

Downtown Library Mixed-Use

Santa Cruz, CA

NOISE IMPACT ANALYSIS

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INTRODUCTION

This report summarizes our environmental noise impact analysis for the Downtown Mixed-Use Library project in Santa Cruz. The project consists of a new 307,968 square-foot, 8-story building in the Cedar Street Village Corridor of Downtown Santa Cruz. The project site spans the full block between Lincoln and Cathcart Street. The primary use is an approximately 38,000 square-foot public library facility with a main entrance at the mid-block point on Cedar, and a roof deck at the southwest corner of Cedar and Cathcart. A 16-child (minimum) daycare is proposed immediately adjacent to the library, with the outdoor play yard capitalizing on south and western light. Approximately 10,000 square feet of commercial use is programmed for the three levels at the southwest corner below the library roof deck with a two-story presence at the sidewalk.

The purpose of this study is to address CEQA compliance and potential impact of the project and its operation on property-line noise levels. Following is a summary of findings:

- Project traffic is not expected to significantly increase environmental noise to the surrounding properties.
- Noise impacts from construction and mechanical equipment would not be significant.

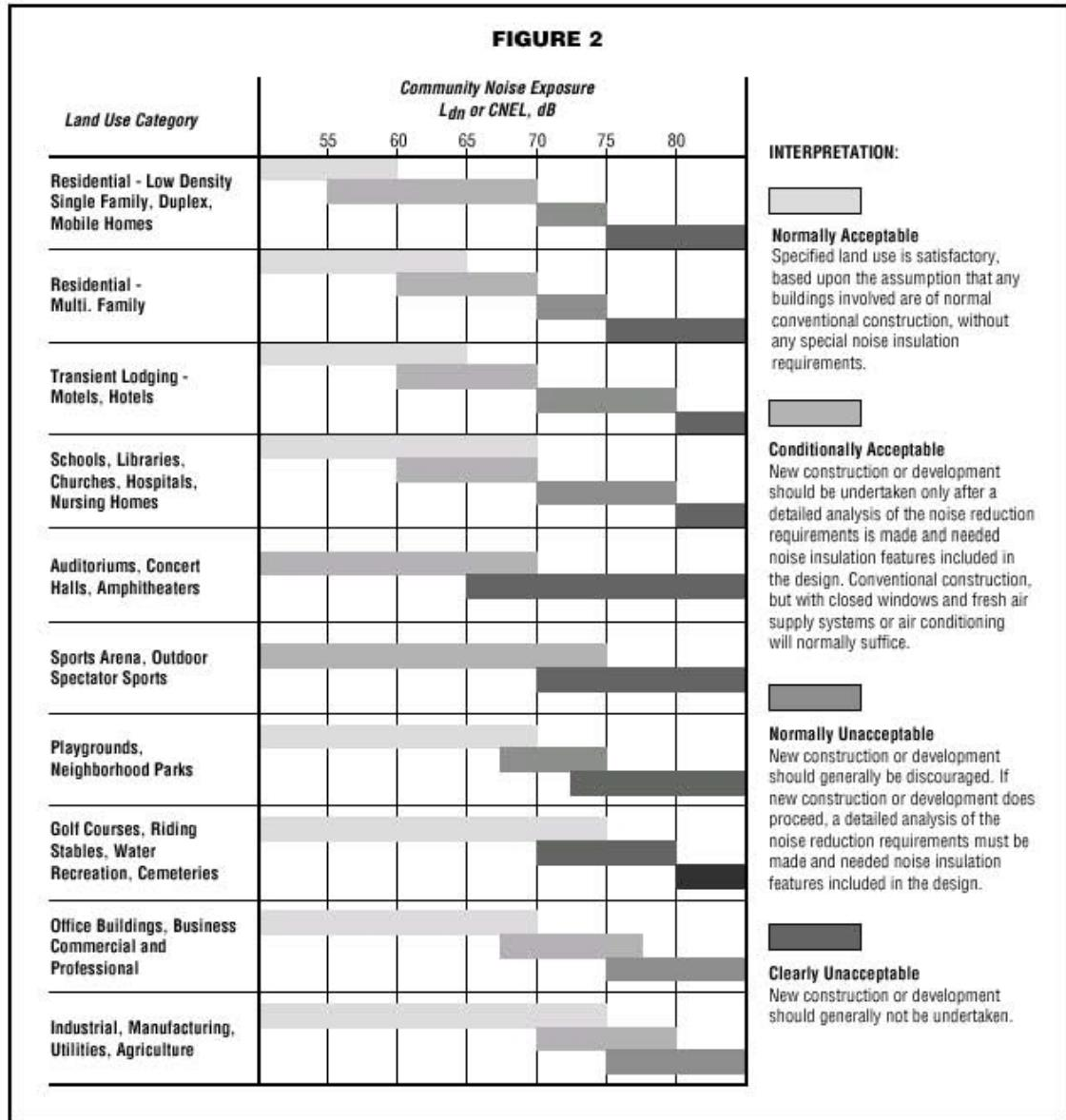
ACOUSTICAL CRITERIA

The City of Santa Cruz and State of California establish guidelines and policies designed to limit noise exposure at noise-sensitive land uses. In addition, the California Environmental Quality Act (CEQA) provides guidelines used to determine whether a project will have a significant impact on the environment.

City of Santa Cruz General Plan

Chapter 4.13 (Noise) of the City of Santa Cruz General Plan provides noise and land use compatibility guidelines for proposed developments as summarized below from the General Plan document (Table 4.13-2).

TABLE 4.13-2
Land Use – Noise Compatibility Standards



SOURCE: California Governor’s Office of Planning and Research

Section 4.13.3 of the General Plan states:

In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines (including Appendix G), City of Santa Cruz plans, policies and/or guidelines, and agency and professional standards, a project impact would be considered significant if the project would:

