

Acoustics
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28 February 2018

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Subject: **Waters Technology Park, San Mateo, CA –
Environmental Noise Study**
Salter Project 18-0092

Dear Bryan:

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 recommend mitigation measures as necessary. This report summarizes the results.

PROJECT CRITERIA

State Noise Standards

Section 1207.4 of the 2016 California Building Code requires that the indoor noise level in multi-family residences not exceed DNL¹ 45 dB where the exterior noise level is greater than DNL 60 dB.

City Noise Standards

The City of San Mateo Noise Element is consistent with the California Building Code standards and extends them to also apply to single-family residences.

Chapter 7, Section C, Policy N1.2 of the City Noise Element also states that exterior noise levels at common open spaces of multi-family land-uses must not exceed DNL 67 dB.

NOISE ENVIRONMENT

The project is located approximately 100 feet east of Highway 101 (U.S. 101). California State Route 92 (SR 92) is approximately 800-feet to the north of the site.

To quantify the existing noise environment, we conducted long-term noise measurements at the four edges of the site between 8 and 12 February 2018. The meters measured continuous noise levels and recorded "loud" noise events allowing us to identify the source of the noise (e.g., sirens, train horns,

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 L_{dn}.

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and plane flyovers). The meters were attached to trees and utility poles at an approximate height of 12 feet above grade. Figure 1 shows the measurement locations and measured DNL around the project site.

Based on our measured data, we calculated the expected DNL at the various facades and elevations. We do not yet have projected future traffic volumes for the roadways, so we have added one dB to the measured noise levels to account for future traffic increases².

ANALYSIS AND RECOMMENDATIONS

Using the 13 February 2018 drawings from Dahlin Group that show unit plans and elevations, we calculated the window and exterior door STC³ ratings needed to meet the project criteria. Our calculations are based on the following assumptions:

- Bedrooms and studies will have carpet
- All other rooms will have hard-surfaced flooring
- Residential ceilings will be approximately nine feet high
- The highway noise barrier located south of the project site will be extended northward (at the same height) for the full length of the site along U.S. 101.

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 dual-pane windows achieve an STC rating of 28. One-inch glazing assemblies (two 1/4-inch thick panes with a 1/2-inch airspace) achieve an STC rating of 32. Where STC ratings above 33 are required, at least one pane will likely need to be laminated.

Interior Noise

To meet the state's indoor DNL 45 dB criterion, it will be necessary for the facades to be sound-rated. The window and exterior door STC ratings will need to be as shown on Figures 2 and 3. Per the Code, sound-rated windows are only needed in "habitable" rooms. Therefore, bathrooms/powder rooms and garages do not require sound-rated windows.

Where sound-rated windows are needed, you should consider an alternative method of supplying fresh air (e.g., mechanical ventilation, z-ducts). This issue should be discussed with the project's mechanical engineer.

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² The California Department of Transportation assumes a traffic volume increase of three-percent per year, which corresponds to a one-dB increase in DNL over a ten-year period.

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.

Exterior Noise

Our calculations indicate that with the extended highway noise barrier, noise levels in the ground level common outdoor use spaces will range from DNL 63 to 65 dB, meeting the City's maximum allowable DNL 67 dB noise criteria.

Noise levels at the common roof decks of the nine-unit block buildings (B-1 through B-6) are calculated to be DNL 63 to 67 dB, also meeting the City's noise criteria.

* * *

This concludes our environmental noise study for the Waters Technology Park project. If you have any questions, please give us a call.

Sincerely,

CHARLES M. SALTER ASSOCIATES, INC.



