

Riverfront Project
Santa Cruz, California

Environmental Noise Assessment

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Prepared for:

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Salter Project Number: 19-0645

INTRODUCTION

This report summarizes our environmental noise assessment for the Riverfront mixed-use project located at 412-508 Front Street in Santa Cruz, California. The project will consist of 175 for-rent dwelling units and approximately 11,500 square feet of ground floor retail in a 7-story building with underground and ground level parking. Outdoor activity areas include Level 7 decks and Levels 1 and 2 east-west passages through the site. The site is currently occupied by commercial/retail buildings and surface level parking.

This analysis is based on the Submittal Package plans and elevations dated 18 October 2019, and estimated noise levels from the tabulated future noise levels in the Santa Cruz General Plan EIR.

EXECUTIVE SUMMARY

Minimum sound insulation ratings for windows and exterior doors intended to meet the Code requirements are presented on Figures 1 and 2, attached. Minimum sound insulation ratings are up to STC 33.

ACOUSTICAL CRITERIA

City of Santa Cruz General Plan

Figure 2 of the Hazards, Safety, and Noise chapter of the Santa Cruz 2030 General Plan includes land use compatibility guidelines for environmental noise. Noise levels are characterized in terms of Day/Night Average Sound Levels¹ (DNL). The guidelines for multi-family residential and commercial projects are summarized in Table 1 below.

Table 1: Summary of Figure 2: Community Noise Exposure Guidelines

Multi-Family Residential Exterior DNL	Business Commercial Exterior DNL	Land-Use Compatibility Level for Multi-Family Residential
65 dB ² or less	70 dB or less	<i>Normally Acceptable</i> – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
60 to 70 dB	67 to 77 dB	<i>Conditionally Acceptable</i> – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
70 to 75 dB	75 dB or greater	<i>Normally Unacceptable</i> – New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
75 dB or greater	n/a	<i>Clearly Unacceptable</i> – New construction or development should generally not be undertaken.

¹ DNL (Day-Night Average Sound Level) – A descriptor for a 24-hour A-weighted average noise level. DNL accounts for the increased acoustical sensitivity of people to noise during the nighttime hours. DNL penalizes sound levels by 10 dB during the hours from 10 PM to 7 AM. DNL is sometimes written as Ldn.

² A-Weighted Sound Level (dB) — The sound level is obtained by use of a standard sound level meter and is expressed in decibels.

In addition, the General Plan includes goals for outdoor and indoor noise in residential projects. These are summarized as follows:

- HZ3.2.2: DNL 65 dB is identified as the target for noise in multi-family residential outdoor activity areas
- HZ3.2.3: DNL 45 dB is identified as the interior noise goal for residences

California Building Code (CBC)

The California Building Code limits indoor noise from outdoor sources to DNL 45 dB in habitable rooms of attached housing.³

The 2019 CALGreen Code provides both prescriptive and performance-based criteria for interior noise levels in non-residential spaces where day/night or hourly average sound levels exceed DNL or $L_{eq}(h)$ ⁴ 65 dB, which are summarized as follows:⁵

- Prescriptive method: Wall and roof-ceiling assemblies exposed to the noise source shall have a composite STC rating of at least 45, with exterior windows having a minimum STC rating of 40
- Performance method: Wall and roof-ceiling assemblies shall reduce average hourly noise levels to $L_{eq}(h)$ 50 dB, or lower, in occupied areas during any hour of operation

This analysis uses the CALGreen performance method to determine the necessary sound insulation at non-residential spaces.

NOISE ENVIRONMENT

The EIR for the General Plan 2030 contains existing and future year 2030 noise contours for the City of Santa Cruz, including in the project vicinity.⁶ Noise due to traffic on roadways adjacent to the site, as presented in the EIR, is summarized in Table 2, below.

Table 2: Environmental Noise per EIR for the General Plan 2030

Street	Existing Condition	Future Condition			
	DNL at 50 ft from Center of Roadway (dB)	DNL at 50 ft from Center of Roadway (dB)	Increase in DNL (dB)	DNL Contour Distances (ft)	
				60 dB	65 dB
Front	65	66	1.2	220	70
Soquel	65	66	1.3	220	70
Broadway	67	69	1.3	100	130

³ California Code of Regulations, Title 24, Part 2: 2019 California Building Code, Chapter 12, Section 1206: Sound Transmission.

⁴ L_{eq} (Time-Average Sound Level) – The average sound level for a specified measurement period (in this case, one hour), as described in ASTM 1686 and ANSI S1.1.

⁵ California Code of Regulations, Title 24, Part 11: 2019 California Green Building Standards Code, Chapter 5, Section 5.507.4: Acoustical Control.