13a Expose persons to noise levels in excess of “normally acceptable” standards established in the State of California General Plan Guidelines’ (2003) “Noise Element Guidelines” for compatible community noise levels;

13b Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project if it will expose outdoor activity areas of noise-sensitive land uses to:

A 5 dB increase in noise where existing noise levels are below 60 dBA Ldn, or

A 3 dB increase in noise where existing noise levels are above 60 dBA Ldn.

13c Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or

13d Expose persons to or generate excessive groundborne vibration.

Santa Cruz Noise Ordinance

Noise from the project mechanical equipment is subject to the regulations of the City of Santa Cruz Municipal Code. Section 24.14.260 states the following:

*Noise Limits, Residential Property. No person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of the same, on residential property, a noise level **more than five dBA¹ above the local ambient**. The local ambient shall establish the maximum noise limit. More stringent noise limits may be established for specific uses through the conditions of a use permit.*

State CEQA Guidelines and Impact Criteria

The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of noise attributable to a proposed project. This would include (but is not limited to) added traffic noise, mechanical equipment noise, and construction noise. CEQA asks the following applicable questions. Would the project result in:

1. 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?
2. Generation of excessive groundborne vibration or groundborne noise levels?

1 A-Weighted Sound Level – The A-weighted sound pressure level, expressed in decibels (dB). Sometimes the unit of sound level is written as dB(A). A weighting is a standard weighting that accounts for the sensitivity of human hearing to the range of audible frequencies. People perceive a 10 dB increase in sound level to be twice as loud.

3. 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?

CEQA does not define the noise level increase that is considered substantial. Typically, the local general plan would establish limits for allowable noise and vibration increases, as discussed later in this report.

IMPACT DISCUSSION

Impact 1: Implementation of the proposed project could result in the 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.

