
Russell Boulevard	A Street to B Street	75	70	70	0
Arthur Street	North of Russell Boulevard	75	62	62	0
Orchard Park	South of Russell Boulevard	75	62	62	0
Sycamore Lane	Russell Boulevard to S. University Mall Driveway	75	64	64	0
Sycamore Lane	S. University Mall Driveway to N. University Mall Driveway	75	63	63	0
Sycamore Lane	North of Project Site	75	63	63	0
La Rue Road	South of Russell Boulevard	75	68	68	0
Anderson Road	Russell Boulevard to Central U Mall Driveways	75	66	66	0
Anderson Road	Central University Mall Driveways to N. University Mall Drive	75	65	66	+1
Anderson Road	North of Project Site	75	65	65	0
California Avenue	South of Russell Boulevard	75	62	62	0
Oak Avenue	North of Russell Boulevard	75	59	59	0
Howard Way	South of Russell Boulevard	75	63	63	0
College Park	North of Russell Boulevard	75	57	57	0
A Street	South of Russell Boulevard	75	60	60	0
A Street	North of Russell Boulevard	75	56	56	0
B Street	North of Russell Boulevard	75	64	64	0
B Street	South of Russell Boulevard	75	66	66	0

Notes: Distances to predicted traffic noise levels and traffic noise contours are measured in feet from the centerlines of the roadways.

Source: j.c. brennan & associates, Inc., 2019.

Future development of projects within the City's Planning Area would be required to comply with the same standards and regulations as the proposed project. Additionally, because the area surrounding the project site is predominately developed, unforeseeable development in the vicinity that could combine with the project would not be likely to occur. Thus, in combination with other cumulative development within

the City's Planning Area, the proposed project would not generate a substantial permanent increase in ambient noise levels associated.

Conclusion

Based on the above, both existing and proposed residences would not experience exterior or interior noise levels in excess of the City's 60 dB L_{dn} and 45 dB L_{dn} noise level standard from traffic in the vicinity. In addition, with construction of a noise barrier along the truck circulation drive for loading docks, Cumulative Plus Project operational noise levels at existing sensitive receptors would not conflict with the City's applicable exterior noise level standards.

Therefore, under Cumulative Plus Project Conditions, the proposed project would not result in a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The proposed project would not result in the generation of a substantial permanent increase in ambient noise levels associated with cumulative development of the proposed project in combination with future development of the City's Planning Area, and the impact would be ***less than significant***.

Mitigation Measure(s)

None required.