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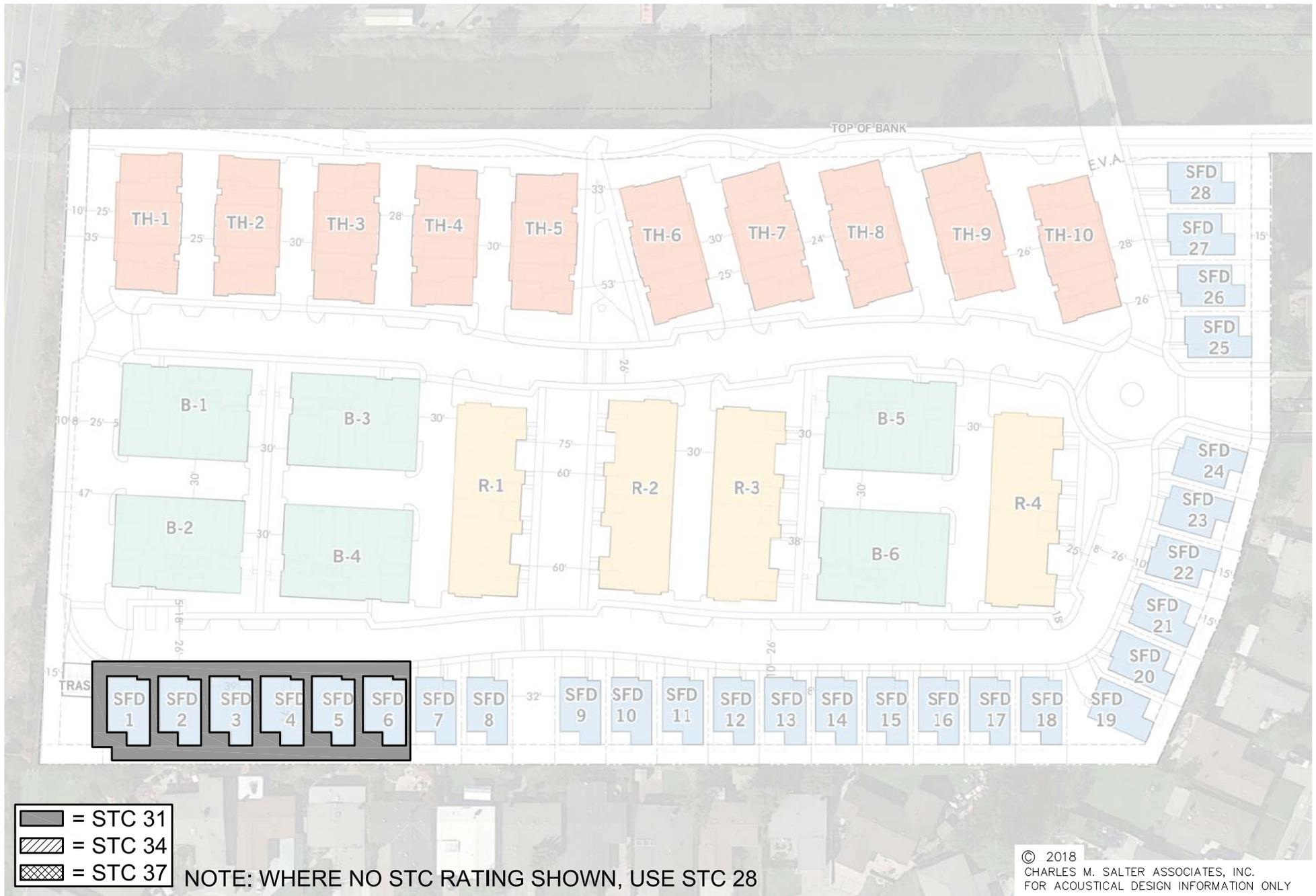