Construction Noise

Construction activities would include use of heavy equipment for grading and other activities through completion of buildings and landscaping. Heavy trucks would travel to, from, and within the development areas to move soil, equipment, and building materials. Smaller equipment, such as jack hammers, pneumatic tools, and saws could also be used throughout each of the construction phases in various areas. The noise and vibration associated with these activities would be generated within the entire project area and at off-site locations near any infrastructure improvements.

The following construction equipment and phasing provided to us by Echelcon Inc. is shown in **Table 1**.

Table 1: Construction Phasing and Equipment List

Construction Phase	Equipment
Demolition	Concrete/Industrial saws
	Excavators
	Rubber-tired dozers
	Tractors/Loaders/Backhoes
Site Preparation	Graders
	Rubber-tired Dozers
	Tractors/Loaders/Backhoes
Grading/Excavation	Scrapers
	Excavators
	Graders
	Tractors/Loaders/Backhoes
Ground Improvement	Tractors/Loaders/Backhoes
	Crane for Caissons
	Bore/Drill Rig

Construction Phase	Equipment
Building Structure/Exterior	Cement Trucks
	Cranes
	Arial Lifts
	Forklifts
	Generator Sets
Building Interior/Architectural Coating	Welders
	Air compressor
	Aerial Lift Man Lift
Offsite/Onsite Improvements/Trenching	Cement and Mortar Mixers
	Pavers
	Paving Equipment
	Rollers
	Skid Steer Loaders Trenchers

The project is east of Cedar Street spanning the block from Lincoln Street to Cathcart Street. Existing commercial properties border the project to the east (along Pacific Avenue). The nearest residences are across Cedar Street approximately 155 feet away. Based on the construction phases and equipment list, estimated construction noise levels are expected to be as shown in **Table 2**. Some activities could be located closer for shorter periods of time, such as for site infrastructure.

Table 2: Estimated Construction Noise Levels

Phase	Estimated Maximum Instantaneous L _{max} Noise Level (dBA at 50 feet)	Estimated Maximum Hourly L _{eq} Noise Level (dBA at 50 feet) ²	Estimated Maximum Hourly L _{eq} Noise Level (dBA at 155 feet)
Demolition	85	78	68
Site Preparation	86	82	72
Grading/Excavation	88	84	74
Ground Improvement	88	80	70
Building Structure/Exterior	88	82	73
Building Interior/ Architectural Coating	86	80	70
Offsite/Onsite Improvements/Trenching	88	85	75

2 Construction noise levels are calculated using the equipment noise levels and acoustical usage factors from Section 9 of the Federal Highway Administration Highway Traffic Noise Construction Noise Handbook.

The hourly L_{eq} noise levels³ in **Table 2** are calculated from the center of the site and assume construction activities would remain in the same location, which is a conservative estimate. Actual construction noise levels will vary based on distance from the receiver and shielding from adjacent buildings and construction elements. Therefore, since construction noise will be variable throughout the construction period, the short-term increase is not considered significant.

Although a significant impact has not been identified, the following construction management best practices are recommended to reduce the impact of construction noise:

- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when adjoining construction sites. Construct temporary noise barriers or partial enclosures to acoustically shield such equipment where feasible.
- Prohibit unnecessary idling of internal combustion engines.
- Use back-up beepers only when required by law. Spotters or flaggers should be used in lieu of back-up beepers to direct backing operations when allowable.
- Minimize drop height when loading excavated materials onto trucks.
- Minimize drop height when unloading or moving materials on-site.
- Locate noisy equipment within the building structure once the exterior facade is installed.
- Route construction related traffic along major roadways and away from sensitive receptors where feasible.

The City of Santa Cruz General Plan 2030 states the following conclusion to the temporary increase in noise levels due to construction:

Adoption and implementation of the proposed General Plan 2030 would not directly result in new development, but new development accommodated by the plan would result in construction of varying sound level and duration, which could be an annoyance to adjacent residents. With implementation of the proposed General Plan 2030 includes goals, policies and actions that set forth measures to minimize exposure construction noise levels, the increase in temporary noise levels from construction-related activities would be considered less-than-significant.