⁶ Draft EIR General Plan 2030, City of Santa Cruz, Table 4.13-3

ANALYSIS AND RECOMMENDATIONS

Land Use Compatibility

Estimated future noise levels at the building facade range from approximately DNL 61 dB at interior, shielded portions of the site to DNL 70 dB, which falls into the City's *normally acceptable* to *conditionally acceptable* land use compatibility categories for multi-family residences. Estimated future noise levels at commercial facades range from approximately DNL 64 to 69 dB, which falls into the City's *normally acceptable* to *conditionally acceptable* categories. Exterior building assemblies will need to be sound-rated to reduce environmental noise to the criteria outlined above.

Exterior to Interior Noise

Residential

As indicated above, the interior noise goal is DNL 45 dB. Estimates suggest that window and exterior door sound insulation ratings of up to STC⁷ 33 will be needed, as indicated in Figures 1 and 2, attached. Estimates assume the following:

- Exterior walls will be equivalent to 7/8-inch thick stucco over wood sheathing with batt insulation in stud cavities and 1 layer of gypsum board on the interior
- The facade will consist of up to 40% glazing

Where no minimum recommended STC value is shown at residences on Figures 1 and 2, the estimated future noise level at the facade is less than DNL 65 dB.⁸

For reference, standard construction grade dual-pane windows and sliding glass doors typically have sound insulation ratings in the range of STC 26-28. Sound insulation ratings should be for the complete assembly, including glass and frame, and should be based on laboratory test reports of similar sized samples from an NVLAP accredited lab.

Ventilation systems should not compromise the sound insulation of the exterior wall assemblies. Because windows will need to be closed to meet the interior noise criterion, an alternate means of providing outside air to habitable spaces should be provided.

Commercial

As indicated above, the interior noise criterion for commercial spaces is $L_{eq}(h)$ 50 dB or lower. Commercial space is planned in Level 1 suites along Front Street and in Level 2 suites along the riverfront facade. Hourly L_{eq} data is not available for the site, however, DNL is often equal to the highest hourly L_{eq} . Assuming this is true for this site, the estimated highest future $L_{eq}(h)$ at commercial facades is 69 dB. The

⁷ STC (Sound Transmission Class) – A single-number rating defined in ASTM E90 that quantifies the airborne sound insulating performance of a partition under laboratory conditions. Increasing STC ratings correspond to improved airborne sound insulation.

⁸ The General Plan Draft EIR notes that "Since normal noise attenuation within residential structures with closed windows is about 20 dBA, an exterior noise exposure of 65 dBA Ldn allows the interior standard to be met without any specialized structural attenuation" (p. 4.13-7).

following minimum recommended storefront sound insulation ratings are intended to reduce noise to the criterion:

- Suites along Front Street, except Commercial C – STC 33
- Commercial C – STC 30
- Suites along the riverfront facade – no sound rating required (the estimated future noise level at the facade is less than DNL 65 dB)

These recommendations would apply to residential amenity spaces as well, if required to meet the criterion. Estimates assume 90% of the facade will consist of storefront assemblies and the ceilings will be sound-absorptive.

