

25 May 2023

Richard Norris
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**Subject: 11 El Camino Real
Environmental Noise Study
Salter Project 21-0184**

Dear Richard:

As requested, we have conducted an environmental noise study for the project. The purpose of the study is to determine the noise environment at the proposed site, compare the measured data with applicable standards, and propose mitigation measures as necessary. This report summarizes the results of our study.

PROJECT CRITERION

The 2019 California Building Code requires that the indoor noise level in residential units of multi-family projects not exceed DNL¹ 45 dB. This is consistent with the City of San Carlos' policies for indoor noise intrusion.

We understand SummerHill is invoking the density bonus and will volunteer to target an instantaneous noise level (L_{\max}^2) of 55 dB for train passby events at bedrooms located throughout the project.

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- 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. For practical purposes, the DNL and CNEL are usually interchangeable. DNL is sometimes written as Ldn.
 - 2 L_{\max} (Maximum Sound Level) – The maximum sound level for a specified measurement period of time as defined in ASTM E1686.



NOISE ENVIRONMENT

The project site is in San Carlos and along El Camino Real Road, with Old County Road and Caltrain tracks to the east. The major noise source is traffic along El Camino with periodic train noise at the eastern train tracks.

To quantify the existing noise environment, we conducted two long-term noise measurements between 26 and 27 April 2021 (see **Figure 1** for measurement locations and measured noise levels). The monitor at El Camino Real was placed at a height of 12 feet above grade and the monitor at the Caltrain side was mounted at the roof of the currently existing CVS.

RECOMMENDATIONS

Using the Submittal 3 Set dated 24 May 2023, we calculated the STC³ ratings needed to meet the criteria. Our calculations assume the flooring is hard surfaced in all rooms.

Interior Spaces

California Building Code

To meet the indoor DNL 45 dB criterion, it will be necessary for the windows and exterior doors to have STC ratings as shown in **Figure 2 to 7**.

The recommended STC ratings are for full window assemblies (glass and frame) rather than just the glass itself. Tested sound-rated assemblies should be used. For reference, typical construction-grade assemblies achieve an STC rating of 28. Where STC ratings above 32 are required, at least one pane will need to be laminated.

Where windows need to be closed to achieve an indoor DNL of 45 dB, an alternative method of supplying fresh air (e.g., mechanical ventilation) should be considered. This applies to all of the locations where an STC rating is shown. This issue should be discussed with the project mechanical engineer.

3 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.

Single-Event Train Noise

We have also calculated the STC ratings needed at bedrooms to meet the L_{\max} 55 dB goal that SummerHill is targeting (these ratings are incorporated in **Figures 2 to 7**). Our calculations are based on the following design elements:

- Bedrooms will not be located at the building corners
- The facade facing the tracks will include staggered-stud walls

With Code-required windows and staggered-stud walls at the living rooms along the train tracks, we calculated noise levels from train passbys to be 61 to 65 dB.

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This concludes our environmental noise study for the 11 El Camino Real project. Please feel free to call if you have any questions.