Project Mechanical Equipment Noise

The library will be fully air-conditioned, and heating, ventilating, and air-conditioning units could be located in areas exposed to adjacent property lines. Based on previous measurements near the project site (October 2021), we determined that the lowest hourly L_{eq} noise level is 43 dBA, which represents the ambient noise level. Therefore, based on Municipal Code Section 24.14.260, the property line noise criterion for the project mechanical equipment is 48 dBA (i.e., ambient noise level plus five).

³ L_{eq} – The equivalent steady-state A-weighted sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period.

We received the following mechanical equipment noise levels to use in our analysis:

- Hot water pumps – 59 dBA sound pressure level at 1 meter
- Chilled water pumps – 62 dBA sound pressure level at 1 meter
- Air-handling units – 79 dBA sound power level
- Air-sourced heat pumps – 74 dBA sound pressure level at 1 meter
- Exhaust fan – 77 dBA sound power level
- Condensing units – 48 dBA sound pressure level at 1 meter

The project mechanical equipment will be limited to the roof and to the area between the library mezzanine and future residential community patio.

Our preliminary calculations indicate that noise levels from the mechanical equipment to the property lines to be as shown in **Table 3**. We have also included the calculated mechanical equipment noise level at the nearest residential property (517 Cedar Street). Our analysis includes shielding provided by the library mezzanine and residential portion of the project.

Table 3: Calculated Equipment Noise Levels

Property Line	Equipment Noise Level (dBA)	Equipment + Ambient Noise Level (dBA)	Criterion (dBA)
North	34	44	
East	37	44	
South	40	45	48
West	44	47	
Nearest Residence	41	45	

Depending on the final placement, as well as any parapets, barriers, and shielding (which would reduce noise levels at the property line), noise levels may vary. An acoustical engineer should review the design as it is developed to confirm noise levels and determine if additional design recommendations are required. However, the potential noise increases related to mechanical equipment is below the threshold considered in the General Plan 2030 EIR for potentially significant impacts

Traffic Noise

The project traffic consultant (Kimley Horn) provided a trip generation study for the entire project dated 23 December 2022. This study concluded that the library would result in a net increase of 52 new trips (vehicles) occurring during the AM peak-hour and 338 new trips occurring in the PM peak-hour. Overall, the library would result in a net increase of 2,653 daily trips. However, applying a 40% reduction for mixed-use development in Downtown Santa Cruz per the Santa Cruz Downtown Recovery Plan Amendment results in a net increase of 1,592 daily trips.

Additionally, the memo dated 6 August 2022 outlining the traffic analysis scope of work specifies that the majority of trips for the library component of the project would be limited to the primary access point and the immediately adjacent intersections, since the existing library is four blocks away. An analysis of existing versus existing plus project conditions shows an increase of less than 3 dB at all intersections studied, which is a less-than-significant increase in noise. The data provided in the cumulative buildout volumes for the City of Santa Cruz at nearby intersections shows an increase of 3 dB from existing to cumulative without the project for one intersection segment (#2 West). The cumulative plus project increase is 4 dB, however, this is due to the cumulative increase without the project, and is not a result of the subject project. Therefore, the addition of this project would not contribute to a significant increase in noise levels, and any potential noise increases related to cumulative plus project is below the threshold considered in the General Plan 2030 EIR for potentially significant impacts. See **Appendix A** for traffic noise calculation tables.

Impact 2: Implementation of the proposed project could result in the generation of excessive groundborne vibration or groundborne noise levels.

Primary vibration producing construction activities are likely to occur during demolition and site preparation with the use of dozers and drilling to clear the site and prepare the foundation of the buildings. Pile driving is not expected. The California Department of Transportation (Caltrans) Transportation and Construction Vibration Guidance Manual⁴ indicates that the risk of damage to “normal dwelling houses” may begin to occur at a limit of 0.2 in/sec PPV for transient vibration events. For continuous vibration, human annoyance may begin to occur at a limit of 0.1 in/sec PPV.