Outdoor Use Spaces

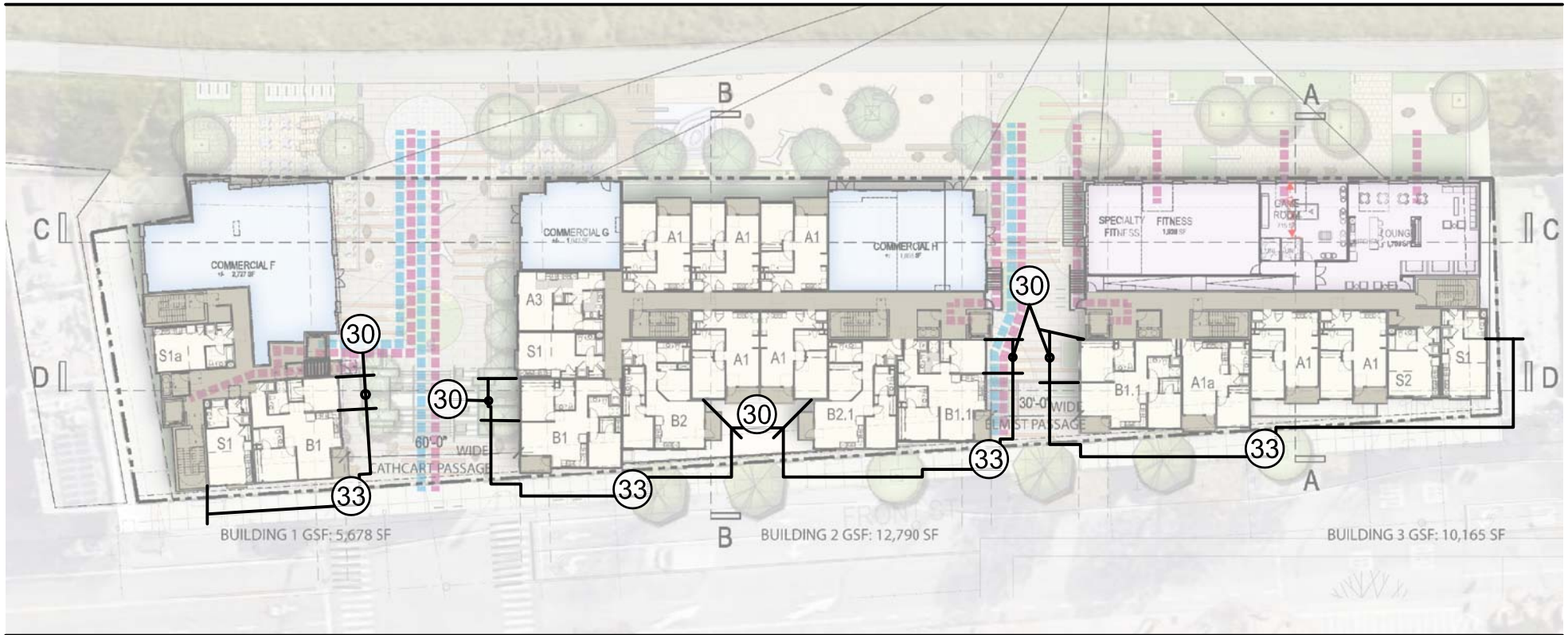
As indicated above, the outdoor noise target is DNL 65 dB. Outdoor activity areas include Level 7 decks and Levels 1 and 2 east-west passages through the site.

- Level 7 Decks – The estimated noise level at these spaces is approximately DNL 65 dB.
- Levels 1 and 2 Passages – The estimated noise level at the east-west passages is approximately DNL 63 to 69 dB, depending on location.

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NOTE: STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

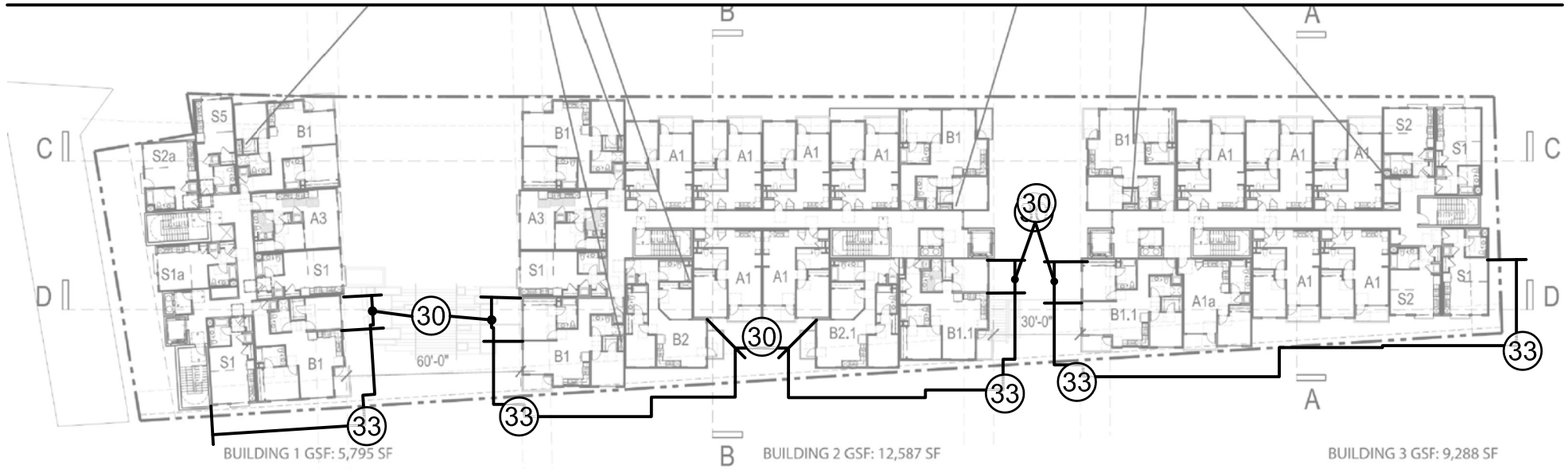
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RIVERFRONT MINIMUM RECOMMENDED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (LEVEL 2)

FIGURE 1

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RIVERFRONT MINIMUM RECOMMENDED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (LEVELS 3-7)

FIGURE 2

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