WATERS TECHNOLOGY PARK
MEASUREMENT LOCATIONS AND MEASURED
NOISE LEVELS

FIGURE 1

Salter #
18-0092

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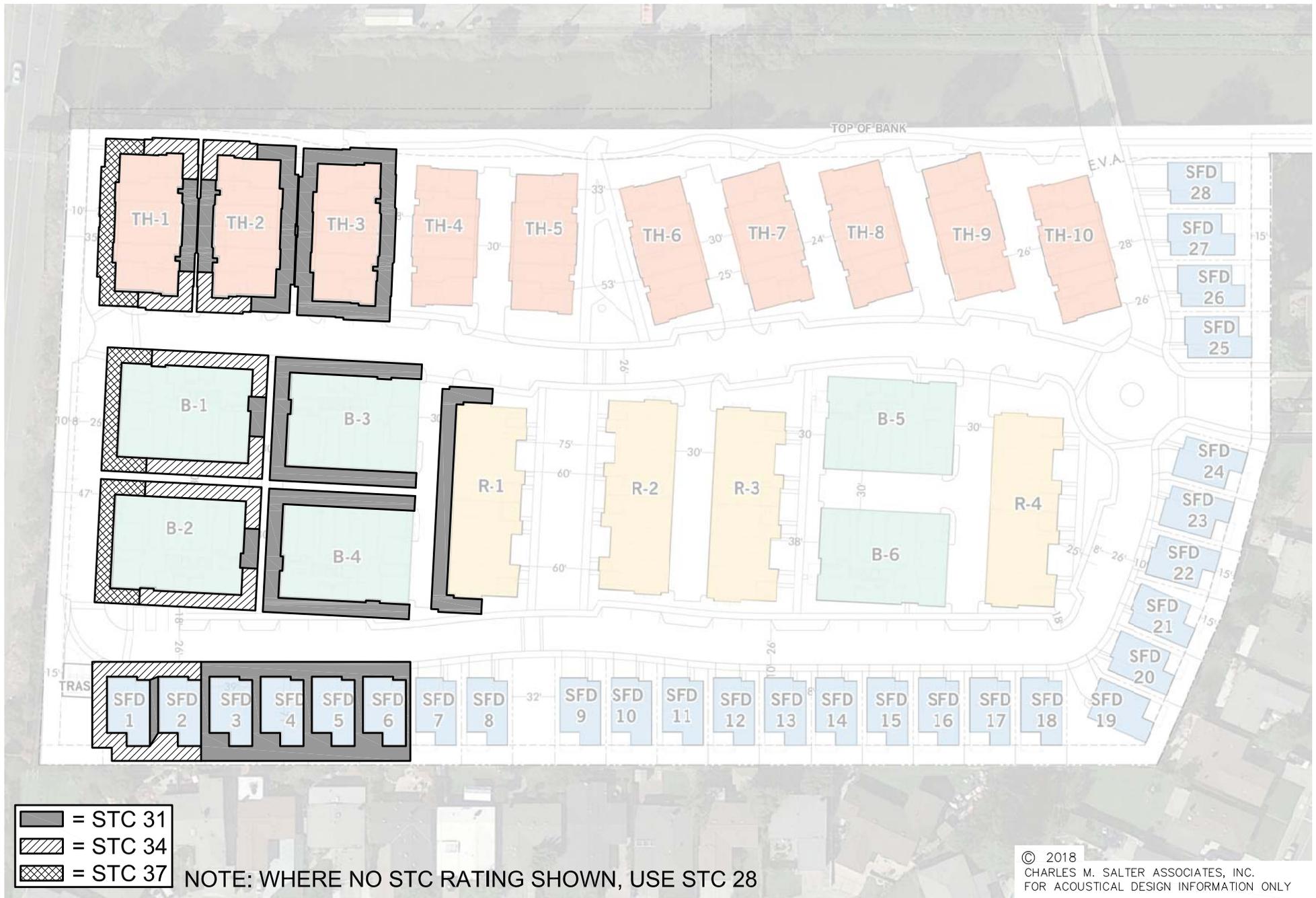


WATERS TECHNOLOGY PARK MINIMUM RECOMMENDED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (LEVEL 1)

FIGURE 2

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WATERS TECHNOLOGY PARK MINIMUM RECOMMENDED STC RATINGS FOR WINDOWS AND EXTERIOR DOORS (LEVELS 2 TO 4)

FIGURE 3

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