The nearest residential structures are located approximately 155 feet from the project site. The majority of the construction will occur setback from this property line. **Table 4** below indicates potential construction vibration levels of various pieces of equipment at 25 feet and 155 feet.

Table 4: Estimated Construction Vibration Levels

Equipment	Reference Vibration Level at 25 feet (in/sec PPV)	Reference Vibration Level at 155 feet (in/sec PPV)
Large Bulldozer	0.089	0.012
Caisson Drilling	0.089	0.012
Loaded Trucks	0.076	0.010
Jackhammer	0.035	0.005
Small Bulldozer	0.003	0.001
Excavator	0.020	0.003

As indicated in **Table 4**, vibration levels are not expected to exceed the 0.1 in/sec PPV threshold for human annoyance, or the 0.2 in/sec PPV threshold for damage to “normal dwelling houses” at the

4 Transportation and Construction Vibration Guidance Manual April 2020 (Caltrans document)

nearest residential properties. At receptors further setback, vibration levels would be expected to be even lower. Groundborne noise would also not be expected to be significant at these vibration levels.

Impact 3: Implementation of the proposed project could expose people residing or working in the project area to excessive noise levels 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.

The project site is not located in the vicinity of a private airstrip or airport land-use plan.



APPENDIX A

Existing vs. Existing Plus Project AM

Intersection	Segment	Existing	Existing Plus Project	Change in Noise Level (Ldn, dBA)
1	North AM	538	553	<1
	South AM	783	822	<1
	East AM	580	608	<1
	West AM	235	239	<1
2	North AM	760	799	<1
	South AM	329	690	0
	East AM	0	0	0
	West AM	157	207	1
3	North AM	78	82	<1
	South AM	230	236	<1
	East AM	181	230	1
	West AM	157	216	1
4	North AM	251	264	<1
	South AM	266	277	<1
	East AM	151	175	<1
	West AM	0	0	0
5	North AM	0	82	N/A*
	South AM	0	0	0
	East AM	158	217	1
	West AM	158	181	<1

*Segment is project driveway that does not currently exist

Existing vs. Existing Plus Project PM

Intersection	Segment	Existing	Existing Plus Project	Change in Noise Level (Ldn, dBA)
1	North PM	937	985	<1
	South PM	1238	1367	<1
	East PM	884	979	<1
	West PM	419	433	<1
2	North PM	1222	1350	<1
	South PM	1112	1146	<1
	East PM	0	0	0
	West PM	340	502	2
3	North PM	187	201	<1
	South PM	349	369	<1
	East PM	339	500	2
	West PM	295	490	2
4	North PM	500	541	<1
	South PM	428	462	<1
	East PM	270	345	1
	West PM	0	0	0
5	North PM	0	269	N/A*
	South PM	0	0	0
	East PM	296	491	2
	West PM	296	370	<1

*Segment is project driveway that does not currently exist

Existing vs. Cumulative vs. Cumulative Plus Project PM⁵

Intersection ⁶	Segment	Existing	Cumulative	Cumulative Plus Project	Change in Noise Level (Ldn, dBA)		
					Existing vs. Cumulative	Cumulative vs. Cumulative Plus Project	Existing vs. Cumulative Plus Project
1	North PM	937	1589	1637	<3	<1	<3
	South PM	1238	2003	2132	<3	<1	<3
	East PM	884	1589	1684	<3	<1	<3
	West PM	419	811	825	<3	<1	<3
2	North PM	1222	1884	2012	2	<1	<3
	South PM	1112	1601	1635	2	<1	2
	East PM	0	0	0	0	0	0
	West PM	340	737	899	3	<1	4

5 Cumulative traffic volumes are only available for the PM peak hour.

6 Cumulative Plus Project traffic volumes are only available at Intersections 1 and 2.