Best,

SALTER



Matthew Hsiung
Senior Consultant



Eric Mori, PE
Senior Vice President

Enclosure

filepath



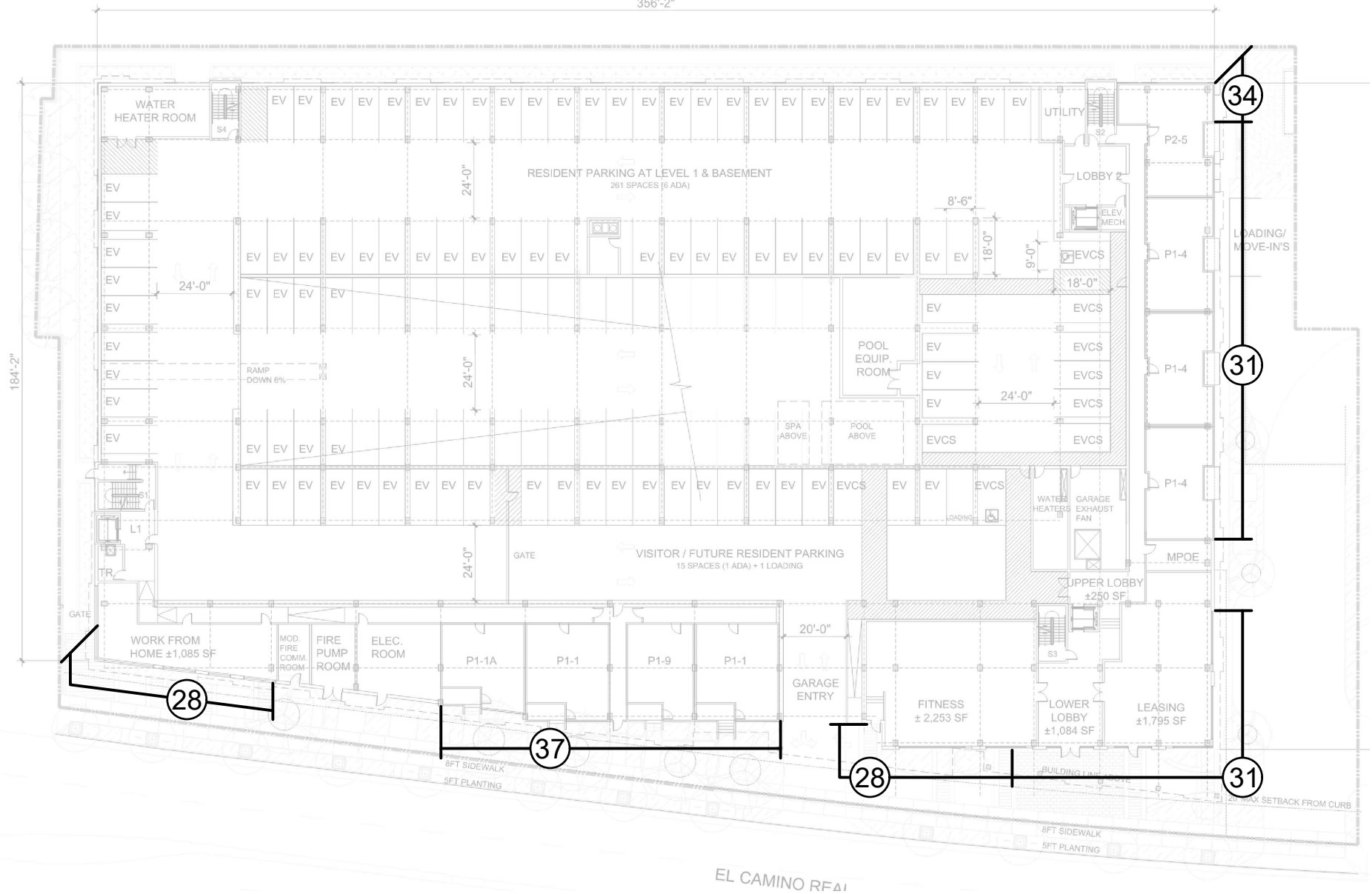
11 EL CAMINO REAL MEASUREMENT LOCATIONS AND MEASURED NOISE LEVELS

FIGURE 1

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MDH/EBM
05.10.21

356'-2"



NOTES: 1. STC RATINGS ARE FOR THE COMPLETE ASSEMBLY (E.G., GLASS, FRAME, AND OPERABLE SECTIONS) BASED ON TEST REPORTS FROM AN NVLAP-ACCREDITED LAB

2. * STAGGERED STUD ASSEMBLY

11 EL CAMINO REAL MINIMUM STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (FLOOR 1)

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FIGURE 2

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11 EL CAMINO REAL
MINIMUM STC RATINGS FOR
WINDOWS AND EXTERIOR DOORS (FLOOR 2)

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11 EL CAMINO REAL
MINIMUM STC RATINGS FOR
WINDOWS AND EXTERIOR DOORS (FLOOR 4)

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